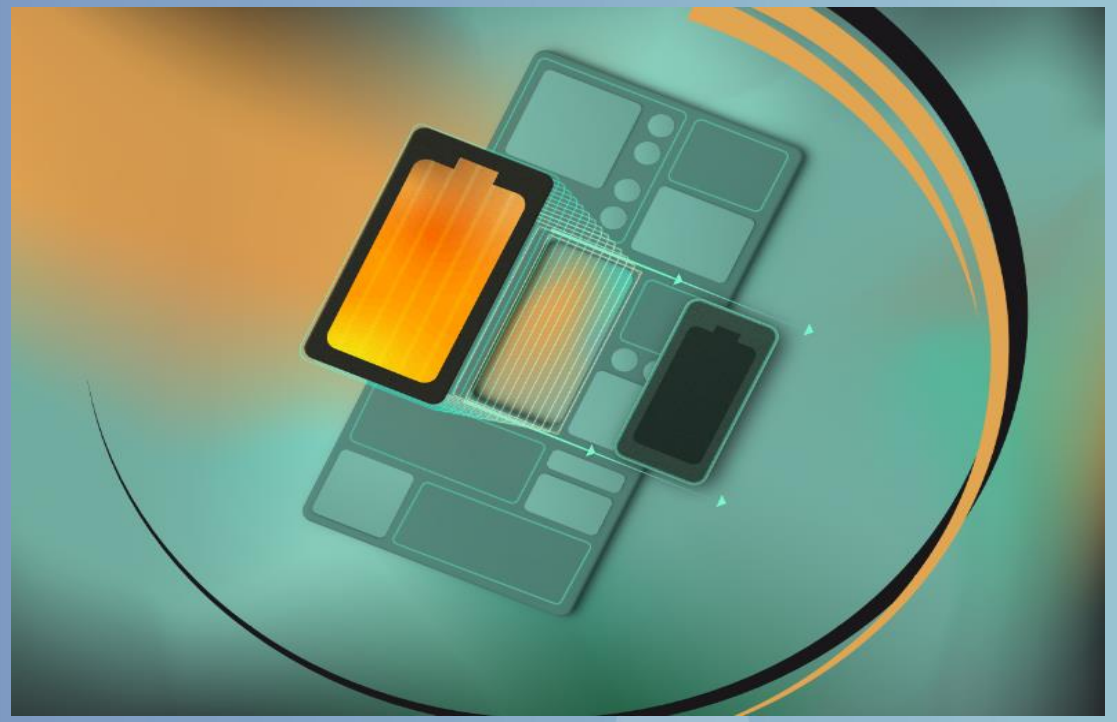
Battery Removability and Replaceability

Support to the development of Guidelines for Battery Regulation Art.11



Chris Spiliotopoulos and Chiara Magrini, Joint Research Centre – B5
Stakeholder consultation meeting – 30 October 2023

European Commission

Battery RR stakeholder meeting 30/10/23 - Attendance Guidelines

- When joining the meeting, please identify yourself by your first and last name, and your organisation, e.g. *John Smith – JRC Seville*
- **Please keep your microphone muted and camera switched off when not speaking.**
- To intervene during the Q&A sessions:
  1) *Please ask for the floor by using the meeting chat (e.g. by typing "FLOOR"). Please **do not use** the "raise hand" button.*
  2) *You can also type questions in the chat box while a presentation is taking place. Please keep your intervention short and succinct, and avoid posting long texts with positions.*
  3) *Please wait for the chair to give you the floor. Chronological order will generally be sought, as reasonably as possible in order to also allow for a diverse range of stakeholders to intervene.*
  4) *To speak, unmute your microphone. After speaking, please mute your line again.*

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Agenda

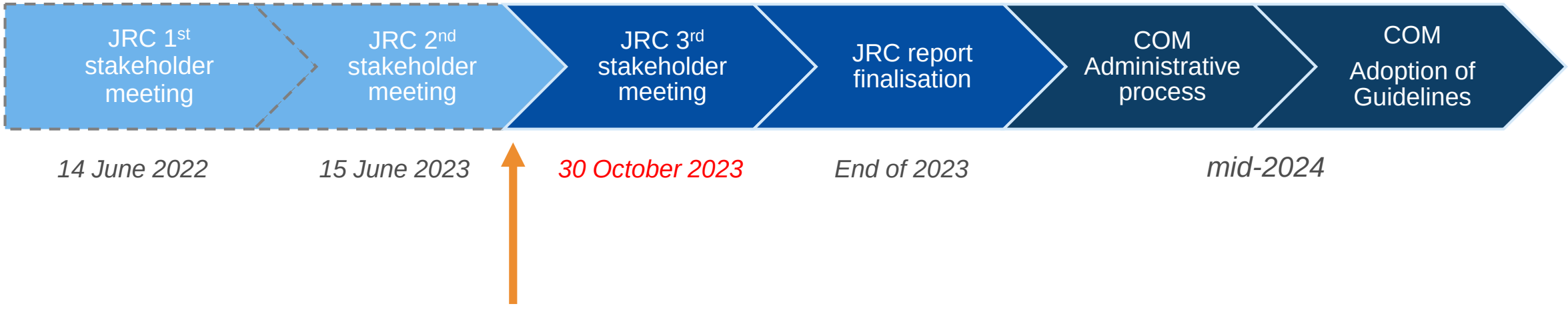
1. Welcome and introduction to the meeting
2. Discussion on draft document
   - 2.1 RR concepts – *Art.11 par.1, par.6 and par.7* (Presentation and Q&A)
   - 2.2 RR by independent professionals – *Art.11 par.2 & par.5* (Presentation and Q&A)

   --- Short Break ---

   - 2.3 Full derogations – *Art.11 par.3, and Software Use par.8* (Presentation and Q&A)
3. Next Steps / AOB

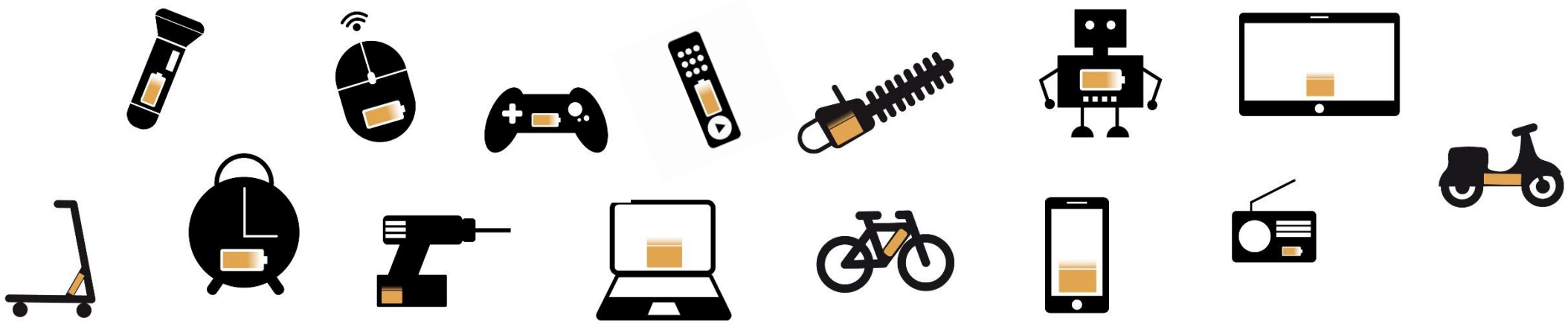
Aim and timeline

(EU) 2023/1542
Article 11, paragraph 9
The Commission shall publish guidelines to facilitate harmonised application of this Article.



Guidelines – General principles

- *The Guidelines cannot amend or conflict with the regulatory provisions;*
- *The Guidelines follow, as far as possible, a principle-based approach, rather than product-by-product approach;*



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Changes introduced compared to June draft

Safe replacement process	Safe operator	Safe replacement battery
• RR always to be performed according to (provided) OEM instructions • RR always by an adult	• Definition of “independent professional”	• Definition of “compatible battery”. • Ensure maintenance of type-approval. • Software can “inform” but not “impede”.

Article 11 – Paragraph 1

- *Ensure portable batteries are readily removable and replaceable by the end-user at any time during the lifetime of the product. That obligation shall only apply to entire batteries and not to individual cells or other parts included in such batteries.*
- *"Readily removable" by the end-user means removal with the use of commercially available tools, without requiring the use of specialised tools, unless provided free of charge with the product, proprietary tools, thermal energy, or solvents to disassemble the product.*
- *Products to be accompanied with instructions and safety information on the use, removal and replacement of the batteries; permanently online, on a publicly available website, in an easily understandable way for end-users.*

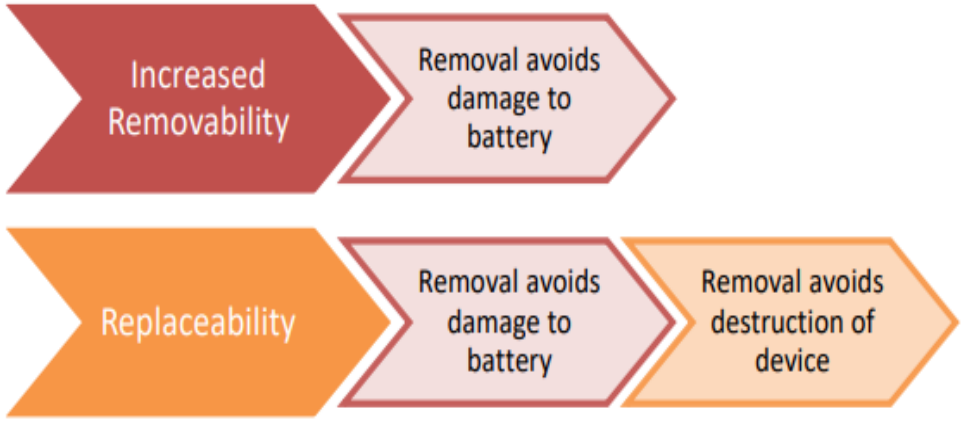
Definitions

- **Removability** of the battery is understood to be possible when the battery can be safely taken out of a device (with or without the use of tools), in some cases resulting in the destruction of the device (Stahl et al, 2020).

→ NOT a disassembly process as per EN45554:2020.

- **Replaceability** is defined as a battery being “removable with tools commonly available to the end-user” and without destruction of the device or battery, thus enabling replacement to support further operation of the device (Stahl et al, 2020).

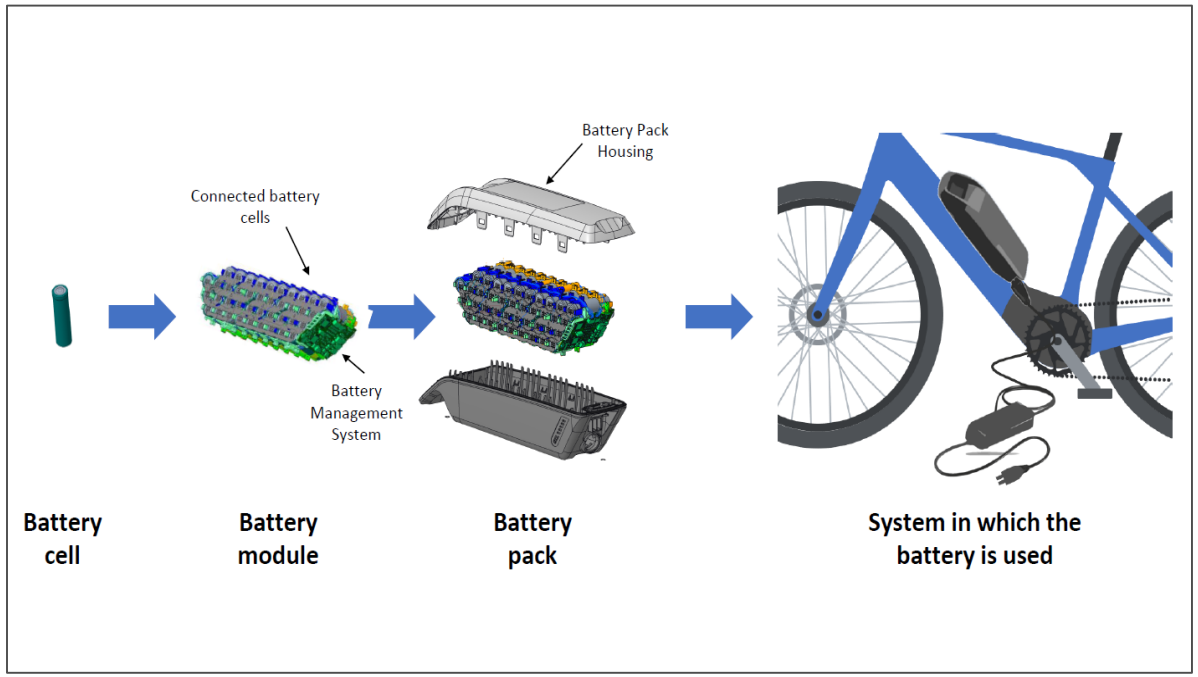
→ The concept of replaceability entails an altogether non-destructive disassembly process.



Adapted from: Stahl et al, 2020

Other general considerations

- Proposals apply to entire batteries and **battery packs**, not to individual cells, **except from** the case of light means of transport (LMT) batteries as described in Art. 11.
- The guidelines only applies to batteries and products placed on the market once Article 11 comes into force.
- *When proposals related to removability and replaceability by an end-user, the end-user is assumed to be an adult.*



Source: RECHARGE 2023

Qualification of RR concepts

Parameter	Removability	Replaceability
1. Tools, fasteners and joining techniques	End-users: • use of commercially available tools, without requiring the use of specialized tools, unless provided free of charge with the product, • Without requiring proprietary tools, thermal energy, or solvents to disassemble • use of fasteners compatible with the above.	(same as remove)
	Independent professionals: • use of commercially available tools, without requiring the use of proprietary tools.	(same as remove)
2. Disassembly Information*		Info relates not only to disassembly, but, upon battery replacement, to reassembly and normal device operation. Incl. elements such as software tools or firmware required for full functionality of the device after battery replacement.

* The following types of information can be considered as relevant in the context of battery removal:
  - technical manual of instructions for removal;
  - a disassembly map or exploded view for the battery disassembly, reassembly and normal operation;
  - software tools, firmware, other means required for full functionality of device after battery replacement;
  - information to ensure a safe disassembly process, including conducting quality replacement process testing.

Qualification of RR concepts

Parameter	Removability	Replaceability
3. Spare battery availability	N/A	Spare battery are available: • to end users. • during the entire lifetime of the appliance/device. Any **software** (and its updates) that might be necessary for the normal operation of the battery within the appliance is available to the same target groups and the same period of time as the physical battery itself. Spare parts for designs before Art 11 entering into force could be still offered, in order to avoid end of product lifetime for products on market.
4. Disassembly Depth	N/A	Reasonable number of disassembly steps. The lower the number of disassembly steps, the higher level of removability and replaceability

Definition of “compatible battery”

Compatible battery is understood to be one that does not pose a risk for the user or the device safety, while allowing the device to operate seamlessly.

The same consideration is understood for batteries consisting of multiple cells: a compatible cell is understood to be one that that does not render the battery pack unsafe, ideally having the same capacities, design and chemistry characteristics.

For products which are subject to type-approval under regulation (EU) No 168/2013, a key component can be considered “compatible” only if its replacement has no impact on its type-approval specifications.

Synergy with ecodesign regulation for mobile phones

Approach: The Battery Regulation explicitly allows for such specific rules under other legislation if those specific rules ensure a higher level of protection of the environment and human health.

- For main replaceability requirements (Battery reg. Art 11(1)), lex specialis approach is foreseen and ecodesign requirements would apply

- Other battery regulation requirements (spare part availability, software impediment of replaceability), battery regulation does not make an explicit exception, so both regulations apply at the same time.

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Article 11 – Paragraphs 2 and 5

2. *By way of derogation from paragraph 1, the following products incorporating portable batteries may be designed in such a way as to make the battery removable and replaceable only by independent professionals:*

   (a) appliances specifically designed to operate primarily in an environment that is regularly subject to splashing water, water streams or water immersion and that are intended to be washable or rinseable;

   (b) professional medical imaging and radiotherapy devices, as defined in Article 2, point (1) of Regulation (EU) 2017/745, and in-vitro diagnostic medical devices, as defined in Article 2, point (2) of Regulation (EU) 2017/746.

   The derogation set out in point a) of this paragraph shall only applicable where such derogation is required to ensure the safety of the user and the appliance.

5. *LMT batteries, as well as individual battery cells included in the battery pack, shall be readily removable and replaceable by an independent professional at any time during the lifetime of the product.*

Independent professionals qualifications

"Independent professionals" are understood to be independent operators who have the (1) technical competence and qualification to repair the product where the battery is integrated in, (2) conduct their business on commercial premises, and (3) comply with the applicable regulations for repairers of electrical equipment in the Member States where it operates.

In case of removability and replaceability actions on individual cells within a battery pack, the "independent professional" is understood to have the technical competence to repair the battery pack.

In case of removability and replaceability actions on products subject to type-approval under the scope of regulation (EU) No 168/2013, independent professionals are understood to be 'independent operators' as defined in regulation (EU) No 168/2013.

Compliance with the above points may be demonstrated by a reference to an official registration system as professional repairer (when such system exists in the Member States concerned), or by registration with, or training/certification by, the manufacturer of the product where the battery is integrated in (when required by national legislation).

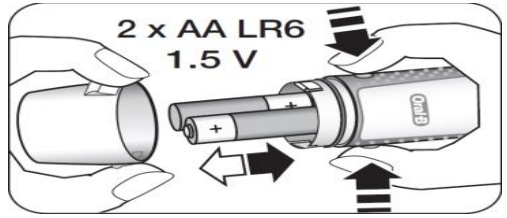
Furthermore, the professional is understood to be covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.

Paragraph 2(a) Appliances in a wet environment

The following specifications are identified as all being relevant criteria to consider for such appliances for the derogation to apply:

(i) "***Specifically***": The appliance is **specifically** designed to operate in the environment described;

(ii) "***Primarily***": The environment described is the **primary environment** of the appliance, as recital 39 explicitly specifies, *"for the majority of the active service of the appliance"*. In other words, not just an environment in which the device may only coincidentally or circumstantially be introduced to;



(iii) "***Washable or rinseable***": The product is intended to be **washable or rinseable;**

(iv) ***Compromising safety***: there is evidence that battery replaceability and removability by end-users would compromise the safety of the user or the appliance;

(v) "***No way to redesign***": there is evidence that there is **no way to redesign** the appliance so that it safely operates in the environment described (as pointed out in recital 39 of the regulation).

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2a. Appliances in a wet environment

0	No protection		-
1	Protected against vertically falling water drops		Vertically falling drops shall have no harmful effects
2	Protected against vertically falling water drops when enclosure tilted up to 15°		Vertically falling drops shall have no harmful effects when the enclosure is tilted at any angle up to15° on either side of the vertical
3	Protected against spraying water		Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects
4	Protected against splashing water		Water splashed against the enclosure from any direction shall have no harmful effects
5	Protected against water jets		Water projected in jets against the enclosure from any directions shall have no harmful effects
6	Protected against powerful water jets		Water projected in powerful jets against the enclosure from any direction shall have no harmful effects
7	Protected against the effects of temporary immersion in water		Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time
8	Protected against the effects of continuous immersion in water		Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7
9	Protected against high pressure and temperature water jets		Water projected at high pressure and high temperature against the enclosure from any direction shall not have harmful effects

Source: https://www.iec.ch/ip-ratings

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Article 11 – Paragraph 3

3. The obligations laid down in paragraph 1 shall not apply where *continuity of power supply is necessary and a permanent connection between the product and the respective portable battery is required to ensure the* ***safety*** *of the user and the appliance or, for products that collect and supply data as their main function, for* ***data integrity*** *reasons.*

Safety

Derogation for:

- equipment connected with the protection of Member States' essential security interests, arms, munitions and war material, with the exclusion of products that are not intended for specifically military purposes (art.1, p 5)
- equipment designed to be sent into space (art.1, p 5)
- equipment and protective systems intended for use in potentially explosive atmospheres (Directive 2014/34/EU)
- devices that perform life-saving and life-sustaining functions

Medical Devices (MDs) and in-vitro diagnostic MDs

MEDICAL DEVICES	Examples of product functions (non-exhaustive)	Examples of products (non-exhaustive)
Class I	Mostly non-invasive / passive devices	Electric wheelchairs; Dental curing lights; Electric hospital beds; Dental patient chairs; Examination lamps
Class IIa	active therapeutic devices intended to administer or exchange energy; intended to allow direct diagnosis or monitoring of vital physiological processes	Gamma cameras; Electrocardiographs; Electronic thermometers; Electronic stethoscopes; Electronic blood pressure measuring equipment; external hearing aids;
Class IIb	administer energy to or exchange energy with the human body in a potentially hazardous way, taking account of nature, density and site of application of the energy; could result in immediate danger to patient	Electrically powered heat exchangers; external pacemakers and external defibrillators with no integrated or incorporated diagnostic function; Diagnostic X-Ray machine; Computed Tomography Devices
Class III	intended specifically for use in direct contact with the heart or central circulatory system or the central nervous system	Cortical electrodes; active implantable;

- Class D, Regulation 2017/746
- WEEE D.: devices expected to be infective prior to end of life, and active implantable medical devices
- Hearing aids

Data Integrity

Regulatory text defines both the function, (data collection and supply), as well as the specific reason justifying such exemption (data integrity).

Examples:

- ✓ Battery-powered instruments used in weather stations or in laboratories is the continuous collection of data, and this continuity is an integral part of the function deeming the continuity of power supply necessary.
- ✓ batteries whose main function is to power a non-volatile memory itself, or deliver backup functions in the internal clock of a device, such as those found in processors or in sensors

✘ delivers a data collection and supply function as an additional feature (beyond its main function), nor for any device that may contain a component which delivers a data collection and supply function.

✘ delivers a data collection and supply function, as a primary function, but does not pose a risk of data integrity loss, due to, for example, the presence of non-volatile memory in the device.

Article 11 – Paragraph 8

8. *Software shall not be used to impede the replacement of a portable battery or LMT battery, or of their key components, with another compatible battery or key components.*

Impeding software

Example

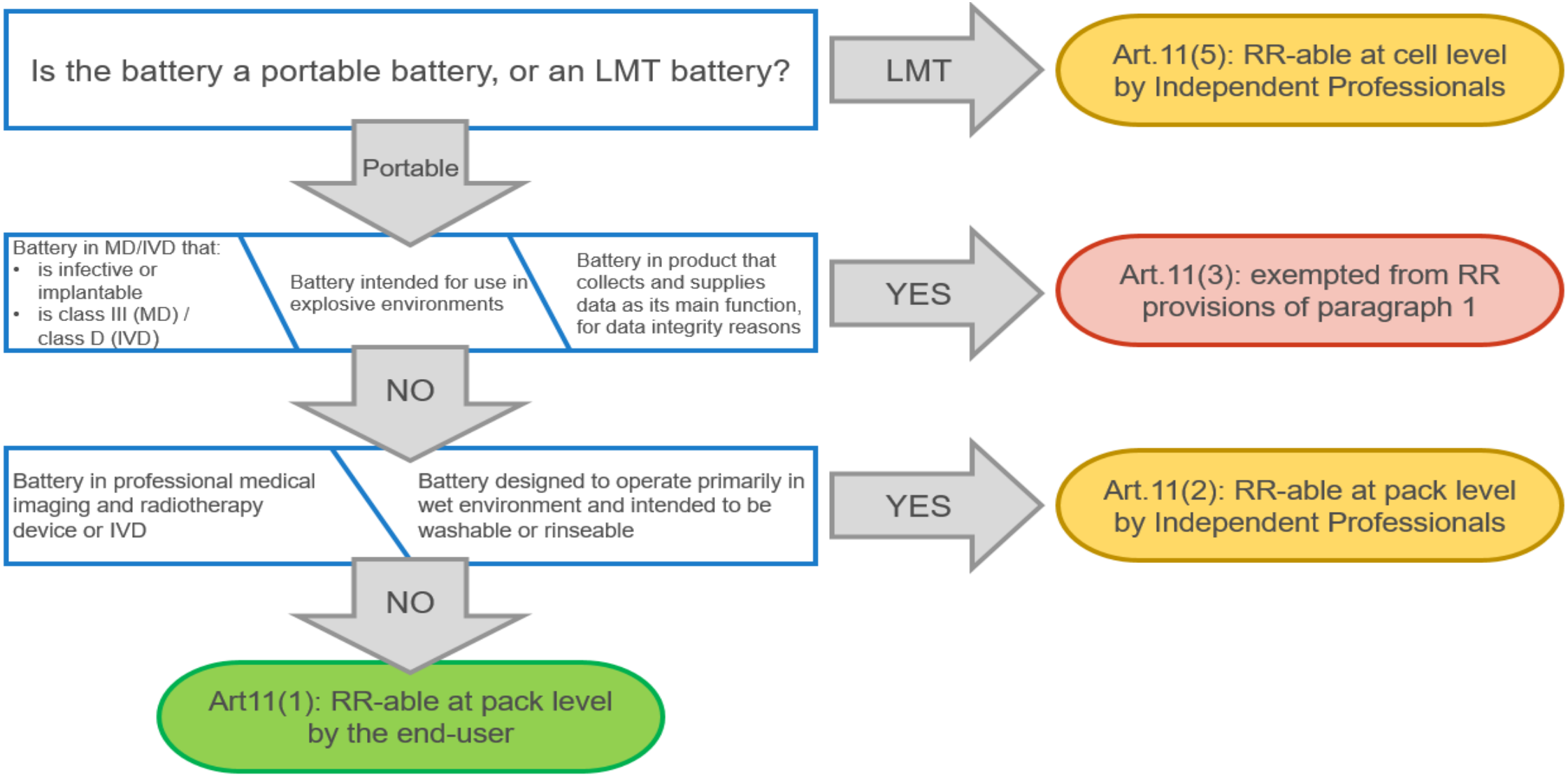
Source: Alfieri and Spiliotopoulos, 2023

A software notification may be provided to the consumer informing that a battery other than the one originally present in the product is in use, only as long as such notification does not affect or deactivate any functionality of the device or affect the user experience. At all times repair should not be impeded.

Summary

Reason	Type	Application	Remove/Replace-ability
Safety	Products Dir. 2014/34/EU	Intended for use in potentially explosive atmospheres	Derogation
	Devices in contact with water	Specifically designed to operate primarily in an environment that is regularly subject to splashing water, water streams or water immersion, and that are intended to be washable or rinseable.	Independent professionals
Medical	Medical devices (Reg. (EU) 2017/745)	Professional medical imaging, radiotherapy devices	Independent professionals
		Class III / infective and implantable	Full Derogation
	In-vitro diagnostic medical devices (Reg. (EU)2017/746)	Class A (except infective and implantable) Class B (except infective and implantable) Class C (except infective and implantable)	Independent professionals
		Class D (except infective and implantable)	Full Derogation
Data Integrity	Products that collect and supply data as main function		Derogation
LMT			Independent professionals

Decision Tree – DRAFT proposal



Questions?

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Thank you

Slide 15: image; source: https://www.iec.ch/ip-ratings

Slide 16: image; source: https://oralb.com/en-us/products/toothbrushes/battery-toothbrushes/pro-health-clinical-battery-toothbrush/

Slide 24: right-hand side image; source: https://support.apple.com/en-us/HT210323

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