One charger to fit them all

ECOS position on the European Commission's common charger initiative

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Executive summary

On 23 September, the European Commission unveiled its long-awaited proposal for a common charger for electronic devices. Based on the revision of the Radio Equipment Directive, the proposal aims to make the introduction of USB-C connectors mandatory for a broad range of electronic devices with harmonised fast charging technology, unbundle the charger sale from the sale of the device, while at the same time improving consumer information. On top of this, an additional proposal for a review of the Ecodesign Regulation on external power supplies (EPS), aiming to tackle the interoperability of chargers themselves, is expected to be launched later this year.

The common charger initiative aims to fill the regulatory gap left open after the voluntary Memorandum of Understanding between manufacturers expired back in 2014. The Memorandum, an agreement signed between phone manufacturers and backed by the European Commission, failed to bring a single charging solution and to tackle the issue of unnecessary proliferation and variation of chargers and cables.

With an estimated half a billion chargers shipped for portable devices in Europe each year, the initiative to reduce consumer inconvenience and easily avoidable e-waste caused by the prevalence of different, incompatible chargers is, we believe, both necessary and much overdue.

Smartphone chargers alone generate some 11,000 to 13,000 tonnes of e-waste each year in the EU, with the associated life cycle emissions of around 600-900 kilotonnes of CO_2 equivalent. If we add chargers for other portable products such as laptop computers, this number easily triples and goes up to well over 35,000 tonnes of e-waste per year, as much as nearly 100,000 cars in weight or over 2,250 kilotonnes of CO_2 equivalent.

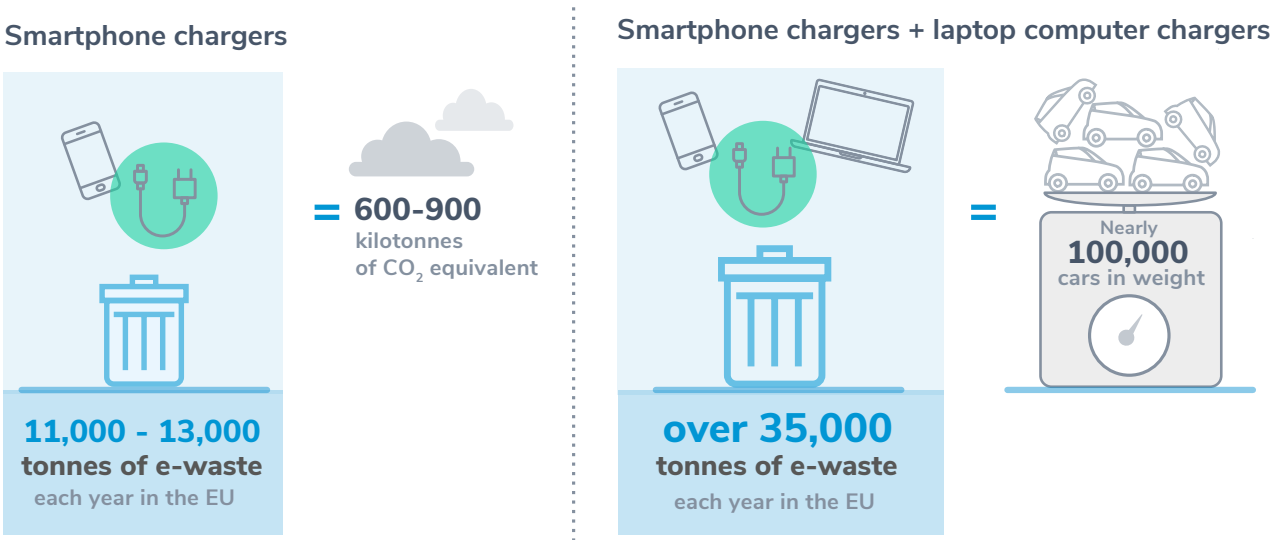


Figure 1 E-waste production associated with smartphone chargers, compared to combined e-waste generation linked to smartphone and laptop chargers (own calculations)

These huge impacts are not unavoidable, however. Our estimates show that a well-designed and fully implemented common charger initiative - tackling electronic devices, chargers and cables together - has the potential to result in savings of around 29,000 tonnes of e-waste per year, which weighs as much as 70 International Space Stations put together. It would also reduce the associated greenhouse gas emissions by over 1,800 kilotonnes of CO_2 equivalent, corresponding to some 1 million cars being taken off our roads.

A lot of these savings might remain theoretical. While providing a solid basis for regulatory discussions, the proposed revision of the Radio Equipment Directive falls short of achieving its full potential. Identifying a number of areas where further improvements are needed for the instrument to have the necessary transformative effect on the market, this paper puts forward a detailed set of improvements to the tabled revision.

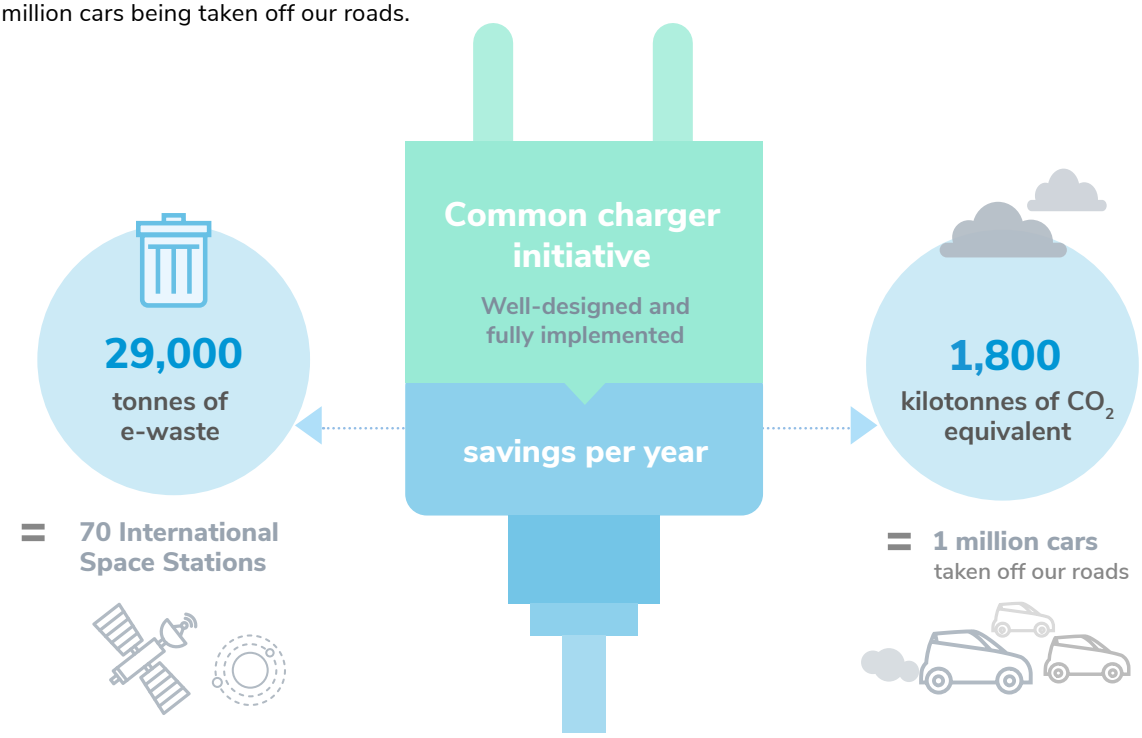


Figure 2 Estimated savings if a common charger initiative is well-designed and fully implemented

Notably, we call on the following changes to be made to the proposed regulatory text of the Radio Equipment Directive:

- Introduce minimum wireless charging interoperability requirements
- Extend the scope to e-readers, low-powered laptops and earbuds
- Make unbundled charger, cable and device sales the default option
- Improve consumer information on charging plugs and cables
- Ensure that the harmonisation of fast charging technology delivers
- Shorten the period prior to the entry into force of requirements

ECOS recommendations

Introduce minimum wireless charging interoperability requirements

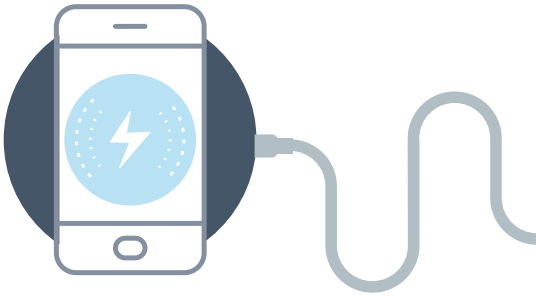
Generally taking the form of a puck, a mat or a stand that is then connected to a power source, wireless - or inductive - chargers are increasingly common in portable devices. On the grounds of allowing for innovation, the new common charger initiative proposes not to introduce any requirements on the interoperability of such charging solutions. However, while the majority of the market appears to have converged on the open interface standard that defines wireless power transfer known as Qi, there is nothing that prevents manufacturers from starting to use other wireless standards in the future. Worse still, manufacturers could even introduce devices on the market without any wired charging capability altogether, offering proprietary wireless charging solutions as the only available option.

If basic interoperability requirements are not introduced for wireless charging solutions, there is a genuine risk that the history of proprietary charging solutions repeats itself for wireless chargers, thereby putting into question the achievement of the objectives of the common charger initiative altogether. We believe that a mandatory requirement specifying harmonisation with at least the existing Qi wireless charging standard would help prevent this.

This, in our view, would allow for innovation in the future, at the same time ensuring that new devices can use chargers consumers may already have at home, thereby reducing the risk of unnecessary replacement. **A provision should be introduced to Article 1(1)(b) of the Directive** as follows:

> *Hand-held mobile phones, tablets, digital cameras, headphones, headsets, handheld videogame consoles and portable speakers, in so far as they are capable of being recharged via* ***wireless*** *charging, shall incorporate* ***at least the Qi V 1.2 specification***.

Moreover, **the review clause of the regulatory text should specify that the assessment of the effectiveness of the instrument should consider the extent to which minimum harmonisation of fast charging protocols is necessary for wireless chargers in the future**. This, we believe, is necessary to ensure that tailored protocols developed over time do not recreate the need for multiple chargers at home.



Extend the scope to e-readers, low-powered laptops and earbuds

The proposed text of the review of the Radio Equipment Directive limits the scope of the initiative to mobile phones, tablets, digital cameras, headphones, headsets, handheld videogame consoles and portable speakers. While all of these products are highly relevant for the purposes of the initiative, which will allow consumers to use a single charger for the devices listed above, a number of additional products that could be expected to be covered by the same requirements are currently excluded from the scope of the regulatory instrument.

While e-readers, smartwatches and fitness trackers were examined in the impact assessment,[1] they were ultimately excluded from the final regulatory text - without a sufficient justification for the decision.

We believe that it is essential for the Radio Equipment Directive to be extended to **e-readers**. With over 16 million purchased in the EU every year - which represents around 80% of sales levels of tablets - e-readers are a highly popular piece of consumer electronics.[2] The impact assessment of the European Commission has demonstrated that around 75% of e-readers use micro-USB rather than USB-C connectors at present, which is a significantly higher proportion of products when compared to portable speakers (58%), for instance. Although both of these product categories are transitioning towards the use of USB-C connectors, only the latter are currently proposed to be included in the scope of the Directive.

Furthermore, while the impact assessment to inform the common charger initiative did not consider the inclusion of laptops in the scope, working on the assumption that they require higher power supply and that this could pose technical challenges when sharing the external power supplies (EPS) with a mobile phone, there is, in practice, little difference between the power demands of high-end tablets (which are currently included in the scope), and the low-powered laptops which typically rely on the use of chargers rated at 45W. In order to further increase the impacts of the proposed interoperability measure, we urge the co-legislative institutions to include the **lower powered laptops** (i.e. using EPS rated less than 60W) in the scope.

In addition, the scope of the initiative should be clarified so as to also cover **earbuds**, as part of the requirements that already apply to headphones and headsets. This is necessary to ensure that earbuds, an increasingly popular battery-run alternative to standard headphones today, do not become an isolated product group that is unjustifiably not subject to requirements for interoperability.

Ensure effective unbundling of charger sales

The proposed legal requirement on unbundling of charger and device sales, which only requires manufacturers to offer 'the possibility to acquire the radio equipment without any charging device,' falls short of what is necessary to genuinely reduce the number of redundant chargers sold to consumers today.

This follows from the flawed approach taken as early as the impact assessment, which did not assess an effective, mandatory unbundling option at all, focusing instead on a regulatory option where manufacturers are allowed to offer bundled versions of devices and chargers, as long as an unbundled version is also made available at the point of sale. Such passive approach is disappointing given that the same impact assessment[1] clearly shows how unlikely it is for manufacturers to unbundle EPS sales without an explicit regulatory requirement to do so: 'manufacturers fear to lose market shares if they unbundle. In turn certain consumers, being unaware of the interoperability, may keep preferring bundled solutions, originating a vicious cycle.'

We strongly believe that the most effective way of ensuring optimal reduction in environmental impacts and increase in consumer savings would be to make the unbundling of charger and device sales mandatory. The impact assessment suggests that such an approach would encourage manufacturers to 'offer EPS out of the box at a reduced price', which is expected to have minimal economic impact and inconvenience to consumers. In line with this, **we call for the proposed Article 3a of the Radio Equipment Directive to be amended as follows:**

Option 1 **preferred**

Where an economic operator offers to end-users the possibility to acquire ***a charging device*** *for radio equipment falling within the scope of Article 3(4)* ~~*together with a charging device*~~*, the end-user shall* ~~*also*~~ ***only*** *be offered the possibility to acquire the radio equipment without any charging device,* ***and to purchase the charging device separately****.'*

If the option above is not adopted, we propose to, at the very least, ensure that the default option offered to users is the one without a charger included in the packaging.

The currently proposed regulatory text entails a high risk for consumers to never become aware of the unbundled sales option, which, in turn, is likely to result in missing out on all the savings estimated in the impact assessment. In order to address this, the EPS should only be shipped together with the product only if specifically requested. **We propose the following fallback change to Article 3a** to ensure this:

Option 2

Where an economic operator offers to end-users the possibility to acquire radio equipment falling within the scope of Article 3(4) together with a charging device, the end-user shall ~~*also*~~ *be offered the possibility to acquire the radio equipment without any charging device* ***as the default option****.'*

Extend unbundling requirement to cover charging cables

With the tabled unbundling requirement focusing on charging plugs exclusively, the proposed amendment to the regulation offers no change to the way cables are provided with products. This means that cables would continue to almost always be unnecessarily provided with products, in spite of the fact that the introduction of a common connector would allow for a single cable to charge multiple devices.

The impact assessment justified discarding the option of extending the unbundling requirement to charging cables, arguing that this would lead to potential consumer inconvenience given that cables are frequently purchased by consumers because they break and because they can be used for purposes other than charging, as well as due to the lower associated environmental savings when compared to unbundling charging plugs.

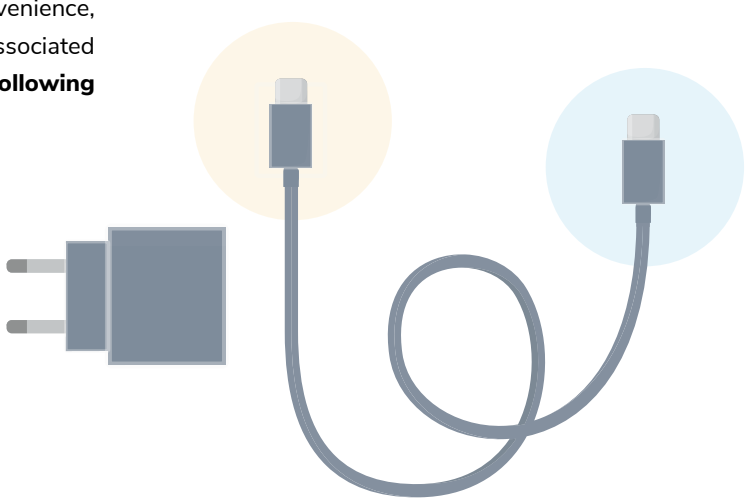
However, such an approach severely neglects the potential for unnecessary waste and consumer confusion caused by the shift to USB-C connectors. Users are likely to find themselves with a proliferation of multiple, almost identical cables at home, even though the apparent need for them will disappear once all of the products shift to a common USB-C connector. Furthermore, the identical-looking cables might in reality offer different charging performance or functions. In order to prevent consumer inconvenience, and to further increase environmental savings associated with the proposed measure, **we propose the following change to Article 3a of the Directive:**

Option 1 **preferred**

Where an economic operator offers to end-users the possibility to acquire ***a charging device*** *for radio equipment falling within the scope of Article 3(4)* ~~*together with a charging device*~~*, the end-user shall* ~~*also*~~ ***only*** *be offered the possibility to acquire the radio equipment without any charging device* ***or cable, and to purchase the charging device and cable separately****.'*

Option 2

Where an economic operator offers to end-users the possibility to acquire radio equipment falling within the scope of Article 3(4) together with a charging device, the end-user shall ~~*also*~~ *be offered the possibility to acquire the radio equipment without any charging device* ***or cable as the default option****.'*



Improve consumer information on charging plugs and on cables

The proposed regulatory text mandates manufacturers to provide certain information to consumers via packaging or labels, in order to improve their understanding of the differences between chargers available on the market. However, we strongly believe that the proposed requirements fall short of what is needed to avoid consumer confusion, which would hinder the achievement of the objectives of the overall initiative.

Moreover, **the current draft of the Directive (Annex Ia Part II) confuses the terms 'minimum power' and 'maximum power', which should be corrected**. The table below provides an overview of the main substantial shortcomings of the current regulatory proposal, alongside our suggestions on how best to address these.

Proposed information requirement	Issue	Suggested information requirement
Minimum wired charger power (W) required	In theory, any EPS could be used to charge any product, albeit with different charging performance. **However:** • some low-power EPS may not be capable of charging a high-powered device; and • some older products may not support charge from an EPS that has a higher power rating than prescribed[3], leading users to believe charging is not possible.	To address this, information should be required on minimum, average and fast charge power ratings: **Charger rating** • **minimum:** 20W; • **average:** 45W; • **fast** > 60W. In addition, an information campaign should be launched upon entry into force of these requirements to ensure consumers are duly informed of the implications of the shift to common chargers.

Proposed information requirement	Issue	Suggested information requirement
Charging capabilities of the product, including if it is capable of being recharged at V>5V, I>3A or P>15W	There are different ways to measure the charging capacity of an EPS, either in terms of voltage (V, in volts [V]), current (I, in ampers [A]) or power (P, in watts [W]). If no clear guidance is provided on which metric should be used for the purpose of information requirements, consumers could be presented with a confusing range of metrics that they are unable to compare.	Power should be established as the key information requirement to ensure comparability between chargers. If deemed necessary, a figure could be provided in brackets indicating the current: **Charger rating** • **minimum:** 20W; • **average:** 45W; • **fast** > 60W (3A).

Table 1 Issues with proposed information requirements and suggested solutions

In addition to the above, **it will be necessary for matching information requirements to be introduced for both EPS and cables through the forthcoming review of the Ecodesign Regulation (2019/1782) on external power supplies.**

The existing USB standards are insufficient to achieve the necessary level of transparency as they are not intuitive, do not address EPS information provided to the consumer on the packaging and product, and their use is not mandatory. The figure below illustrates the need for standardisation of information on chargers and cables, on the products themselves as well as on packaging. A range of current (A), power (W) and cable features are currently shown on packaging in a non-standard way, and chargers with different power ratings have identical casings. Once the chargers and cables are out of the packaging, there is no indication of their properties, creating considerable confusion for consumers.

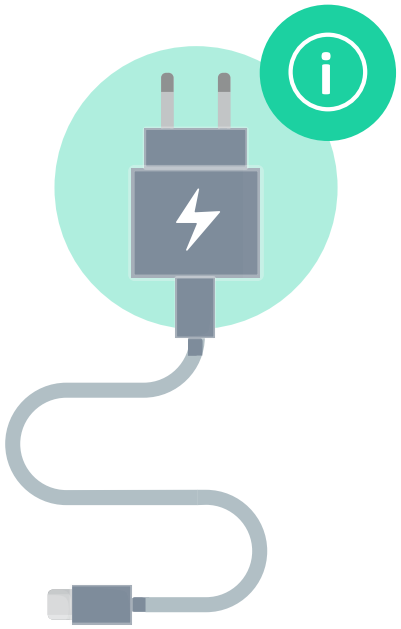


Figure 3 Example of confusing sales information provided to consumers today

As a result of the current regulatory proposal coming into force, consumers may find themselves with a number of chargers at home that may or may not work with various products, and a proliferation of cables that will appear similar or even identical but that may offer different functionalities.

It is essential that intuitive information is available not only on packaging, but also on cables and power supplies themselves. A dedicated study to inform the forthcoming review of the Ecodesign Regulation should be carried out for the purpose of designing information requirements that are fit for purpose. An example of the type of information that will be necessary is presented in the table below:

Product-related information (Radio Equipment Directive)	Charger (EPS)-related information (Ecodesign Regulation)	Cable-related information (Ecodesign Regulation)
Charger rating (on packaging and within product settings), e.g.: • **minimum:** 20W, • **average:** 45W, • **fast** > 60W (3A).	Power and current range (on charger), e.g.: • 65W (3.25A) to 15W (3A).	Maximum power, voltage and current (on cable), e.g.: • Maximum: 100W (20V / 5A).
Fast charge capability, if available (on packaging and within product settings), e.g.: • USB PD fast charging	Fast charge capability if available (on charger).	Data delivery speed and display delivery resolution, if available (on cable), e.g.: • data delivery: 5Gbps; • display delivery: 4K@60Hz.

Table 2 Proposed information requirements for products, charging plugs and cables

Improve harmonisation of fast charging technology

We strongly support the harmonisation of fast charging technology proposed in the draft regulatory text, which makes use of the existing USB Power Delivery technology. The latter allows to establish a communication link between the device and the charger on the voltage necessary and thereby allows to safely charge products with a single charger and cable. However, the Commission's goal of ensuring that charging speed is the same when using any compatible charger may, we believe, not be achieved by means of the current proposal, as the regulatory text lacks sufficient detail.

In order to make the requirement more robust, **a clause should be added to the regulatory text to prevent manufacturers from circumventing interoperability requirements by requiring a given product to be used solely with power supplies produced by the product's manufacturer**. Examples of such practices already exist. For instance, it was found that Hewlett Packard had intentionally designed their Spectre laptop to be capable of charging solely when using an HP USB-C charger[5]. Allowing for such practices comes at the risk of invalidating the regulatory text in its entirety.

Furthermore, **the proposed limit above 5 volts, 3 amperes or 15 watts for the requirement for USB power delivery should be reworded**, as many products in scope of this requirement operate at these levels rather than above them, as demonstrated in the table below:

USB PD power range	Fixed voltage	Current range	Example devices
0.5 - 15W	5V	0.1 - 3.0A	Headphones, small USB accessories
15 - 27W	9V	1.67 - 3.0A	Smartphones, cameras, drones
27 - 45W	15V	1.8 - 3.0A	Tablets, small laptops
45 - 100W	20V	2.25 - 3.0A 3.0 - 5.0A only with rated cable	Large laptops, displays

Table 3 USB Power Delivery 3.0 examples[4]

In line with the above, **we propose to amend Part I, (2) of Annex 1a on Power Delivery as follows:**

*Hand-held mobile phones, tablets, digital cameras, headphones, headsets, handheld videogame consoles and portable speakers, in so far as they are capable of being recharged via wired charging at voltages ~~higher than~~ **of** 5 volts **or higher,** or currents **of** ~~higher than~~ 3 amperes **or higher**, or powers ~~higher than~~ **of** 15 watts or higher, shall:*

(a) incorporate USB Power Delivery, as described in the standard EN IEC 62680-1-2:2021 'Universal serial bus interfaces for data and power - Part 1-2: Common components - USB Power Delivery specification';

(b) ensure that any additional charging protocol allows the full functionality of the USB Power Delivery referred to in point (a).

(c) enable the charging of the radio equipment via USB Power Delivery regardless of the manufacturer of origin of the charging device.

Shorten the period prior to the entry into force of requirements

We believe that the proposed timeframe of 24 months for the entry into force of the requirements after the publication of the adopted text in the Official Journal of the EU is not justified.

Action is urgently needed to reduce environmental impacts of power supplies and prevent the potential consumer confusion that could emerge in the shift towards interoperability. **We call on the co-legislative institutions to shorten the proposed time periods**. A 6-month period for the transposition of the Directive with an additional 3 months of transitional period should be sufficient for companies to adjust.

Notes and references

1 European Commission (2021), Impact Assessment Report, SWD(2021) 245 final.

2 European Commission (2019), Impact Assessment Study on Common Chargers of Portable Devices, available at https://op.europa.eu/en/publication-detail/-/publication/c6fadfea-4641-11ea-b81b-01aa75ed71a1

3 Hruska, J. (2021), How USB charging works, or how to avoid blowing up your phone. ExtremeTech, available at: https://www.extremetech.com/computing/115251-how-usb-charging-works-or-how-to-avoid-blowing-up-your-smartphone

4 Triggs, R. (2021), USB Power Delivery explained: What you need to know about ubiquitous charging, available at: https://www.androidauthority.com/usb-power-delivery-806266/

5 Lacoma, T. (2021). Charging via USB-C for laptops: Here's what you need to know, available at: https://www.digitaltrends.com/computing/charging-via-usb-c/

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