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

of XXX

**laying down ecodesign requirements for mobile phones, cordless phones and tablets
pursuant to Directive 2009/125/EC of the European Parliament and of the Council**

(Text with EEA relevance)

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WORKING DOCUMENT ON COMMISSION REGULATION (EU) .../...

of **XXX**

laying down ecodesign requirements for mobile phones, cordless phones and tablets pursuant to Directive 2009/125/EC of the European Parliament and of the Council

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to Article 114 of 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 products¹, and in particular Article 15(1) and Article 15(4)(a) 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 Communication from the Commission COM/2020/98 (A new Circular Economy Action Plan for a cleaner and more competitive Europe) strongly fosters the improvement of product durability, reusability, upgradability and reparability. Under the Circular Electronics Initiative, regulatory measures for mobile phones and tablets under the Ecodesign Directive, so that devices are designed for energy efficiency and durability, reparability, upgradability, maintenance, reuse and recycling, are announced.
- (3) A preparatory study² identified a number of areas for potential regulatory intervention, related to a) design for reliability (resistance to accidental drops, scratch resistance, protection from dust and water, battery longevity), b) ability of the product to be disassembled and repaired, c) availability of operating system version upgrades, d) data deletion and transfer functionalities, e) provision of appropriate information for users, repairers and recyclers and f) battery endurance.
- (4) The total primary energy consumption of the installed base in the EU27 of mobile phones and tablets in 2020 over their lifecycle was 39,5 TWh (thereof 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 tablets) which includes a major share of primary energy consumption in production outside the EU27. Of these 39,5 TWh the share

¹ OJ L 285, 31.10.2009, p. 10.

² 'Ecodesign preparatory study on mobile phones, smartphones and tablets', DOI 10.2873/175802

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 tablets. Without a regulation, these values will slightly decrease to 39,3 TWh (29,3 TWh, 1,5 TWh, 1,4TWh and 7,3TWh respectively for smartphones, mobile phones other than smartphones, cordless phones and tablets) of primary energy in 2030. The combined effect of an ecodesign and energy labelling regulation is expected to limit this 2030 value to 25,4 TWh (18,2TWh, 1,0 TWh, 1,1TWh and 5,2 TWh respectively for smartphones, mobile phones other than smartphones, cordless phones and tablets), saving around 33% on the primary energy consumption of smartphones, mobile phones other than smartphones, cordless phones and tablets.

- (5) The environmental aspects of smartphones, mobile phones other than smartphones, cordless phones and tablets in the scope of this Regulation that have been identified as significant for the purposes of this Regulation primarily relate to the manufacturing phase, which represents over 55% of the total greenhouse gases emissions.
- (6) 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 Council³.
- (7) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.
- (8) 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 this information relates to the requirements laid down in this Regulation.
- (9) For market surveillance purposes, manufacturers, importers or authorised representatives should be allowed to refer to the product database if the technical documentation as per Commission Delegated Regulation (EU) 20XX/XXX⁴ contains the same information.
- (10) To improve the effectiveness of this Regulation and to protect consumers, products that automatically alter their performance in test conditions to improve the declared parameters should be prohibited.
- (11) 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 products' environmental performance over their life cycle subject to this Regulation widely available and easily accessible, in accordance with Directive 2009/125/EC, Annex I, part 3, point (2).

³ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardization, 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).

⁴ Commission Delegated Regulation (EU) 2022/XXX *[full OJ-L references of Regulation EL smartphones/tablets]*

- (12) A review of this Regulation should assess the appropriateness and effectiveness of its provisions in achieving its goals. The timing of the review should allow for all provisions to be implemented and show an effect on the market.
- (13) [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

This Regulation establishes ecodesign requirements for the placing on the market of mobile phones, cordless phones and tablets.

Article 2

Definitions

For the purpose of this Regulation, the following definitions shall apply:

- (1) ‘mobile phone’ means a cordless handheld electronic device 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. It is designed for battery mode usage, and connection to mains via an external power supply is mainly for battery charging purposes;
- (2) ‘smartphone’ means a mobile phone characterized by WiFi connectivity, mobile use of internet services, and the ability to accept original and third-party software applications. A smartphone has an integrated touch screen display with a diagonal size between 4 and 7 inches. Devices with more than one and/or foldable displays are characterized as smartphones if at least one of the displays falls into the size range in either opened or closed mode;
- (3) ‘cordless phone’ means a cordless handheld electronic device designed for long-range voice communication over a landline telecommunications network, which is connected to a base station through a radio interface. It is designed for battery mode usage, and connection to mains via an external power supply is mainly for battery charging purposes;
- (4) ‘tablet’ means a type of notebook computer designed for portability that includes an integrated touch-sensitive display with a diagonal size greater than 7 inches but does not have an integrated, physical attached keyboard in its as-shipped configuration. A tablet relies on a wireless network connection, which might or might not be a telecommunications network, and is primarily powered by an internal battery (with connection to the mains for battery charging, not primary powering of the device). A tablet is furthermore characterized by an operating system, mobile use of internet services, and the ability to accept original and third-party software applications;
- (5) ‘battery endurance per cycle’ means the time a mobile phone or tablet can operate with an initially fully charged battery, running a defined test scenario, before the device shuts off automatically due to a drained battery, expressed in hours (h);
- (6) ‘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 (n);

- (7) ‘equivalent mobile phone, cordless phone or tablet’ means a model of a mobile phone, cordless phone or tablet placed on the market with the same technical and performance characteristics as regards generic and specific eco-design requirements as another model of a mobile phone, cordless phone or tablet placed on the market under a different commercial code number by the same manufacturer;

For the purposes of the Annexes, additional definitions are set out in Annex I.

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 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 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 include the information in the order and as set out in **Annex VI of Regulation (EU) 20YY/XXX [EL smartphones/tablets]**. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to Annex IV, point 2(g) of Directive 2009/125/EC, refer to the technical documentation uploaded to the product database which contains the same information laid down in Regulation (EU) 20YY/XXX [EL smartphones/tablets].

Article 5
Verification procedure for market surveillance purposes

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

Article 6
Circumvention

The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level for any of the parameters declared by the manufacturer, importer or authorised representative in the technical documentation or included in any documentation provided.

The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to update. No performance change shall occur as a result of rejecting the update.

A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

Article 7
Indicative benchmarks

The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Regulation 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 by *[4 years after its entry into force]*.

The review shall in particular assess:

- (a) the need to revise the scope definition to reflect market evolution;
- (b) the appropriateness to set specific ecodesign requirements on free fall test robustness of tablets;
- (c) the feasibility of defining a standardised battery, that could be used interchangeably across a range of mobile phones and tablets.

Article 11
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 xx.yy.zz.

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

Done at Brussels,

For the Commission
The President
Ursula VON DER LEYEN

Definitions applicable for the Annexes

For the purposes of the Annexes the following definitions shall apply:

- (1) 'base station' means a device, which acts as the bridge between the network connection (telephone or Internet connection) and one or several cordless phone handset(s), 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;
- (2) 'charging cradle' means a device, which acts as the charging unit for a cordless phone handset, but does not provide network connection functionality;
- (3) 'networked standby' is defined as in Regulation (EC) No 1275/2008;
- (4) ' P_n (W)' is the power consumption in networked standby mode, expressed in Watt and rounded to two decimal places;
- (5) 'spare part' means a separate part that can replace a part with the same or similar function in a mobile phone, cordless phone or tablet. The part is considered necessary for use if the mobile phone, cordless phone or tablet cannot function as intended without that part. The functionality of the mobile phone, cordless phone or tablet is restored or is upgraded when the part is replaced by a spare part;
- (6) 'display unit' means the image displaying unit, which might include electronics components and a unit housing and/or carrier elements, but excludes touch-sensitive parts;
- (7) 'display assembly' means the assembly of display unit and front panel digitizer unit;
- (8) 'front panel digitizer unit' means the touch-sensitive part including the front panel, which might include a bezel, including related electronics components;
- (9) 'failure analysis' means a process of collecting and analysing data to identify the part which causes a malfunction;
- (10) 'encryption' means a (reversible) transformation of data by a cryptographic algorithm to produce ciphertext, i.e. to hide the information content of the data;
- (11) 'key' means a sequence of symbols that controls the operation of a cryptographic transformation (e.g., encipherment, decipherment);
- (12) 'faulty operation' means a state, where a connection between a base station and a handset cannot be established, e.g. if one or more handsets are outside the radio range of the base station, if registered handsets are switched off by the user or they are no longer ready for use due to a low battery;
- (13) 'disassembly' means a process whereby a product is taken apart in such a way that it could subsequently be reassembled and made operational;
- (14) 'security updates' means operating system updates with the main purpose to provide enhanced security for the device;
- (15) 'functionality updates' means operating system updates with the main purpose to implement new functionalities, corresponding to the latest version of this operating system available in the market; a functionality update may include a security update;
- (16) 'state of charge' means the available capacity in a battery expressed as a percentage of rated capacity;
- (17) '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;
- (18) '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 batteries laid down in Annex II and that communicates with the appliance in which the battery is incorporated;

- (19) ' $C \text{ (h}^{-1}\text{)}$ ' is a measure of the rate at which a battery is charged relative to its capacity, defined as the charge current divided by the capacity, expressed in 1/h;
- (20) 'fast charging' means charging a battery at a charging rate of above $0,7C$ for at least part of the charging cycle;
- (21) '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;
- (22) ' $\text{END}_{\text{talk}} \text{ (h)}$ ' is the measured battery endurance per cycle for the function "phone call", expressed in hours;
- (23) ' $\text{END}_{\text{web}} \text{ (h)}$ ' is the measured battery endurance per cycle for the function "browsing the web", expressed in hours;
- (24) ' $\text{END}_{\text{video}} \text{ (h)}$ ' is the measured battery endurance per cycle for the function "playing a video", expressed in hours;
- (25) ' $\text{END}_{\text{standby}} \text{ (h)}$ ' is the measured battery endurance per cycle for the function "standby", expressed in hours;
- (26) ' $\text{END}_{\text{Device}} \text{ (h)}$ ' is the calculated battery endurance as calculated weighted value based on the measured endurance for defined functions, expressed in hours;
- (27) ' R_{cyc} ' means the recyclability rate, expressed in percent;

ANNEX II
Ecodesign requirements

Mobile phones other than smartphones

From 1 ~~xxx~~ 2023, mobile phones other than smartphones shall meet the following requirements:

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

- (1) availability of spare parts:
- (a) manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market, when present:
- battery;
 - back cover or back cover assembly;
 - front-facing camera assembly;
 - rear-facing camera assembly;
 - external connectors;
 - buttons;
 - microphone;
 - speaker(s);
 - hinge assembly;
 - mechanical display folding mechanism;
 - mechanical display rolling mechanism.
- (b) manufacturers, importers or authorised representatives shall either make available to end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market:
- battery;
- or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity and the device is at least dust tight and protected against immersion in water up to 1 meter depth.
- (c) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market:
- display unit;

- charger
 - (d) the list of spare parts concerned by point (a), (b) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from 6 months after placing the first unit of a model on the market and until the end of the period of availability of these spare parts;
 - (e) the repair instructions for parts concerned by points (b) and (c) shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from the placing on the market of the first unit of a model and until seven years after placing the last unit of the model on the market;
- (2) access to repair and maintenance information

From 6 months after placing on the market the first unit of a model and until seven years after placing the last unit of the model on the market, the manufacturer, importer or authorised representative shall provide access to the repair and maintenance information to professional repairers for parts concerned by point 1(a) in the following conditions:

- (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 require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair mobile phones, cordless phones and 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;
- (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 this information. A fee is reasonable 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 one 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 (a) shall include:
 - i. the unequivocal appliance identification;
 - ii. a disassembly map or exploded view;

- iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams, as required for failure analysis;
 - v. list of necessary repair and test equipment;
 - vi. technical manual of instructions for repair;
 - vii. diagnostic fault and error codes (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);
 - xi. software tools, firmware and similar auxiliary means required for full functionality of the spare part and device after repair, such as remote authorisation of serial numbers.
- (f) third parties shall be allowed to use and publish repair and maintenance information covered by point (e) once the manufacturer, importer or authorised representative terminates access to this information after end of the period of access to repair and maintenance information.
- (g) for access to information and tools referred to in (e, xi) the manufacturer, importer or authorised representative might require the owner of the device to notify the manufacturer, importer or authorised representative of the intended repair case
- (3) maximum delivery time of spare parts
- (a) During the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall ensure the delivery of the spare parts within 5 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) maximum price of spare parts
- (a) during the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall indicate a maximum pre-tax price for spare parts listed in points 1(a), 1(b) and 1(c) disclosed on the free access website of the manufacturer, importer or authorised representative mentioned under points 1(d) and 1(e). The stated maximum pre-tax price may not be increased after it has been published on the website.
- (5) disassembly requirements
- Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:
- (a) manufacturers, importers or authorised representatives shall ensure that the process for battery replacement meets either the following criteria:
- Fasteners and connectors: Reusable

- Tools: Feasible with the use of no tool, or a tool or set of tools that is supplied with the product or spare part, or basic tools
- Working environment: Use environment
- Skill level: Layman

or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity and the device is at least dust tight and protected against immersion in water up to 1 meter depth.

- (b) manufacturers, importers or authorised representatives shall ensure that the process for display unit replacement meets the following criteria:
 - Fasteners and connectors: Removable
 - Tools: Feasible with commercially available tools
 - Working environment: Workshop environment
 - Skill level: Generalist
- (c) manufacturers, importers or authorised representatives shall ensure, that joining, fastening or sealing techniques do not prevent the disassembly of parts concerned by points 1(a) using commercially available tools.
- (6) requirements for preparation for reuse
 - (a) manufacturers, importers or authorised representatives shall ensure, that devices include a software function, that resets the device to its factory settings and erases by default address book, text messages and call history;

1.2. Design for reliability

- (1) resistance to accidental drops

manufacturers, importers or authorised representatives shall ensure that the devices pass 200 falls (may be tested with protective cover, if shipped with product), and in any case 100 falls without cover, without loss of functionality, following the test procedure set out in Annex III; for devices with movable parts this requirement applies to both, the state in which the device is shipped and the fully extended state;
- (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.
- (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 1millimeter 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 percent remaining charge capacity.
- (5) battery management and fast charging

- (a) manufacturers, importers or authorised representatives shall ensure that by default the charging rate does not exceed 0,7C at any point during the charging process; fast charging may be available as an option, but needs to be activated by the user.
- (b) fast charging might be enabled by the user.
- (6) software updates
 - (a) manufacturers, importers or authorised representatives shall ensure the availability of security updates for at least 5 years and the availability of functionality updates for at least 3 years, at no costs
 - (b) the user shall have the option to de-install an operating system version update and to re-install the operating system version running on the device prior to the update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update.
 - (c) security updates mentioned under (a) need to be available to the user at latest 2 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 (a) need to be available to the user at latest 3 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

1.3. Marking of plastic components

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 are exempt from marking requirements in the following circumstances:

- the marking is not possible because of the shape or size;
- the marking would impact on the performance or functionality of the plastic component; and
- marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

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

1.4. Recyclability requirements

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 of Article 15 of Directive 2012/19/EU, make available, on a free-access website, the dismantling information needed to access the battery or batteries.
- (2) This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the battery or batteries.
- (3) The end of life information listed under points (1) and (2) 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

2.1 Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free-access websites the following information:

- (a) compatibility with removable memory cards, if any;
- (b) whether the semiconductor chips are produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions, separately for
 - SoC/CPU,
 - RAM,
 - Storage (flash memory only or including memory controller);
- (c) whether the display is produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions;
- (d) whether air cargo is involved in shipping the device from final assembly to the location where the product is put on the market in the European Union;
- (e) list of up to ten components, where electricity consumption is based on 100% renewable energy in the manufacturing stage with the highest electricity consumption of this particular supply chain;
- (f) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - Cobalt in the battery (weight range: less than 2 g, between 2 g and 10 g, above 10 g)
 - Tantalum in capacitors (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g)
 - 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)
 - Gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,05 g, above 0,05 g)
- (g) Recyclability rate R_{cyc}
- (h) Optionally, the percentage of recycled content for the product or a part thereof.
- (i) energy efficiency index (EEI) according to Annex III;

- (j) ingress protection rating;
- (k) minimum battery endurance in cycles in number of cycles;
- (l) minimum battery endurance in cycles under conditions of fast charging (if applicable) in numbers of cycles;

2.2 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) instructions for battery maintenance,
 - including impacts on battery lifetime related to exposing the device to elevated temperatures, state of charge, fast charging and other known adverse effects on battery lifetime;
 - including effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
 - if the device supports other features, which extend battery lifetime, such as smart charging and how these features are activated or under which conditions these features work best;
- (b) instructions for de-installation of operating system updates, and re-installation of the operating system version running on the device prior to an update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update

2.3 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 on the sales packaging of the device and shall include:

- (a) if the package does not include a charger the following information: “For environmental reasons this package does not include a charger. This device is compatible with <connector type> chargers.”

Smartphones

From 1 ~~xxx~~ 2023, smartphones shall meet the following requirements:

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

- (1) availability of spare parts:
 - (a) manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market, when present:
 - battery;
 - back cover or back cover assembly;
 - front-facing camera assembly;

- rear-facing camera assembly;
 - external connectors;
 - buttons;
 - microphone;
 - speaker(s);
 - hinge assembly;
 - mechanical display folding mechanism;
 - mechanical display rolling mechanism.
- (b) manufacturers, importers or authorised representatives of smartphones shall either make available to end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market:
- battery;
- or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity and the device is at least dust tight and protected against immersion in water up to 1 meter depth.
- (c) manufacturers, importers or authorised representatives of smartphones shall make available to professional repairers and end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until five years after placing the last unit of the model on the market:
- display assembly;
 - charger
- (d) the list of spare parts concerned by points (a), (b) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from 6 months after placing the first unit of a model on the market and until the end of the period of availability of these spare parts;
- (e) the repair instructions for parts concerned by points (b) and (c) shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from the placing on the market of the first unit of a model and until seven years after placing the last unit of the model on the market;

(2) access to repair and maintenance information

From 6 months after placing on the market the first unit of a model and until seven years after placing the last unit of the model on the market, the manufacturer, importer or authorised representative shall provide access to repair and maintenance information to professional repairers for parts concerned by point 1(a) in the following conditions:

- (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 require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair mobile phones, cordless phones and 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;
- (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 this information. A fee is reasonable 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 one 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 (a) shall include:
 - i. the unequivocal appliance identification;
 - ii. a disassembly map or exploded view;
 - iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams, as required for failure analysis;
 - v. list of necessary repair and test equipment;
 - vi. technical manual of instructions for repair;
 - vii. diagnostic fault and error codes (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);
 - xi. software tools, firmware and similar auxiliary means required for full functionality of the spare part and device after repair, such as remote authorisation of serial numbers.

- (f) third parties shall be allowed to use and publish repair and maintenance information covered by point (e) once the manufacturer, importer or authorised representative terminates access to this information after end of the period of access to repair and maintenance information.
- (g) for access to information and tools referred to in (e, xi) the manufacturer, importer or authorised representative might require the owner of the device to notify the manufacturer, importer or authorised representative of the intended repair case
- (3) maximum delivery time of spare parts
- (a) During the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall ensure the delivery of the spare parts within 5 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) maximum price of spare parts
- (a) during the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall indicate a maximum pre-tax price for spare parts listed in points 1(a), 1(b) and 1(c) disclosed on the free access website of the manufacturer, importer or authorised representative mentioned under points 1(d) and 1(e). The stated maximum pre-tax price may not be increased after it has been published on the website.
- (5) disassembly requirements
- Manufacturers, importers or authorised representatives shall meet the following disassembly requirements:
- (a) manufacturers, importers or authorised representatives shall ensure that the process for battery replacement meets either the following criteria:
- Fasteners and connectors: Reusable
 - Tools: Feasible with the use of no tool, or a tool or set of tools that is supplied with the product or spare part, or basic tools
 - Working environment: Use environment
 - Skill level: Layman
- or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity and the device is at least dust tight and protected against immersion in water up to 1 meter depth.
- (b) manufacturers, importers or authorised representatives shall ensure that the process for display assembly replacement meets the following criteria:
- Fasteners and connectors: Removable
 - Tools: Feasible with commercially available tools
 - Working environment: Workshop environment

- Skill level: Generalist
- (c) manufacturers, importers or authorised representatives shall ensure, that joining, fastening or sealing techniques do not prevent the disassembly of parts concerned by points 1(a) using commercially available tools.
- (6) requirements for preparation for reuse

manufacturers, importers or authorised representatives shall ensure, that devices

 - (a) encrypt user data by default;
 - (b) include a software function, that resets the device to its factory settings and erases by default the encryption key;
 - (c) record the following data from the battery management system in the system settings or another location accessible for end-users:
 - Date of manufacturing of the battery;
 - Date of first use of the battery;
 - Number of full charge/discharge cycles (reference: rated capacity);
 - Estimated state of health (full charge capacity relative to the rated capacity in %).

1.2. Design for reliability

- (1) resistance to accidental drops

manufacturers, importers or authorised representatives shall ensure that the devices pass 200 falls (may be tested with protective cover, if shipped with product), and in any case 100 falls without cover, without loss of functionality, following the test procedure set out in Annex III; for devices with movable parts this requirement applies to both, the state in which the device is shipped and the fully extended state;
- (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.
- (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 1millimeter 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 percent remaining charge capacity.
- (5) battery management and fast charging
 - (a) manufacturers, importers or authorised representatives shall ensure that by default the charging rate does not exceed 0,7C at any point during the charging process; fast charging may be available as an option, but needs to be activated by the user.
 - (b) fast charging might be enabled by the user.

- (6) software updates
- (a) manufacturers, importers or authorised representatives shall ensure the availability of security updates for at least 5 years and the availability of functionality updates for at least 3 years, at no costs
 - (b) the user shall have the option to de-install an operating system version update and to re-install the operating system version running on the device prior to the update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update.
 - (c) updates mentioned under (a) need to be available to the user at latest 2 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 (a) need to be available to the user at latest 3 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

1.3. Marking of plastic components

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 are exempt from marking requirements in the following circumstances:

- the marking is not possible because of the shape or size;
- the marking would impact on the performance or functionality of the plastic component; and
- marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

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

1.4. Recyclability requirements

- (1) Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 of Article 15 of Directive 2012/19/EU, make available, on a free-access website, the dismantling information needed to access the battery or batteries.
- (2) This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the battery or batteries.

- (3) The end of life information listed under points (1) and (2) 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

2.1 Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free-access websites the following information:

- (a) compatibility with removable memory cards, if any;
- (b) whether the semiconductor chips are produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions, separately for
 - SoC/CPU,
 - RAM,
 - Storage (flash memory only or including memory controller);
- (c) whether the display is produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions;
- (d) whether air cargo is involved in shipping the device from final assembly to the location where the product is put on the market in the European Union;
- (e) list of up to ten components, where electricity consumption is based on 100% renewable energy in the manufacturing stage with the highest electricity consumption of this particular supply chain;
- (f) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - Cobalt in the battery (weight range: less than 2 g, between 2 g and 10 g, above 10 g)
 - Tantalum in capacitors (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g)
 - 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)
 - Gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,05 g, above 0,05 g)
- (g) Recyclability rate R_{cyc}
- (h)
- (i) Optionally, the percentage of recycled content for the product or a part energy efficiency index (EEI) according to Annex III;
- (j) ingress protection rating;
- (k) minimum battery endurance in cycles in number of cycles;
- (l) minimum battery endurance in cycles under conditions of fast charging (if applicable) in numbers of cycles;

2.2 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:
 - Date of manufacturing of the battery;
 - Date of first use of the battery;
 - Number of full charge/discharge cycles (reference: rated capacity);
 - Estimated state of health (full charge capacity relative to the rated capacity in %).
- (b) instructions for battery maintenance,
 - including impacts on battery lifetime related to exposing the device to elevated temperatures, state of charge, fast charging and other known adverse effects on battery lifetime;
 - including effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
 - if the device supports other features, which extend battery lifetime, such as smart charging and how these features are activated or under which conditions these features work best;
- (c) instructions for de-installation of operating system updates, and re-installation of the operating system version running on the device prior to an update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update

2.3 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 instructions shall be displayed on the device under certain conditions and shall include:

- (a) information that data encryption is enabled by default shall be displayed in the course of configuring a new device, including an explanation that this eases data erasure through factory reset;
- (b) if fast charging is permanently selectable, a message shall notify the user that fast charging may have a negative impact on battery endurance.

2.4 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 on the sales packaging of the device and shall include:

- (a) if the package does not include a charger the following information: “For environmental reasons this package does not include a charger. This device is compatible with <connector type> chargers.”

Cordless phones

From 1 **xxx** 2023, cordless phones shall meet the following requirements:

1. LOW POWER MODES

Manufacturers, importers or authorised representatives shall ensure, that devices meet the following requirements:

- (1) the networked standby power consumption of cordless phones
 - shipped with a base station shall not exceed 0,4 W;
 - shipped with a charging cradle without base station functionality shall not exceed 0,2 W.
- (2) devices shall be configured in their factory settings to cut off the radio signals of the base station and handset (or handsets) in network standby mode. The base station must switch off its radio signal in this operating mode regardless of the number of registered handsets. This must also be ensured in the event of 'faulty operation'. Resetting the device to the factory settings must restore the configuration described above.

2. RESOURCE EFFICIENCY REQUIREMENTS

2.1. Design for repair and reuse

- (1) availability of spare parts:
 - (a) manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, for a minimum period from 6 months after placing the first unit of a model on the market until seven years after placing the last unit of the model on the market, when present:
 - display unit;
 - external connectors;
 - buttons;
 - microphone;
 - speaker;
 - (b) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until seven years after placing the last unit of the model on the market:
 - battery;
 - battery compartment cover;
 - charger
 - (c) the list of spare parts concerned by point (a) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from 6 months after placing the first unit of a model on the market and until the end of the period of availability of these spare parts;
 - (d) the list of spare parts concerned by point (b) and the procedure for ordering them and the repair instructions shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from the

placing on the market of the first unit of a model and until seven years after placing the last unit of the model on the market;

- (2) cordless phones shall be designed for the use of rechargeable batteries with standardised physical dimensions
- (3) access to repair and maintenance information

From 6 months after placing on the market the first unit of a model and until seven years after placing the last unit of the model on the market, the manufacturer, importer or authorised representative shall provide access to the repair and maintenance information to professional repairers in the following conditions:

- (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 require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair mobile phones, cordless phones and 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;
- (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 this information. A fee is reasonable 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 one 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 (a) shall include:
 - i. the unequivocal appliance identification;
 - ii. a disassembly map or exploded view;
 - iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams, as required for failure analysis;
 - v. list of necessary repair and test equipment;
 - vi. technical manual of instructions for repair;
 - vii. diagnostic fault and error codes (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);
 - xi. software tools, firmware and similar auxiliary means required for full functionality of the spare part and device after repair, such as remote authorisation of serial numbers.
- (f) third parties shall be allowed to use and publish repair and maintenance information covered by point (e) once the manufacturer, importer or authorised representative terminates access to this information after end of the period of access to repair and maintenance information.
- (g) for access to information and tools referred to in (e, xi) the manufacturer, importer or authorised representative might require the owner of the device to notify the manufacturer, importer or authorised representative of the intended repair case
- (4) maximum delivery time of spare parts
 - (a) During the period mentioned under points 1(a) and 1(b) the manufacturers, importers or authorised representatives of mobile phones, cordless phones and tablets shall ensure the delivery of the spare parts within 5 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 3 (a) and (b);
- (5) maximum price of spare parts
 - (a) during the period mentioned under points 1(a) and 1(b) the manufacturers, importers or authorised representatives shall indicate a maximum pre-tax price for spare parts listed in points 1(a) and 1(b) disclosed on the free access website of the manufacturer, importer or authorised representative mentioned under points 1(c) and 1(d). The stated maximum pre-tax price may not be increased after it has been published on the website.
- (6) disassembly requirements

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

 - (a) manufacturers, importers or authorised representatives shall ensure that the process for battery replacement meets the following criteria:
 - Fasteners and connectors: Reusable
 - Tools: Feasible with the use of no tool, or a tool or set of tools that is supplied with the product or spare part, or basic tools
 - Working environment: Use environment
 - Skill level: Layman

- (b) manufacturers, importers or authorised representatives shall ensure that the process for display unit replacement meets the following criteria:
 - Fasteners and connectors: Removable
 - Tools: Feasible with commercially available tools
 - Working environment: Workshop environment
 - Skill level: Generalist
 - (c) manufacturers, importers or authorised representatives shall ensure, that joining, fastening or sealing techniques do not prevent the disassembly of parts concerned by point 1(a) using commercially available tools.
- (7) requirements for preparation for reuse
- (a) manufacturers, importers or authorised representatives shall ensure, that devices includes a software function, that resets the device to its factory settings and erases by default address book, text messages and call history;

2.2. Marking of plastic components

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 are exempt from marking requirements in the following circumstances:

- the marking is not possible because of the shape or size;
- the marking would impact on the performance or functionality of the plastic component; and
- marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

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

2.4. Recyclability requirements

- (1) Manufacturers, importers or their authorised representatives shall ensure that joining, fastening or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU on WEEE or in Article 11 of Directive 2006/66/EC of the European Parliament and of the Council on batteries and accumulators and waste batteries and accumulators, when present.
- (2) Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 of Article 15 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 point 1 of Annex VII of Directive 2012/19/EU.

- (3) This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (4) The end of life information listed under points (1), (2) and (3) 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

3.1 Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free-access websites the following information:

- (a) compatibility with removable memory cards, if any;
- (b) whether the semiconductor chips are produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions, separately for
 - SoC/CPU,
 - RAM,
 - Storage (flash memory only or including memory controller);
- (c) whether the display is produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions;
- (d) whether air cargo is involved in shipping the device from final assembly to the location where the product is put on the market in the European Union;
- (e) list of up to ten components, where electricity consumption is based on 100% renewable energy in the manufacturing stage with the highest electricity consumption of this particular supply chain;
- (f) indicative weight range of the following critical raw materials and environmentally relevant materials:
 - Cobalt in the battery (weight range: less than 2 g, between 2 g and 10 g, above 10 g)
 - Tantalum in capacitors (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g)
 - 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)
 - Gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,05 g, above 0,05 g)
- (g) Recyclability rate R_{cyc}
- (h) Optionally, the percentage of recycled content for the product or a part thereof.

3.2 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 on the sales packaging of the device and shall include:

- (a) if the package does not include a charger the following information: “For environmental reasons this package does not include a charger. This device is compatible with <connector type> chargers.”

Tablets

From 1 ~~xxx~~ 2023, tablets shall meet the following requirements:

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) availability of spare parts:

- (a) manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, for a minimum period from 6 months after placing the first unit of a model on the market until six years after placing the last unit of the model on the market, when present:

- display unit;
- front panel digitizer unit;
- battery;
- back cover or back cover assembly;
- front-facing camera assembly;
- rear-facing camera assembly;
- external connectors;
- buttons;
- microphone;
- speaker(s);
- hinge assembly;
- mechanical display folding mechanism;
- mechanical display rolling mechanism.

- (b) manufacturers, importers or authorised representatives shall either make available to end-users at least the following spare parts, for a minimum period from 6 months after placing the first unit of a model on the market until six years after placing the last unit of the model on the market:

- battery;

or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity.

- (c) manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, for a

minimum period from 6 months after placing the first unit of a model on the market until six years after placing the last unit of the model on the market:

- charger
 - (d) the list of spare parts concerned by point (a), (b) and (c) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from 6 months after placing the first unit of a model on the market and until the end of the period of availability of these spare parts;
 - (e) the repair instructions for parts concerned by points (b) and (c) shall be publicly available on the free access website of the manufacturer, importer or authorised representative, from the placing on the market of the first unit of a model and until seven years after placing the last unit of the model on the market;
- (2) access to repair and maintenance information

From 6 months after placing on the market the first unit of a model and until seven years after placing the last unit of the model on the market, the manufacturer, importer or authorised representative shall provide access to repair and maintenance information to professional repairers for parts concerned by point 1(a) in the following conditions:

- (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 require the professional repairer to demonstrate that:
 - (i) the professional repairer has the technical competence to repair mobile phones, cordless phones and 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;
- (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 this information. A fee is reasonable 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 one 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 (a) shall include:

- i. the unequivocal appliance identification;
 - ii. a disassembly map or exploded view;
 - iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams, as required for failure analysis;
 - v. list of necessary repair and test equipment;
 - vi. technical manual of instructions for repair;
 - vii. diagnostic fault and error codes (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);
 - xi. software tools, firmware and similar auxiliary means required for full functionality of the spare part and device after repair, such as remote authorisation of serial numbers.
 - (f) third parties shall be allowed to use and publish repair and maintenance information covered by point (e) once the manufacturer, importer or authorised representative terminates access to this information after end of the period of access to repair and maintenance information.
 - (g) for access to information and tools referred to in (e, xi) the manufacturer, importer or authorised representative might require the owner of the device to notify the manufacturer, importer or authorised representative of the intended repair case
- (3) maximum delivery time of spare parts
- (a) During the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall ensure the delivery of the spare parts within 5 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 2 (b);
- (4) maximum price of spare parts
- (a) during the period mentioned under points 1(a), 1(b) and 1(c) the manufacturers, importers or authorised representatives shall indicate a maximum pre-tax price for spare parts listed in points 1(a), 1(b) and 1(c) disclosed on the free access website of the manufacturer, importer or authorised representative mentioned under points 1(d) and 1(e). The stated maximum pre-tax price may not be increased after it has been published on the website.
- (5) disassembly requirements
- Manufacturers, importers or authorised representatives shall meet the following disassembly requirements according to:

- (a) manufacturers, importers or authorised representatives shall ensure that the process for battery replacement meets either the following criteria:
- Fasteners and connectors: Reusable
 - Tools: Feasible with the use of no tool, or a tool or set of tools that is supplied with the product or spare part, or basic tools
 - Working environment: Use environment
 - Skill level: Layman
- or shall ensure that the battery endurance in cycles achieves a minimum of 1000 full charge cycles, and after 1000 full charge cycles the battery must, in addition, have in a fully charged state, a remaining capacity of at least 80 percent of the rated capacity.
- (b) manufacturers, importers or authorised representatives shall ensure that the process for display unit and front panel digitizer unit replacement each meet the following criteria:
- Fasteners and connectors: Removable
 - Tools: Feasible with commercially available tools
 - Working environment: Workshop environment
 - Skill level: Generalist
- (c) manufacturers, importers or authorised representatives shall ensure, that joining, fastening or sealing techniques do not prevent the disassembly of parts concerned by point 1(a) using commercially available tools.
- (7) requirements for preparation for reuse
- manufacturers, importers or authorised representatives shall ensure, that devices
- (a) encrypt user data by default;
- (b) include a software function, that resets the device to its factory settings and erases by default the encryption key;
- (c) record the following data from the battery management system in the system settings or another location accessible for end-users:
- Date of manufacturing of the battery;
 - Date of first use of the battery;
 - Number of full charge/discharge cycles (reference: rated capacity);
 - Estimated state of health (full charge capacity relative to the rated capacity in %).

1.2. Design for reliability

- (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.
- (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 percent remaining charge capacity

(5) battery management and fast charging

(a) manufacturers, importers or authorised representatives shall ensure that by default the charging rate does not exceed $0,7C$ at any point during the charging process; fast charging may be available as an option, but needs to be activated by the user.

(b) fast charging might be enabled by the user.

(6) software updates

(a) manufacturers, importers or authorised representatives shall ensure the availability of security updates for at least 5 years and the availability of functionality updates for at least 3 years, at no costs

(b) the user shall have the option to de-install an operating system version update and to re-install the operating system version running on the device prior to the update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update

(c) security updates mentioned under (a) need to be available to the user at latest 2 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 upgrades mentioned under (a) need to be available to the user at latest 3 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

1.3. Marking of plastic components

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 are exempt from marking requirements in the following circumstances:

- the marking is not possible because of the shape or size;
- the marking would impact on the performance or functionality of the plastic component; and
- marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

- packaging, tape, labels and stretch wraps;

- wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;
- PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
- transparent parts where the marking would obstruct the function of the part in question.

1.4. Recyclability requirements

- (1) Manufacturers, importers or their authorised representatives shall ensure that joining, fastening or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU on WEEE or in Article 11 of Directive 2006/66/EC of the European Parliament and of the Council on batteries and accumulators and waste batteries and accumulators, when present.
- (2) Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 of Article 15 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 point 1 of Annex VII of Directive 2012/19/EU.
- (3) This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (4) The end of life information listed under points (1), (2) and (3) 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

2.1 Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on free-access websites the following information:

- (a) compatibility with removable memory cards, if any;
- (b) whether the semiconductor chips are produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions, separately for
 - SoC/CPU,
 - RAM,
 - Storage (flash memory only or including memory controller);
- (c) whether the display is produced in a factory with a high reduction rate for fluorinated greenhouse gas emissions;
- (d) whether air cargo is involved in shipping the device from final assembly to the location where the product is put on the market in the European Union;
- (e) list of up to ten components, where electricity consumption is based on 100% renewable energy in the manufacturing stage with the highest electricity consumption of this particular supply chain;
- (f) indicative weight range of the following critical raw materials and environmentally relevant materials:

- Cobalt in the battery (weight range: less than 2 g, between 2 g and 10 g, above 10 g)
- Tantalum in capacitors (weight range: less than 0,05 g, between 0,05 g and 0,2 g, above 0,2 g)
- 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)
- Gold in all components (weight range: less than 0,02 g, between 0,02 g and 0,05 g, above 0,05 g)

(g) Recyclability rate R_{cyc}

(h) Optionally, the percentage of recycled content for the product or a part thereof.

(i) energy efficiency index (EEI) according to Annex III;

(j) ingress protection rating;

(k) minimum battery endurance in cycles in number of cycles;

(l) minimum battery endurance in cycles under conditions of fast charging (if applicable) in numbers of cycles;

(m) passed falls according to the methodology set out in Annex III

- with protective cover (if shipped with product)
- without protective cover
- fully extended state (applicable to devices with movable parts)

2.2 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:

- Date of manufacturing of the battery;
- Date of first use of the battery;
- Number of full charge/discharge cycles (reference: rated capacity);
- Estimated state of health (full charge capacity relative to the rated capacity in %).

(b) instructions for battery maintenance,

- including impacts on battery lifetime related to exposing the device to elevated temperatures, state of charge, fast charging and other known adverse effects on battery lifetime;
- including effects of switching off radio connections, such as WiFi, Bluetooth, on power consumption;
- if the device supports other features, which extend battery lifetime, such as smart charging and how these features are activated or under which conditions these features work best;

- (c) instructions for de-installation of operating system updates, and re-installation of the operating system version running on the device prior to an update, unless the device performance and microprocessor frequency remains at least the same when performing the same functions after an update

2.3 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 instructions shall be displayed on the device under certain conditions and shall include:

- (a) information that data encryption is enabled by default shall be displayed in the course of configuring a new device, including an explanation that this eases data erasure through factory reset;
- (b) if fast charging is permanently selectable, a message shall notify the user that fast charging may have a negative impact on battery endurance.

2.4 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 on the sales packaging of the device and shall include:

- (a) if the package does not include a charger the following information: “For environmental reasons this package does not include a charger. This device is compatible with <connector type> chargers.”

ANNEX III
Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards, or other reliable, accurate and reproducible methods, which takes into account the generally recognised state-of-the-art methods and are in line with the provisions set out below. The reference numbers of these harmonised standards have been published for this purpose in the Official Journal of the European Union.
2. In the absence of existing relevant standards and until the publication of the references of the relevant harmonised standards in the Official Journal, 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 shipped with a base station shall be tested for networked standby power consumption, with the following test settings,
 - (1) 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.
 - (2) The devices shall be measured in the condition as delivered to the end customer (factory setting).
 - (3) The power consumptions shall be measured as average power consumptions over a time period of 10 minutes.
 - (4) The measurements are to be carried out with a mains supply voltage of $230V \pm 1\%$.
4. Cordless phones shipped with a charging cradle shall be tested for networked standby power consumption, with the following test settings,
 - (1) Tests shall be performed with the charged handset placed on the charging cradle.
 - (2) The devices shall be measured in the condition as delivered to the end customer (factory setting).
 - (3) The power consumptions shall be measured as average power consumptions over a time period of 10 minutes.
 - (4) The measurements are to be carried out with a mains supply voltage of $230V \pm 1\%$.
5. Mobile phones and tablets shall be tested for battery endurance per cycle, consecutively with the following test settings, each with a fully charged battery:
 - (1) Phone call (mobile phones only)
 - all applications closed (except required system applications), all radios switched off except cellular network,
 - for Dual-SIM devices only 1 SIM card inserted; for Dual-SIM devices with eSIM, eSIM to be switched off; for devices with eSIM only, eSIM to be used,

- initiate 3G call, or 4G in case of no 3G capability; test setting with a base station simulator, sending constant “power up command” to the terminal, i.e. the phone is commanded to transmit at full power,
 - audio at 80% volume,
 - measure talk time (END_{talk}) until phone shuts off (screens may shut off during a call, if this is the default setting)
- (2) Browsing the web (smartphones and tablets only)
- display brightness set to 200 candela per square meter (cd/m²); automatic screen brightness adjustment disabled
 - 802.11n access point in short distance for full connectivity
 - running an automated script which reloads a webpage every ten seconds; no flash elements on the web pages
 - measure web browsing time (END_{web}) until phone shuts off
- (3) Playing a video (smartphones and tablets only)
- display brightness set to 200 candela per square meter (cd/m²); automatic screen brightness adjustment disabled
 - radios on the device switched off (airplane mode)
 - looping a standard-definition video
 - end-point: battery state of charge at 10% (END_{video})
- (4) Standby (mobile phones and tablets)
- all applications closed (except required system applications), all radios switched off except cellular network,
 - measure standby time ($END_{standby}$) until phone shuts off

The endurance score is an aggregated and normalised value in hours, as a calculated value derived from the four types of battery endurance per cycle tests.

Overall battery endurance (END_{device}) in hours is calculated as follows:

(a) smartphones:

$$END_{device} = \frac{24}{\left(\frac{1}{END_{talk}} + \frac{1}{END_{web}} + \frac{1}{END_{video}} + \frac{21}{END_{standby}}\right)}$$

(b) mobile phones other than smartphones:

$$END_{device} = \frac{24}{\left(\frac{1}{END_{talk}} + \frac{23}{END_{standby}}\right)}$$

(c) tablets:

$$END_{device} = \frac{24}{\left(\frac{1}{END_{web}} + \frac{1}{END_{video}} + \frac{22}{END_{standby}}\right)}$$

The energy efficiency index (EEI) of a mobile phone or tablet shall be calculated using the following equation:

$$EEI = \frac{END_{Device}}{C_{rated}}$$

Where:

C_{rated} is the rated battery capacity in mAh

6. Mobile phones and tablets shall be tested for battery endurance in cycles until the battery's usable electrical capacity has reached 80% of its rated capacity; the battery shall be tested
 - (a) according to the default charging algorithms implemented by the manufacturer, and
 - (b) with fast charging enabled (if applicable).

The resulting number of cycles shall be rounded down to full hundreds and stated as " $\geq x00$ ".

7. .

ANNEX IIIa

Transitional Methods

Table 1

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

Parameter	Source	Reference Test Method / Title	Notes
Disassembly requirements	CEN	EN 45554:2020	Fasteners and connectors: please refer to Table A.1 Tools: please refer to Table A.2 Working environment: please refer to Table A.4 Skill level: please refer to Table A.5
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 1millimeter and splashing of water: IP44
Rated capacity and battery endurance in cycles	CENEL EC	IEC EN 61960-3:2017	
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	

high reduction rate for fluorinated greenhouse gas emissions	IEEE	IEEE 1680.1	<p>a. for displays, deviating from IEEE 1680.1, demonstrating that F-GHG emissions have been reduced by at least 90% by all fabs</p> <p>b. deviating from IEEE 1680.1, for CPU/SoC, RAM, flash memory each $\geq 70\%$ F-GHG emission reduction if F-HTF emissions are included in the reduction assessment and $\geq 75\%$ if F-HTF emissions are excluded from the assessment, for all fabs manufacturing one of the covered semiconductor components</p>
electricity consumption based renewable energy	EECS		evidence based on Guarantees of Origin under the European Energy Certificate System or a similar scheme in non-EU, non-EFTA countries to be provided
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 \pm 5) °C, relative humidity 10% to 80%, ambient light (250 \pm 50) Lux
Free fall tests	IEC	IEC 60068-2-31, Free fall repeated – Procedure 2	<p>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 3 units pass the test.</p> <p>Tablets shall be tested for resistance to accidental drops, fall height 1 meter; the test has to be performed with 5 units consecutively. The free fall test shall be interrupted after 50, 100, 150 falls and terminated after 200 falls to verify, if full functionality of the device is still given. The number of falls passed by at least 3 out of 5 units is the value to be stated in user instructions as set out in Annex II.</p>
R _{cyc}		EN 45555:2019	<p>To be calculated as mass based recyclability rate, with the following reference end-of-life scenario:</p> <ul style="list-style-type: none"> 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

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 these values with a view to achieving compliance or to communicate better performance by any means.

Where a model has been designed to be able to detect it is being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, 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),(d) and (e), except for the requirement referred to in Annex II.1.2.1 [*resistance to accidental drops*], where the test shall be performed with five units of the model pursuant to points 2(a),(b),(c),(d) and (f), and except for the requirement referred to in Annex II.1.2.4 [*battery endurance in cycles*], where the test shall be performed with five units of the model pursuant to points 2(a),(b),(c),(d) and (g).
2. The model shall be considered to comply with the applicable requirements if:
 - (a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these 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; and
 - (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; and
 - (c) when the Member State authorities check the unit of the model, they check whether the manufacturer, importer or authorised representative has put in place a system that complies with the requirements in the second paragraph of Article 6; and
 - (d) when the Member State authorities check the unit of the model, it complies with the requirements in *Annex II*; and
 - (e) 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 2.
 - (f) 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 these measurements) comply with the respective pass rate as given in Table 3.

- (g) 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) comply with the respective verification tolerances as given in Table 2.
3. If the results referred to in point 2(a), (b), (c), (d) or (g) 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(e) 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(f) is not achieved, the Member State authorities shall select ten 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 2
7. The model shall be considered to comply with the applicable requirements if for these ten units tested pursuant to point 5, where applicable, the pass rate complies with the respective values given in Table 3.
8. If the result referred to in points 6 and 7 is 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 points 3, 6, 7 or 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 2 and shall use only the procedure described in points 1 to 9 for the requirements set out in this Annex. For the parameters in Table 2, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 2

Verification tolerances

Parame	Verificationtoler
battery endurance per cycle (END _{device} [h])	The determined value ^a shall not be more than 2 hours lower than the declared value.
battery endurance in cycles – default settings [cycles]	The determined value ^a shall not be more than 20 cycles lower than the declared value.
battery endurance in cycles – fast charging [cycles]	The determined value ^a shall not be more than 20 cycles lower than the declared value.

rated battery capacity (C_{rated} [mAh])	The determined value ^a shall not be more than 10% higher than the declared value.
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^a 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 3
Pass rates for measured parameters

Parameters	Pass rate
repeated free fall reliability	The determined value ^a corresponding to the declared value shall be met by at least 40 % of the tested devices.

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 other than smartphones:

- (a) Resistance to accidental drops
- (b) Scratch resistance
- (c) ingress protection rating: IP 68;
- (d) battery endurance per cycle:
- (e) battery endurance in cycles:

Smartphones

- (f) Resistance to accidental drops: 200 falls without protective cover;
- (g) Scratch resistance: 6;
- (h) energy efficiency index (EEI) according to Annex III: 0,045 h/mAh;
- (i) ingress protection rating: IP68 (in combination with user-replaceable battery);
- (j) battery endurance per cycle: 63 hours talk time, 35 hours web browsing, 28 hours video playback;
- (k) battery endurance in cycles: 1000 cycles;
- (l) battery endurance in cycles under conditions of fast charging (if applicable): not available;

Tablets

- (m) Resistance to accidental drops
- (n) Scratch resistance
- (o) energy efficiency index (EEI) according to Annex III;
- (p) ingress protection rating: IP68;
- (q) battery endurance per cycle:
- (r) battery endurance in cycles: 1000 cycles;
- (s) battery endurance in cycles under conditions of fast charging (if applicable):