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⁽¹⁾ Text with EEA relevance.

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II

(Non-legislative acts)

REGULATIONS

COMMISSION DELEGATED REGULATION (EU) 2023/1668

of 25 May 2023

supplementing Directive (EU) 2019/2034 of the European Parliament and of the Council with regard to regulatory technical standards specifying the measurement of risks or elements of risks not covered or not sufficiently covered by the own funds requirements set out in Parts Three and Four of Regulation (EU) 2019/2033 of the European Parliament and of the Council and the indicative qualitative metrics for the amounts of additional own funds

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

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

Having regard to Directive (EU) 2019/2034 of the Parliament and of the Council of 27 November 2019 on the prudential supervision of investment firms and amending Directives 2002/87/EC, 2009/65/EC, 2011/61/EU, 2013/36/EU, 2014/59/EU and 2014/65/EU ⁽¹⁾, and in particular Article 40(6), fourth subparagraph, thereof,

Whereas:

- (1) To ensure the harmonised application of the additional own funds requirement across the Union, it is necessary to set out a uniform approach towards the measurement of the risks and elements of risks that would support the determination of the level of capital adequate to address all material risks to which investment firms might be exposed. Competent authorities should therefore ensure that investment firms hold adequate additional own funds to cover each risk category (Risk-to-Client, Risk-to-Firm and Risk-to-Market), as well as any other material risks.
- (2) In order for competent authorities to be able to appropriately monitor the risk profile of investment firms and to identify, assess and quantify material risks, it is necessary to set out a detailed and comprehensive methodology proportionate to the nature, scope and complexity of investment firm activities based on all available information sources, including information gathered for the purpose of Article 36 of Directive (EU) 2019/2034.
- (3) The level of the additional own funds requirement is deemed adequate when it reduces the likelihood of investment firm failure and limits the risk of disorderly wind-down that would pose threats to the investment firm's clients and to the wider market, including other financial institutions, market infrastructures, or the market as a whole. Due to this dual objective of the additional own funds requirement and in keeping with the structure of the own funds requirements as set out in Parts Three and Four of Regulation (EU) 2019/2033 of the European Parliament and of the Council ⁽²⁾, competent authorities should consider separately the risks related to ongoing investment firm activities and the risk of disorderly wind-down of the investment firm's business.

⁽¹⁾ OJ L 314, 5.12.2019, p. 64.

⁽²⁾ Regulation (EU) 2019/2033 of the European Parliament and of the Council of 27 November 2019 on the prudential requirements of investment firms and amending Regulations (EU) No 1093/2010, (EU) No 575/2013, (EU) No 600/2014 and (EU) No 806/2014 (OJ L 314, 5.12.2019, p. 1).

- (4) To ensure that all the risks or elements of risks that an investment firm is exposed to or poses to others are duly covered, an investment firm should hold sufficient own funds, taking into account the business model, scale and complexity of activities performed by the investment firm, to withstand additional operational expenses related to an orderly wind-down process. In order to ensure that such own funds would be appropriate in particular economic circumstances, different plausible economic scenarios should be considered by competent authorities during the supervisory review and evaluation process carried out in accordance with Article 36 of Directive (EU) 2019/2034. In particular, business continuity, investor protection and market integrity are not to be jeopardised during the wind-down process. To that end, the investment firm should be capable, also during that process, of absorbing costs and losses not matched by a sufficient volume of profits. Given that the length of the wind-down process could differ significantly depending on specific circumstances, competent authorities should take this into account when setting the additional own funds requirement. Moreover, given the potentially diverse legal forms that investment firms can have, the competent authorities should take into account the applicable national insolvency, corporate and trade laws, which could affect the length of wind-down processes, as well as associated costs and risks.
- (5) To ensure proportionality in determining the additional own funds requirement, risks and elements of risk not covered or not sufficiently covered by the K-factor requirement referred to in Article 15 of Regulation (EU) 2019/2033 should be measured only for those investment firms that are subject to the K-factor requirement referred to in that Article, and not for small and non-interconnected firms that meet the conditions set out in Article 12(1) of that Regulation. Other risks not covered at all by the own funds requirements set out in Parts Three and Four of Regulation (EU) 2019/2033, including risks explicitly excluded from those own funds requirements, exist for investment firms. Therefore, it is necessary to specify that those risks are assessed and measured by competent authorities on the basis of the size and business model of the investment firm as well as on the basis of the scope, nature and complexity of its activities.
- (6) To ensure the correct measurement and coverage of all the risks which are referred to in Parts Three and Four of Regulation (EU) 2019/2033 but not fully or adequately covered by those requirements, such risks should be measured separately for each risk category (Risk-to-Client, Risk-to-Market and Risk-to-Firm). For the same reason, the risks not covered in Parts Three and Four of that Regulation, including those explicitly excluded from those requirements, should be measured on a risk-by-risk basis. However, if the measurement per risk category or on a risk-by-risk basis is overly burdensome or is not feasible in cases of investment firms subject to an initial capital requirement lower than the requirement laid down in Article 9(1) of Directive (EU) 2019/2034, the measurement of risks should in those cases be performed on an aggregate level, taking into account the principle of proportionality.
- (7) To strike the right balance between prudential considerations and proportional application, the measurement of risks on an aggregate level should not apply to investment firms that are subject to the initial capital requirement laid down in Article 9(1) of Directive (EU) 2019/2034. Investment firms that are subject to higher initial capital requirements should be assessed in terms of risks with a measurement per risk category and on a risk-by-risk basis.
- (8) To ensure consistency in the measurement of material risks that investment firms could pose to others or face themselves, competent authorities should rely on a harmonised set of minimum indicative qualitative metrics. Given that risks evolve throughout the business cycle of a firm, competent authorities should perform not only a static assessment, but also perform a historical trend analysis of such metrics. To cover all the relevant risks properly, different metrics should be used for investment firms with different business models and activities. In order to properly cover all the relevant risks of the investment firm, taking into account the specific business model or activity, legal form and the availability of reliable data, competent authorities should, under certain conditions notably pertaining to the specificities of a firm's business model or data quality, adjust the metrics and use those adjusted metrics or, if that is not possible, use alternative metrics that are proportionate to the investment firm's size, complexity, business model, and operating model and that would ensure an appropriate assessment of the risks.
- (9) This Regulation is based on the draft regulatory technical standards submitted to the Commission by the European Banking Authority.

- (10) The European Banking Authority has conducted open public consultations on the draft regulatory technical standards on which this Regulation is based, analysed the potential related costs and benefits and requested the advice of the Banking Stakeholder Group established in accordance with Article 10 of Regulation (EU) No 1093/2010 of the European Parliament and of the Council ⁽³⁾,

HAS ADOPTED THIS REGULATION:

Article 1

Risk of disorderly wind-down

1. Competent authorities shall, having regard to the legal form, business model, the business and risk strategy, and the scale and complexity of the activities of an investment firm, during their supervisory review and evaluation process carried out in accordance with Article 36 of Directive (EU) 2019/2034, measure the risk of disorderly wind-down of the investment firm's business by determining the amount of capital that would be considered adequate for that firm to be wound down in an orderly manner under plausible scenarios.
2. The measurement referred to in paragraph 1 shall be proportionate to the complexity, risk profile, and scope of operation of the investment firm, and to the potential impact of its wind-down on clients and markets, and shall include the following:
 - (a) an estimation of the realistic time frame to wind down the investment firm;
 - (b) an assessment of operational and legal tasks of the investment firm during the wind-down process over a realistic time frame;
 - (c) the identification and assessment of material fixed and variable costs;
 - (d) the identification and assessment of material risks or elements of risks that could materialise during the wind-down process;
 - (e) any other aspect relevant for the wind-down process.
3. Where Directive 2014/59/EU of the European Parliament and of the Council ⁽⁴⁾ applies, available information on recovery actions and governance arrangements in the investment firm's recovery or group recovery plan shall be taken into account by competent authorities for the purpose of paragraph 2, points (b) and (c), if the competent authorities consider that information sufficiently credible and reliable.
4. For investment firms subject to the initial capital requirement laid down in Article 9(1) of Directive (EU) 2019/2034, competent authorities shall include in their measurement the following:
 - (a) the closure costs, including litigation costs for the purpose of paragraph 2, point (c), of this Article;
 - (b) the loss in revenues and loss in the net realisable value of assets expected to be incurred due to the wind-down process for the purpose of paragraph 2, point (d), of this Article.
5. Competent authorities shall identify and quantify material costs, risks or elements of risks and shall determine the capital considered adequate to absorb them in accordance with paragraphs 1 and 2 of this Article.

⁽³⁾ Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC (OJ L 331, 15.12.2010, p. 12).

⁽⁴⁾ Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council (OJ L 173, 12.6.2014, p. 190).

Competent authorities shall use the relevant indicative qualitative metrics referred to in Article 6(1) and shall combine them with static and historical trend analysis, delivering their expert judgement as appropriate.

6. The capital considered adequate to cover the risk of disorderly wind-down of an investment firm's business measured in accordance with this Article shall be at least equal to the fixed overheads requirement of that investment firm calculated in accordance with Article 13 of Regulation (EU) 2019/2033.

Article 2

Material risks or elements of risks not covered or not fully covered by the K-Factor requirement set out in Part Three, Title II, of Regulation (EU) 2019/2033

1. Where the investment firm does not meet the conditions for qualifying as a small and non-interconnected investment firm as set out in Article 12(1) of Regulation (EU) 2019/2033, competent authorities shall, having regard to the business model, legal form, the business and risk strategy, and the scale and complexity of the activities of the investment firm, during their reviews carried out in accordance with Articles 36 and 37 of Directive (EU) 2019/2034, measure any material risk or material element of risk deriving from the investment firm's ongoing activities, which that firm poses to itself, to its clients and to the market, and which is not covered or not fully covered by the K-factor requirement set out in Part Three, Title II, of Regulation (EU) 2019/2033.

Competent authorities shall determine the capital that would be considered adequate to cover the relevant risks related to the K-factor requirement.

2. The measurement referred to in paragraph 1 shall be made separately for each risk category set out as 'Risk-to-Client' (RtC), 'Risk-to-Market' (RtM) and 'Risk-to-Firm' (RtF) in Article 15 of Regulation (EU) 2019/2033.

By way of derogation from the first subparagraph, for investment firms subject to an initial capital requirement lower than the requirement laid down in Article 9(1) of Directive (EU) 2019/2034, where competent authorities deem a more granular quantification not feasible or overly burdensome, the measurement shall be performed on an aggregate level.

3. The measurement referred to in paragraph 2 shall identify and quantify material risks or elements of risks for each risk category, including risks from the use of the alternative internal model approach as referred to in Article 22, point (c), of Regulation (EU) 2019/2033, based on the indicative qualitative metrics set out in Article 6(2), (3) and (4), of this Regulation and on expert judgement to be delivered by competent authorities.

4. Competent authorities shall ensure that the capital considered adequate to cover material risks related to the K-factor requirement is not lower than the total K-factor requirement.

Article 3

Material risks or elements of risks not covered by the own funds requirements set out in Parts Three and Four of Regulation (EU) 2019/2033

1. Where the investment firm does not meet the conditions for qualifying as a small and non-interconnected investment firm as set out in Article 12(1) of Regulation (EU) 2019/2033, competent authorities shall, having regard to the business model, the legal form, the business and risk strategy, and the scale and complexity of the activities of the investment firm, during their supervisory review and evaluation process set out in Article 36 of Directive (EU) 2019/2034, measure any material risk or material element of risk deriving from any of the investment firm's ongoing activities, other than those referred to in Article 2 of this Regulation and not already covered by the own funds requirements of that firm set out in Parts Three and Four of Regulation (EU) 2019/2033, by determining on a risk-by-risk basis the additional capital considered adequate to cover material risks or elements of risks.

2. The measurement referred to in paragraph 1 shall comprise the identification, assessment and, where appropriate, the quantification of the following risk areas:

- (a) the risks posed to the security of the investment firm's network and information systems to ensure confidentiality, integrity and availability of their processes, data, and assets;
- (b) the interest rate risk and credit risk arising from non-trading book activities.

For investment firms subject to an initial capital requirement lower than the requirement laid down in Article 9(1) of Directive (EU) 2019/2034, where competent authorities deem a more granular quantification not feasible or overly burdensome, the measurement shall be performed on an aggregate level.

3. When performing the measurement referred to in paragraphs 1 and 2, competent authorities shall use the relevant indicative qualitative metrics referred to in Article 6(5) and combine them with static and historical trend analysis, delivering their expert judgement as appropriate.

Article 4

Total material risk not covered or not fully covered by the own funds requirements set out in Parts Three and Four of Regulation (EU) 2019/2033

1. Competent authorities shall calculate the total amount of additional capital considered adequate to cover material risks or material elements of risk posed by the investment firm's ongoing activities as the sum of the capital considered adequate calculated in accordance with Articles 2 and 3.

2. Competent authorities shall measure the total material risk not covered or not fully covered by the own funds requirements set out in Parts Three and Four of Regulation (EU) 2019/2033 by determining the level of additional own funds required as the difference between the higher of the amounts calculated in accordance with Article 1 or paragraph 1 of this Article and the own funds requirements set out in Part Three or Part Four of Regulation (EU) 2019/2033.

Article 5

General qualitative metrics for the determination of the additional own funds requirement

1. When determining the amount of the additional own fund requirements for the purposes of Articles 1, 2 and 3, competent authorities shall take into account the following:

- (a) the outcomes of the internal capital adequacy assessment process and the internal risk assessment process by the investment firm set out in Article 24 of Directive (EU) 2019/2034;
- (b) data reported in accordance with Articles 54 and 55 of Regulation (EU) 2019/2033;
- (c) the outcome of the reviews carried out in accordance with Articles 36 and 37 of Directive (EU) 2019/2034;
- (d) the results of any other supervisory activities;
- (e) other relevant inputs, including supervisory judgement.

2. Competent authorities shall ensure comparability in the quantification of the additional own funds requirement imposed across all investment firms under their supervisory remit.

*Article 6***Indicative qualitative metrics**

1. For the purposes of Article 1(5), second subparagraph, the indicative qualitative metrics shall be the following:
 - (a) the number of tied agents compared to total staff;
 - (b) the average duration of a wind-down in the jurisdiction, taking into consideration the complexity of the investment firm's business;
 - (c) the share of non-cancellable contracts and their residual duration;
 - (d) the identification of markets where the investment firm is the main service provider;
 - (e) the value and liquidity of fixed assets that the investment firm would have to dispose of during a wind-down;
 - (f) the average severance payments payable in case of a wind-down, taking into consideration employment legislation and contracts with employees.

2. For the purposes of Article 2, with regard to the measurement of the RtC, the indicative qualitative metrics shall be the following:
 - (a) the amount of client money held over the preceding 5 years;
 - (b) the amount of assets under management over the preceding 5 years;
 - (c) the amount of assets safeguarded and administered for clients over the preceding 5 years;
 - (d) the amount of losses or damages incurred by the investment firm due to breaches of its legal or contractual obligations over at least the preceding 5 years, including losses arising from the following:
 - (i) unsuitable advice given to investors and related investors' compensation;
 - (ii) failure to establish, implement and maintain appropriate procedures to prevent breaches;
 - (iii) trading or valuation errors;
 - (iv) business disruption, system failures, failure of transaction processing or process management;
 - (v) an action of the investment firm's tied agents or appointed representatives for which the investment firm is liable;
 - (e) specifically for investment firms holding client money, any inability of the investment firm to timely return client money when required and associated financial consequences over the past 5 years.

3. For the purposes of Article 2, with regard to the measurement of the RtM, the indicative qualitative metrics shall be the following:
 - (a) the variability of the value of the positions, including due to changing market conditions;
 - (b) the share of complex and illiquid products in the investment firm's trading book, in terms of volume and net income;
 - (c) specifically for investment firms using internal models, the availability of regular back-testing of models used for regulatory purposes.

4. For the purposes of Article 2, with regard to the measurement of the RtF, the indicative qualitative metrics shall be the following:
 - (a) the daily trading flow and average daily trading flow over the preceding 5 years;
 - (b) any significant operational events related to daily trading flow and associated financial losses over the preceding 5 years, including processing errors;

- (c) the variability of the investment firm's income and revenues over the preceding 5 years;
- (d) any losses incurred due to variations in positions in financial instruments, foreign currencies and commodities over the preceding 5 years;
- (e) the default rate of clients or counterparties, and associated losses over the preceding 5 years;
- (f) any losses due to material changes in the book value of assets, including due to changes in market conditions and in the creditworthiness of counterparties;
- (g) the amounts and variability of payments or contributions under a defined benefit pension scheme over the preceding 5 years;
- (h) any concentration of the investment firm's assets, including concentration of clients and counterparties, as well as sectoral and geographical concentration;
- (i) the share of off-balance sheet exposure compared to the investment total assets and related credit risk.

5. For the purposes of Article 3, the indicative qualitative metrics shall be the following:

- (a) any indication of significant financial risks not addressed by the own funds requirements set out in Article 11 of Regulation (EU) 2019/2033, in particular:
 - (i) the average of total operational risk losses over gross income over the preceding 5 years;
 - (ii) any significant operational events and associated financial losses over the preceding 5 years;
 - (iii) the share of the investment firm's net income coming from services or activities that are not listed in Section A of Annex I to Directive 2014/65/EU of the European Parliament and of the Council ^(⁵);
- (b) any indication of significant information and communication technology (ICT) risk, in particular:
 - (i) the overall complexity of ICT architecture, including the share of outsourced ICT services;
 - (ii) the number of material changes within the ICT environment over the preceding 5 years;
 - (iii) any losses due to disruption caused by incidents affecting critical ICT services over the preceding 5 years;
 - (iv) the number of cyberattacks and related losses over the preceding 5 years;
- (c) any indication of significant interest rate risk arising from non-trading book activities, in particular:
 - (i) the volume of transactions based on interest rates or otherwise depending on interest rates, outside of the trading book of the investment firm;
 - (ii) the investment firm's hedging policy and potential misalignments between the position and the hedge, outside of the trading book of the investment firm.

6. Competent authorities may extend the list of indicative qualitative metrics set out in paragraphs 1 to 5 while ensuring that such additional metrics are proportionate to the investment firm's size, complexity, business model, and operating model.

7. Competent authorities shall adjust the metrics set out in paragraphs 1 to 5 and shall use those adjusted metrics where any of the following conditions apply:

- (a) the metric is not appropriate given the specific legal form, structural changes, business and operating model of the investment firm;

⁽⁵⁾ Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ L 173, 12.6.2014, p. 349).

- (b) the estimation of the metric is overly burdensome given the size and complexity of activities of the investment firm;
- (c) the estimation of the metric is not feasible due to the lack of reliable data, where such data do not fall under Articles 54 and 55 of Regulation (EU) 2019/2033 or Article 39(2), point (j), of Directive (EU) 2019/2034;
- (d) the estimation of the metric is not feasible due to the lack of reliable historical data, rendering the historical analysis period irrelevant. In such cases, competent authorities shall limit the period of historical analysis to the time that has elapsed since the last supervisory review and evaluation process set out in Article 36 of Directive (EU) 2019/2034.

Where it is not possible for competent authorities to adjust the metrics as referred to in the first subparagraph, competent authorities shall use alternative metrics as appropriate, while ensuring that such alternative metrics are proportionate to the investment firm's size, complexity, business model, and operating model.

Article 7

Entry into force

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

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

Done at Brussels, 25 May 2023.

For the Commission
The President
Ursula VON DER LEYEN

COMMISSION DELEGATED REGULATION (EU) 2023/1669
of 16 June 2023
supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with
regard to the energy labelling of smartphones and slate tablets

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

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

Having regard to Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU ⁽¹⁾, and in particular Article 16(1) thereof,

Whereas:

- (1) Regulation (EU) 2017/1369 empowers the Commission to adopt delegated acts as regards the labelling or re-scaling of the labelling of product groups representing significant potential for energy savings and, where relevant, other resources.
- (2) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of mobile phones, smartphones and slate tablets. The study was conducted in close cooperation with stakeholders and interested parties in the Union and third countries, and the results have been made publicly available.
- (3) The preparatory study concluded that the scope for reducing the energy consumption of smartphones and slate tablets is substantial. It also concluded that the battery lifetime and consequently the product lifetime of smartphones and slate tablets can significantly be improved by means of an energy labelling scheme. Smartphones and slate tablets should therefore be covered by energy labelling requirements. An energy label is however currently not seen as appropriate for cordless phones and feature phones, given the moderate spread in the energy efficiency of products available on the market.
- (4) In total, smartphones and slate tablets consumed 36,1 TWh of primary energy in 2020, including all life cycle phases. The preparatory study showed that, without regulatory action, these values are likely to increase to 36,5 TWh of primary energy in 2030. The combined effect of this Regulation and Commission Regulation (EU) 2023/1670 ⁽²⁾ is expected to limit the energy consumption of smartphones and slate tablets in 2030 to 23,3 TWh, meaning 35 % of primary energy consumption is saved compared to what would happen if no measures were taken.

⁽¹⁾ OJ L 198, 28.7.2017, p. 1.

⁽²⁾ Commission Regulation (EU) 2023/1670 of 16 June 2023 laying down ecodesign requirements for smartphones, mobile phones other than smartphones, cordless phones and slate tablets pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation (EU) 2023/826 (see page 47 of this Official Journal).

- (5) Smartphones and slate tablets that are displayed at trade fairs should bear the energy label if the first unit of the model has already been placed on the market or is placed on the market at the trade fair.
- (6) The relevant product parameters should be measured or calculated using reliable, accurate and reproducible methods. Those methods should take into account recognised state-of-the-art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council ⁽⁷⁾.
- (7) The energy efficiency index of a smartphone or a slate tablet should be calculated with the operating system version installed on the product model at the date of placement on the market. Until the date of end of placement on the market, if an updated version of the operating system is installed on the same product model, the energy efficiency index should be recalculated and, where applicable, the value of any other parameter of the label and of the product information sheet should be reassessed. Any change in the energy efficiency index, or where applicable in any other parameter value part of the label and of the product information sheet, should be considered relevant in respect to Article 4(4) of Regulation (EU) 2017/1369, in particular when this change is detrimental for the end users.
- (8) To facilitate compliance checks, the content of the technical documentation referred to in Annex VI should be sufficient to allow market surveillance authorities to check the values published on the label and in the product information sheet. In accordance with Article 12 of Regulation (EU) 2017/1369, values for the measured and calculated parameters of the model should be entered into the product database.
- (9) Recognising the growth of sales of energy-related products through providers of online platforms, as defined in Regulation (EU) 2022/2065 of the European Parliament and of the Council ⁽⁸⁾, rather than directly from suppliers' websites, it should be clarified that such providers of online platforms should enable traders to provide information concerning the labelling of the product concerned, in compliance with Article 31(2) of Regulation (EU) 2022/2065. The 'information concerning the labelling and marking' referred to in Article 31(2), point (c) of Regulation (EU) 2022/2065 should, in the context of this Regulation, be understood as encompassing both the energy label and the product information sheet. In line with Article 6 of Regulation (EU) 2022/2065, providers of online platforms are not liable for products sold through their interfaces on the condition that they do not have actual knowledge of the illegality of such products and upon receiving knowledge on the illegality of the products they act expeditiously to remove them from their interfaces. A supplier selling directly to end-users via its own website is covered by dealers' distance selling obligations referred to in Article 5 of Regulation (EU) 2017/1369.
- (10) In order to ensure coherence with existing industry norms, references in this Regulation related to fasteners and connectors, tools, working environment and skill level, in the context of calculating the repairability score, are consistent with the terminology used in standard EN 45554, which provides general methods for the assessment of the ability to repair, reuse and upgrade energy-related products.
- (11) The requirements set out in this Regulation should apply from 21 months after its entry into force.
- (12) The measures provided for in this Regulation were discussed by the Consultation Forum established pursuant to Article 14(1) of Regulation (EU) 2017/1369 and with the Member States experts in accordance with Article 17 of Regulation (EU) 2017/1369,

⁽⁷⁾ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

⁽⁸⁾ Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act) (OJ L 277, 27.10.2022, p. 1).

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

This Regulation establishes requirements for the labelling of smartphones and slate tablets, and the provision of supplementary product information on smartphones and slate tablets.

This Regulation does not apply to the following products:

- (a) mobile phones and tablets with a flexible main display which the user can unroll and roll up partly or fully;
- (b) smartphones for high security communication.

Article 2

Definitions

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

(1) 'mobile phone' means a cordless handheld electronic device, which has the following characteristics:

- (a) it is designed for long-range voice communication over either a cellular telecommunications network or a satellite-based telecommunications network, requiring a SIM card, eSIM or similar means to identify the connected parties;
- (b) it is designed for battery mode usage, and connection to mains via an external power supply and/or wireless power transmission is mainly for battery charging purposes;
- (c) it is not designed to be worn on the wrist;

(2) 'smartphone' means a mobile phone, which has the following characteristics:

- (a) it is characterised by wireless network connection, mobile use of internet services, an operating system optimised for handheld use and the ability to accept original and third-party software applications;
- (b) it has an integrated touch screen display with a viewable diagonal size of 10,16 centimetres (or 4,0 inches) or more, but less than 17,78 centimetres (or 7,0 inches);
- (c) where the device has a foldable display or has more than one display, at least one of the displays falls into the size range in either opened or closed mode;

(3) 'smartphone for high security communication' means a smartphone, which has the following characteristics:

- (a) it is accredited, or otherwise approved by the designated authority in a Member State or is in the process of accreditation or other approval to transmit, process or store classified information;
- (b) it is intended for professional users only;
- (c) it is capable of detecting physical intrusion to the hardware, including for intrusion detection at least a controller, related wiring, flexible printed circuit board circuitry for drill protection integrated to the device chassis and integrated tamper loops on the main printed circuit board;

(4) 'professional user' means any natural or legal person, to whom a product has been made available for use in the course of their industrial or professional activities;

- (5) 'slate tablet' means a device that is designed for portability and has the following characteristics:
- (a) it has an integrated touch-sensitive display with a viewable diagonal size greater than or equal to 17,78 centimetres (or 7,0 inches) and less than 44,20 centimetres (or 17,4 inches);
 - (b) it does not have an integrated, physically attached keyboard in its designed configuration;
 - (c) it primarily relies on a wireless network connection;
 - (d) it is powered by an internal battery and is not intended to work without battery; and
 - (e) it is placed on the market with an operating system designed for mobile platforms, identical or analogous to smartphones;
- (6) 'point of sale' means a location where smartphone or slate tablet units are displayed or offered for sale, hire or hire-purchase.
2. For the purposes of Annexes II to IX, the definitions set out in Annex I shall apply.

Article 3

Obligations of suppliers

1. Suppliers shall ensure that:
- (a) each smartphone or slate tablet is supplied with a printed label in the format as set out in Annex III;
 - (b) the values of the parameters of the product information sheet, as set out in Annex V, are entered into the public part of the product database;
 - (c) where specifically requested by the dealer, the product information sheet is made available in printed form;
 - (d) the content of the technical documentation, as set out in Annex VI, is entered into the product database;
 - (e) any visual advertisement for a specific model of smartphones or slate tablets contains the energy efficiency class and the range of energy efficiency classes available on the label in accordance with Annexes VII and VIII;
 - (f) any technical promotional material concerning a specific model of smartphones or slate tablets, including technical promotional material on the internet, which describes its specific technical parameters includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII;
 - (g) an electronic label in the format and containing the information, as set out in Annex III, is made available to dealers for each smartphone and slate tablet model;
 - (h) an electronic product information sheet, as set out in Annex V, is made available to dealers for each smartphone and slate tablet model.
2. The energy efficiency class and the repeated free fall reliability class as set out in Annex II shall be calculated in accordance with Annex IV.

Article 4

Obligations of dealers

Dealers shall ensure that:

- (a) each smartphone and slate tablet, at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point (a) of Article 3(1) displayed in proximity to the product or hung on it or placed in such a way as to be clearly visible and unequivocally associated to the specific model;

- (b) in the event of distance selling, the label and product information sheet are provided in accordance with Annexes VII and VIII;
- (c) any visual advertisement for a specific model of smartphones or slate tablets, including on the internet, contains the energy efficiency class and the range of energy efficiency classes available on the label, in accordance with Annex VII;
- (d) any technical promotional material concerning a specific model of smartphone or slate tablet, including technical promotional material on the internet, which describes its specific technical parameters includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII.

Article 5

Measurement methods

The information to be provided pursuant to Articles 3 and 4 shall be obtained by reliable, accurate and reproducible measurement and calculation methods, which take into account the recognised state-of-the-art measurement and calculation methods, as set out in Annex IV.

Article 6

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex IX when performing the market surveillance checks referred to in Article 8(3) of Regulation (EU) 2017/1369.

Article 7

Review

The Commission shall review this Regulation in the light of technological progress and present the results of this assessment including, if appropriate, a draft revision proposal, to the Consultation Forum established pursuant to Article 14(1) of Regulation (EU) 2017/1369, no later than 20 September 2027.

The review shall in particular assess the appropriateness of:

- (a) revising the test methods to reflect changes in typical end-user behaviour and new functionalities;
- (b) adding environmental footprint information on the label;
- (c) revising the verification tolerances set out in Annex IX;
- (d) revising the reparability index, including additional aspects and the prices of spare parts.

Article 8

Entry into force and application

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

It shall apply from 20 June 2025.

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

Done at Brussels, 16 June 2023.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX I

Definitions applicable to the Annexes

- (1) 'declared values' means the values provided by the supplier for the stated, calculated or measured technical parameters in the technical documentation pursuant to Article 3(3) of Regulation (EU) 2017/1369 and in accordance with Article 3(1), point (d), and Annex VI of this Regulation, for the verification of compliance by the Member State authorities;
- (2) 'battery endurance per cycle' means the time a smartphone or slate tablet can operate running a defined test scenario with an initially fully charged battery, before the device shuts off automatically due to a drained battery, expressed in hours (h);
- (3) 'rated capacity' means the amount of electricity declared by the manufacturer that a battery can deliver during a 5-hour period when measured under specified conditions, expressed in milliampere-hours (mAh);
- (4) 'remaining capacity' of a battery means the capacity with the battery keeping normal peak performance and measured relative to when the product was new;
- (5) '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;
- (6) 'END_{device} [h]' means the battery endurance per cycle calculated as a weighted value based on the measured endurance for defined functions, including standby, expressed in hours;
- (7) 'C' means 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;
- (8) 'nominal voltage' means the voltage of a battery measured at the mid point between fully charged and fully discharged based on a 0,2 C discharge rate;
- (9) 'final voltage for battery endurance in cycles test' means the specified closed circuit voltage at which a discharge of a battery is terminated, during test;
- (10) 'energy efficiency index' means the ratio between the battery endurance per cycle (END_{device}) and the nominal voltage of the battery multiplied by the rated capacity of the battery;
- (11) 'ingress protection rating' means the extent of protection provided by an enclosure against ingress of solid foreign objects and/or against ingress of water, measured according to standardised test methods and expressed with a coding system to indicate the degree of such protection;
- (12) 'fully extended state' means a state of the device whereby movable parts as intended for use, such as displays and keyboards, are unfolded, flipped open or similarly extended in a way that the projected area of length times width is maximised;
- (13) 'guarantee' means any undertaking by the retailer or supplier to the consumer to do any of the following:
 - (a) reimburse the price paid;
 - (b) replace, repair or handle the smartphone or slate tablet in any way if it does not meet the specifications set out in the guarantee statement or in the relevant advertising;
- (14) 'spare part' means a separate part that can replace a part with the same or similar function in a smartphone or slate tablet. The functionality of the smartphone or slate tablet is restored or upgraded when the part is replaced by a spare part. Spare parts may be used parts;

- (15) 'disassembly' means a process whereby a product is separated into its parts and/or components in such a way that it could subsequently be reassembled and made operational;
- (16) 'fastener' means a hardware device or substance that mechanically, magnetically or by other means connects or fixes two or more objects, parts or pieces. A hardware device which in addition serves an electrical function shall also be considered a fastener;
- (17) 'reusable fastener' means a fastener that can be completely reused in the reassembly for the same purpose and that does no damage either to the product or to the fastener itself during the disassembly or reassembly process in a way that makes their multiple reuse impossible;
- (18) 'resupplied fastener' means a removable fastener that is supplied at no additional cost with the spare part which it is intended to connect or fix; adhesives shall be considered resupplied fasteners if they are supplied with the spare part in a quantity that is sufficient for the reassembly, at no additional cost;
- (19) 'removable fastener' means a fastener that is not a reusable fastener, but whose removal does not damage the product, or leave residue, which precludes reassembly;
- (20) 'step' means an operation that finishes with the removal of a part (or bundle) or with a change of tool; any placement of a part away from its initial location, even if that entails partial disconnection or unplugging, shall also be considered as removal;
- (21) 'security update' means an operating system update, including security patches, if relevant for a given device, whose main purpose is to provide enhanced security for the device;
- (22) 'corrective update' means an operating system update, including corrective patches, whose purpose is to provide corrections to bugs, errors or malfunctions in the operating system;
- (23) 'functionality update' means an operating system update whose main purpose is to implement new functionalities;
- (24) 'battery' means any part consisting of one or several battery cells, including, as relevant to the product model, an electronic circuitry with battery-related sensors for battery management, housing(s), battery tray, brackets, shieldings, thermal interface materials, and electric connections to other assemblies of the device;
- (25) 'back cover' or 'back cover assembly' means the main backside housing, including one or more of the following elements, as relevant to the product model: the frame, a backside cover layer attached to the main back cover body, rear-facing camera lens covers, printed antennas, brackets, shieldings, gaskets, electric connections to other assemblies of the device and thermal interface materials;
- (26) 'auxiliary microphone' means a microphone that is not essential for user's voice signals, but provides secondary functions, such as, but not limited to, ambient noise reduction;
- (27) 'front-facing camera assembly' means any part consisting of one or several cameras oriented towards the user of the device, including, as relevant to the product model:
- (a) camera components and related sensors;
 - (b) flashlight components;
 - (c) optical components;

- (d) mechanical components needed for functions such as image stabilisation and focus;
 - (e) module housing(s);
 - (f) brackets;
 - (g) shieldings;
 - (h) signal lights;
 - (i) auxiliary microphones;
 - (j) electric connections to other assemblies of the device;
- (28) 'rear-facing camera assembly' means any part consisting of one or several cameras oriented to the rear side of the device, including, as relevant to the product model:
- (a) camera components and related sensors;
 - (b) flashlight components;
 - (c) optical components;
 - (d) mechanical components needed for functions such as image stabilisation and focus;
 - (e) module housing(s);
 - (f) brackets;
 - (g) shieldings;
 - (h) auxiliary microphones;
 - (i) electric connections to other assemblies of the device;
- (29) 'external audio connector' means a connector for audio signals to connect to a headset or external loudspeakers or similar audio device, including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (30) 'external charging port' means a port for wired battery charging, possibly also used for data exchange and reverse charging of another device, which is composed of a USB-C receptacle and a related housing and including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (31) 'mechanical button' means a mechanical switch or an assembly of mechanical switches that can be depressed or a slider button which can be mechanically moved to switch on or off functions such as volume, triggering the camera, or switching on or off the device and including, as relevant to the product model, brackets, gaskets and electric connections to other assemblies of the device;
- (32) 'main microphone(s)' means the microphone(s) intended for the user's voice signals including, as relevant to the product model, gaskets and electric connections to other assemblies of the device;
- (33) 'speaker' means all loudspeakers and mechanical parts to generate sound, including, as relevant to the product model, module housing(s), gaskets and electric connections to other assemblies of the device;
- (34) 'hinge assembly' means a part that allows a device to be folded while preserving its operational integrity including, where relevant, module housings;
- (35) 'mechanical display folding mechanism' means a part that allows a device, including its display, to be folded while preserving its operational integrity;
- (36) 'charger' means an external power supply to charge the battery of and provide electrical power to a battery-powered mobile phone, cordless phone or slate tablet;

- (37) 'display assembly' means the assembly of display unit and where relevant front panel digitiser unit, including, as relevant to the product model:
- (a) backplate;
 - (b) shielding;
 - (c) display frame;
 - (d) backlight units;
 - (e) electronics circuitry including:
 - (i) display driver but excluding the main graphics processing unit functionality;
 - (ii) row and column controllers;
 - (iii) touch signal circuitry;
 - (iv) electric connections to other assemblies of the device;
- (38) 'professional repairer' means an operator or undertaking which performs repair and professional maintenance of smartphones or slate tablets, either as a service or with a view to the subsequent resale of the repaired device;
- (39) 'repair and maintenance information' means the repair and maintenance information as from Annex II, point B 1.1 (2)e of Regulation (EU) 2023/1670, for smartphones, and as from Annex II, point D 1.1 (2)e of Regulation (EU) 2023/1670, for slate tablets, that manufacturers, importers or authorised representatives are required to provide access to in relation to the relevant product;
- (40) 'date of placement on the market' means the date of placing on the market of the first unit of a product model;
- (41) 'date of end of placement on the market' means the date of placing on the market of the last unit of a product model;
- (42) 'proprietary tool' means a tool that is not available for purchase by the general public or for which any applicable patents are not available to licence under fair, reasonable and non-discriminatory terms;
- (43) 'basic tools' means a screwdriver for slotted heads, a screwdriver for cross recess screws, a screwdriver for hexalobular recess heads, a hexagon socket key, a combination wrench, combination pliers, combination pliers for wire stripping and terminal crimping, half round nose pliers, diagonal cutters, multigrip pliers, locking pliers, a prying lever, tweezers, magnifying glass, a spudger and a pick;
- (44) 'commercially available tool' means a tool that is available for purchase by the general public and is neither a basic tool nor a proprietary tool;
- (45) 'separate protective cover' means a protective cover which may be shipped with a smartphone or slate tablet, but does not serve as a required part of the housing and is not considered an integral part of the product.
-

ANNEX II

Energy efficiency classes

- A. The energy efficiency class of a smartphone or a slate tablet shall be determined on the basis of its Energy Efficiency Index (EEI) as set out in Table 1 for smartphones and table 2 for slate tablets. The EEI of a smartphone or a slate tablet shall be determined in accordance with Annex IV, point 1.

Table 1

Energy efficiency classes of smartphones

Energy Efficiency Class	Energy Efficiency Index (EEI)
A (most efficient)	$EEI > 2,70$
B	$2,30 < EEI \leq 2,70$
C	$1,95 < EEI \leq 2,30$
D	$1,66 < EEI \leq 1,95$
E	$1,41 < EEI \leq 1,66$
F	$1,20 < EEI \leq 1,41$
G (least efficient)	$EEI \leq 1,20$

Table 2

Energy efficiency classes of slate tablets

Energy Efficiency Class	Energy Efficiency Index (EEI)
A (most efficient)	$EEI > 7,90$
B	$6,32 < EEI \leq 7,90$
C	$5,06 < EEI \leq 6,32$
D	$4,04 < EEI \leq 5,06$
E	$3,24 < EEI \leq 4,04$
F	$2,59 < EEI \leq 3,24$
G (least efficient)	$EEI \leq 2,59$

- B. The repeated free fall reliability class of a smartphone or a slate tablet shall be determined on the basis of the number of falls without defect as set out in Table 3. The number of falls without defect shall be determined in accordance with Annex IV, point 4.

Table 3

Repeated free fall reliability classes of smartphones and slate tablets

Repeated Free Fall Reliability Class	Falls without defect			
	Non-foldable smartphone	Non-foldable slate tablet	Foldable smartphone	Foldable slate tablet
A (most robust)	$n \geq 270$	$n \geq 208$	$n \geq 210$ (in un-extended state) and $n \geq 45$ (in fully extended state)	$n \geq 182$ (in un-extended state) and $n \geq 20$ (in fully extended state)

B	$180 \leq n < 270$	$156 \leq n < 208$	$140 \leq n < 210$ (in un-extended state) and $35 \leq n < 45$ (in fully extended state)	$130 \leq n < 182$ (in un-extended state) and $15 \leq n < 20$ (in fully extended state)
C	$90 \leq n < 180$	$104 \leq n < 156$	$70 \leq n < 140$ (in un-extended state) and $25 \leq n < 35$ (in fully extended state)	$78 \leq n < 130$ (in un-extended state) and $10 \leq n < 15$ (in fully extended state)
D	$45 \leq n < 90$	$52 \leq n < 104$	$35 \leq n < 70$ (in un-extended state) and $15 \leq n < 25$ (in fully extended state)	$52 \leq n < 78$ (in un-extended state) and $5 \leq n < 10$ (in fully extended state)
E (least robust)	-	$n < 52$	-	$n < 52$ (in un-extended state) and $n < 5$ (in fully extended state)

C. The reparability class of a smartphone or a slate tablet shall be determined on the basis of the reparability index as set out in Table 4. The reparability index shall be determined in accordance with Annex IV, point 5.

Table 4

Reparability classes of smartphones and slate tablets

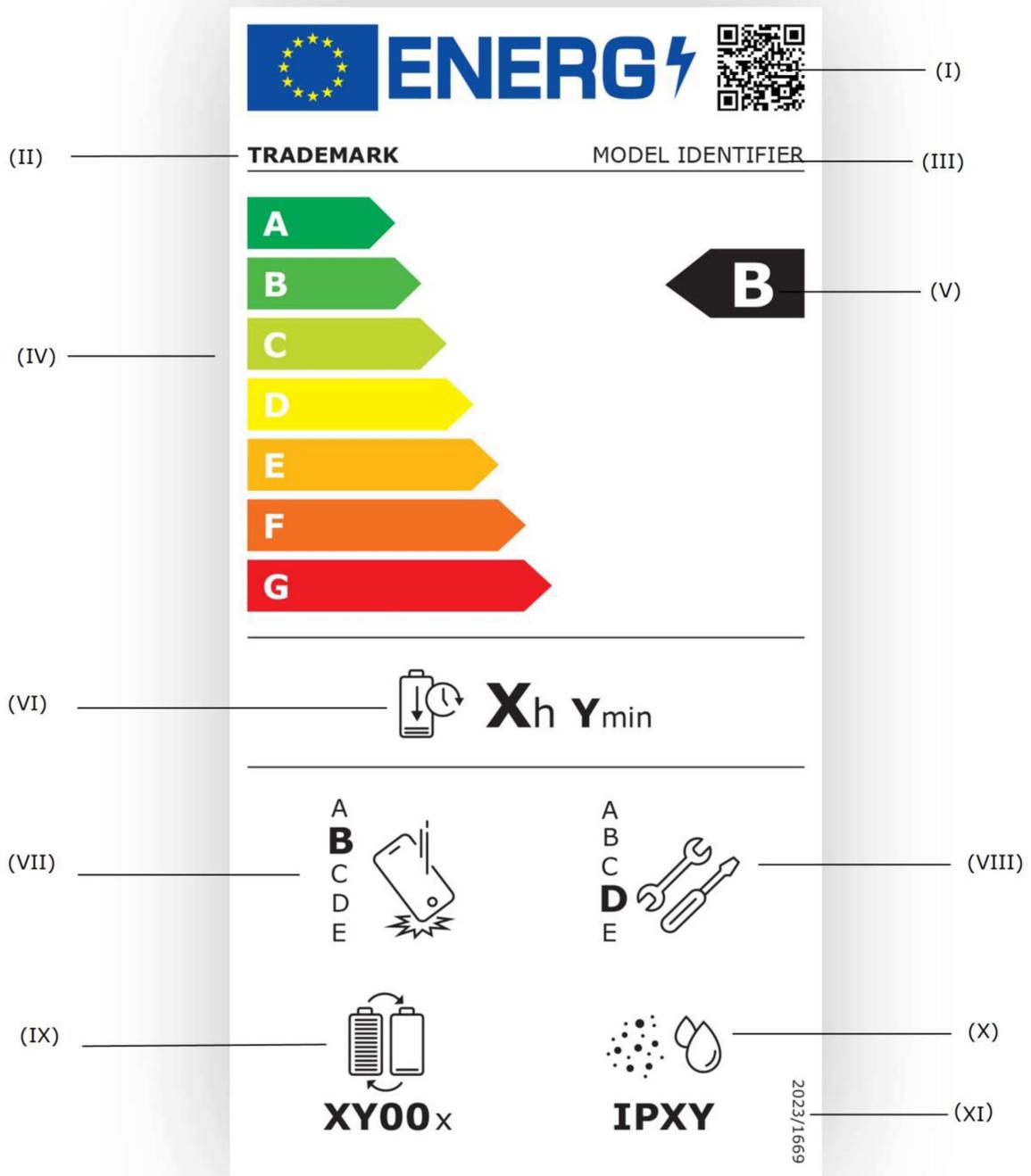
Reparability Class	Reparability Index (R)
A (most repairable)	$R \geq 4,00$
B	$4,00 > R \geq 3,35$
C	$3,35 > R \geq 2,55$
D	$2,55 > R \geq 1,75$
E (least repairable)	$1,75 > R \geq 1,00$

ANNEX III

Label for smartphones and slate tablets

1. LABEL FOR SMARTPHONES AND SLATE TABLETS

Label:

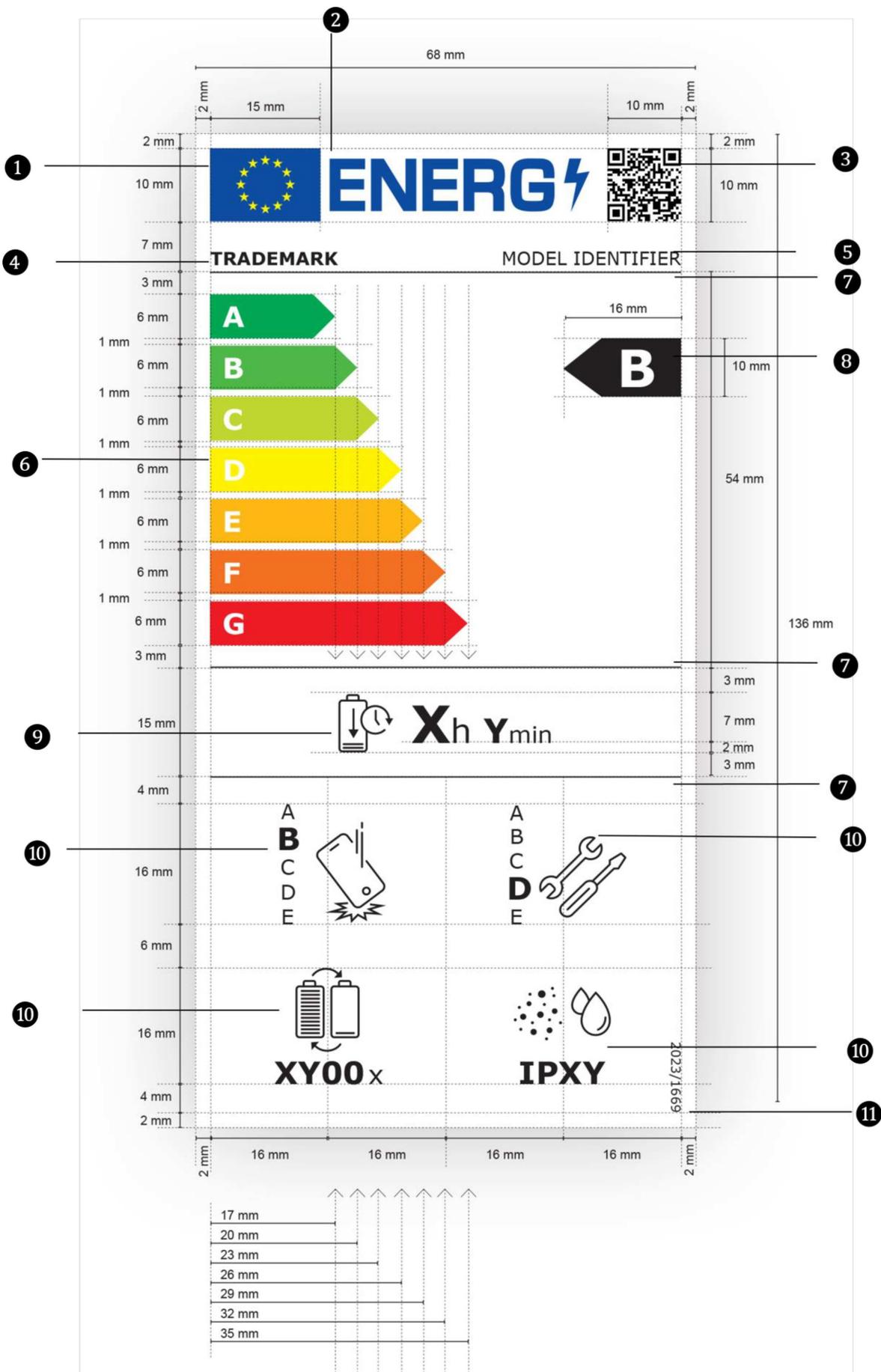


The following information shall be included in the label for smartphones and slate tablets:

- (I) a QR code;
- (II) the trade mark;
- (III) the supplier's model identifier;
- (IV) the scale of energy efficiency classes from A to G;
- (V) the energy efficiency class determined in accordance with Annex II;
- (VI) the battery endurance per cycle (END_{Device}), in hours and minutes per full battery charge, in accordance with Annex IV, point 1;
- (VII) repeated free fall reliability class determined in accordance with Annex II;
- (VIII) repairability class determined in accordance with Annex II;
- (IX) battery endurance in cycles, in cycles, in accordance with Annex IV, point 2;
- (X) ingress protection rating in accordance with Annex IV, point 3;
- (XI) the number of this Regulation, that is '2023/1669'.

2. LABEL DESIGN FOR SMARTPHONES AND SLATE TABLETS

2.1. The design of the label for smartphones and slate tablets shall be as in the figure below.



2.2. The label for smartphones and slate tablets shall fulfil the following specifications:

- (a) The label shall be at least 68 mm wide and 136 mm high. Where the label is printed in a larger format, its content shall nevertheless remain proportionate to those specifications above. If necessary to fit the label into the product packaging, the label can be printed scaled down, but not less than 70 % of the above specified width and height; its content shall nevertheless be proportionate to the specifications above and the QR code still readable by a commonly available QR reader, such as those integrated in a smartphone;
- (b) The background of the label shall be 100 % white;
- (c) The typeface shall be Verdana;
- (d) The dimensions and specifications of the elements constituting the label shall be as indicated in the label design;
- (e) Colours shall be CMYK – cyan, magenta, yellow and black, following this example: 0,70,100,0: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black;
- (f) The label shall fulfil all of the following requirements (numbers refer to the figures above):
 - ① the colours of the EU logo shall be as follows:
 - the background: 100,80,0,0;
 - the stars: 0,0,100,0;
 - ② the colour of the energy logo shall be: 100,80,0,0;
 - ③ the QR code shall be 100 % black;
 - ④ the trade mark shall be 100 % black and in Bold, 7 pt;
 - ⑤ the model identifier shall be 100 % black and in Regular 7 pt;
 - ⑥ the A to G scale shall be as follows:
 - the letters of the energy efficiency scale shall be 100 % white and in Bold 11 pt; the letters shall be centred on an axis at 4 mm from the left side of the arrows;
 - the colours of the A to G scale arrows shall be as follows:
 - A-class: 100,0,100,0;
 - B-class: 70,0,100,0;
 - C-class: 30,0,100,0;
 - D-class: 0,0,100,0;
 - E-class: 0,30,100,0;
 - F-class: 0,70,100,0;
 - G-class: 0,100,100,0;
 - ⑦ the internal dividers shall have a weight of 0,5 pt and the colour shall be 100 % black;
 - ⑧ the letter of the energy efficiency class shall be 100 % white and in Bold 20 pt. The energy efficiency class arrow and the corresponding arrow in the A to G scale shall be positioned in such a way that their tips are aligned. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow which shall be 100 % black;
 - ⑨ the number of hours of the value of the battery endurance per cycle shall be in Bold 20 pt; 'h' shall be in Regular 13 pt; the number of minutes of the value of the battery endurance per cycle shall be in Bold 13 pt; 'min' shall be in Regular 9 pt; the text shall be centred and 100 % black;

- 10 the pictograms shall be as shown as in the label design and as follows:
- the pictograms' lines shall have a weight of 1 pt and they and the texts (numbers and units) shall be 100 % black;
 - repeated free fall reliability class pictogram: the range of repeated free fall reliability classes (A to E for slate tablets, A to D for smartphones) shall be aligned on a vertical axis on the left side of the icon, with the letter of the applicable repeated free fall reliability class in Bold 12 pt and the other letters of the repeated free fall reliability classes in Regular 8 pt;
 - repairability class pictogram: the range of repairability classes (A to E) shall be aligned on a vertical axis on the left side of the icon, with the letter of the applicable repairability class in Bold 12 pt and the other letters of the repairability classes in Regular 8 pt;
 - battery endurance in cycles pictogram: the value of the battery endurance in cycles shall be in Bold 12 pt; 'x' shall be in Regular 10 pt; the text shall be centred under the pictogram;
 - ingress protection rating pictogram: the text under the pictogram shall be in Bold 12 pt, and it shall be centred under the pictogram;
- 11 the number of the regulation shall be 100 % black and in Regular 5 pt.
-

ANNEX IV

Measurement and calculation methods

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards, the reference numbers of which have been published in the *Official Journal of the European Union* or using other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods and are in line with the provisions set out below.

In the absence of relevant standards and until the publication of the references of the relevant harmonised standards in the *Official Journal of the European Union*, the transitional testing methods set out in Annex IVa, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art methods, shall be used.

Where a parameter is declared pursuant to Article 3(3) of Regulation (EU) 2017/1369 and in accordance with Table 9 of Annex VI to this Regulation, its declared value shall be used by the supplier for the calculations in this Annex.

1. CALCULATION OF THE ENERGY EFFICIENCY INDEX

Smartphones and slate tablets shall be tested for battery endurance per cycle with the following test settings, starting the test with a fully charged battery:

1.1. General device settings and configuration

- an application shall be installed on the device to embed the test scenario and the needed contents used during the testing;
- all applications shall be closed (except required system applications);
- no specific user account (e.g. Google or Apple ID) shall be needed to perform the test;
- the web browser used during the testing shall be the native OS browser of the device;
- power saving features shall be disabled before starting the testing;
- no accessory shall be connected to the device;
- for Dual-SIM devices, only one SIM card shall be inserted; for Dual-SIM devices with eSIM, eSIM shall be switched off; for devices with eSIM only, eSIM shall be used;
- brightness shall be set at 200cd/m² using an external equipment to ensure this setting;
- auto brightness shall be switched off and the refresh rate shall be set at the default value;
- darkmode shall be disabled;
- all audio volumes (call and media) shall be set at 75 dBa at a defined distance using an external equipment to ensure this setting. The audio volume shall be set using a sound level meter at 20 cm from the front (screen) of the device;
- speaker to be used during video shall be the one set in the default setting of the device;
- during the call, the application shall ensure that the screen is off, no specific simulation of the proximity sensor shall be required;
- any network simulator may be used, if capable of supporting the required settings; the specific contents (video, web pages, files) shall be uploaded on the simulator.

1.2. Test sequence

1.2.1. Test sequence for smartphones

From 100 % battery charge level to power off: repeat a cycle of:

- Phone call (4 min);
- Idle (30 min);
- Web browsing (9 min);
- Idle (30 min);
- Video streaming (4 min);
- Gaming (1 min);
- Idle (30 min);
- Data transfer: http upload and download (8 min);
- Idle (30 min);
- Video playback (4 min);

When device powers off: Terminate test.

1.2.2. Test sequence for slate tablets

From 100 % battery charge level to power off: repeat a cycle of:

- Gaming (5 min);
- Idle (66 min);
- Web browsing (11 min);
- Idle (66 min);
- Video streaming (6 min);
- Idle (66 min);
- Data transfer: http upload and download (2 min);
- Idle (66 min);
- Video playback (6 min);
- Idle (66 min);

When device powers off: Terminate test.

1.3. Calculation

The battery endurance (END_{device}) in hours equals to the execution time of the specified test sequence:

$$END_{device} = END_{test}$$

where END_{test} is the run-time of the test in hours, rounded to two decimal places.

The energy efficiency index (EEI) of a smartphone or slate tablet shall be calculated using the following equation and rounded to two decimal places:

$$EEI = \frac{END_{Device}}{U_{nom} \times C_{rated}} \times 1000$$

Where:

- EEI is the Energy Efficiency Index in 1/W;
- U_{nom} is the nominal voltage in V;
- C_{rated} is the rated battery capacity in mAh.

The EEI shall be calculated with the operating system version installed on the product model at the date of placement on the market.

2. MEASUREMENT OF THE BATTERY ENDURANCE IN CYCLES

Batteries of smartphones and slate tablets shall be tested for battery endurance in cycles until the battery has, in a fully charged state, a remaining capacity of at least 80 % of the rated capacity; the battery shall be tested according to the default charging algorithms implemented by the manufacturer.

The resulting number of cycles shall be rounded down to full hundreds as ' $\geq x00$ ' and stated in ranges as ≥ 800 , ≥ 900 , $\geq 1\ 000$, $\geq 1\ 100$, $\geq 1\ 200$, $\geq 1\ 300$, $\geq 1\ 400$.

The battery endurance in cycles shall be calculated with the operating system version installed on the product model at the date of placement on the market.

3. MEASUREMENT OF THE INGRESS PROTECTION

Ingress protection against particle and moisture ingress shall be stated as an IP code, corresponding to the levels listed in Table 5. Tests shall be performed without protective cover.

Table 5

Ingress protection rating levels

Rating level	Ingress of solid foreign objects	Ingress of water with harmful effects
	Object size	Protection against
0	no protection	no protection
1	≥ 50 mm	vertical water dripping
2	protected from touch by fingers and ≥ 12 mm	water spray less than 15 degrees from vertical
3	$\geq 2,5$ mm	water spray less than 60 degrees from vertical
4	≥ 1 mm	splashing of water
5	dust-protected	jetting of water
6	dust-tight	powerful jetting of water
7	n.a.	temporary immersion, 1 m depth
8	n.a.	continuous immersion, 1 m or more depth

4. RESISTANCE TO ACCIDENTAL DROPS OR REPEATED FREE FALL RELIABILITY

Resistance to accidental drops or repeated free fall reliability is measured through the number of falls without defect in the repeated free fall test. The repeated free fall tests shall be performed with five units of each model for each of the applicable test cases. The resistance to accidental drops is the number of falls which have been passed by at least four out of the five units under test. The number of falls per unit shall be determined with the following test conditions:

- (a) without protective foils and separate protective cover, if any, for non-foldable devices;
- (b) with a protective foil on the display for foldable devices, first in the un-extended state and then in the fully extended state on the same unit under test in line with tables 6 and 7;
- (c) fall height 1 m;
- (d) after a defined number of falls corresponding to the intervals specified in tables 6 and 7, the unit under test has to be functional without defect, with particular reference to the following functionalities, where applicable:
 - (i) integrity of screen;
 - (ii) display with less than 10 pixel defects or similar malfunctions;
 - (iii) all cameras, tested for still images and videos;
 - (iv) mobile communication;
 - (v) Bluetooth connectivity;
 - (vi) WiFi connectivity;
 - (vii) battery charging: wired and wireless;
 - (viii) display touch sensitivity;
 - (ix) responsive buttons and switches;
 - (x) vibration alarm;
 - (xi) main microphone(s);
 - (xii) loudspeaker;
 - (xiii) headset audio.
- (e) cracks of the frame or backside shall not be considered a defect as long as full functionality and safe use of the unit under test is given;
- (f) cracks of the touchscreen and of any other cover layers of a display shall not be considered a defect as long as full functionality and safe use of the unit under test is given;
- (g) in case of no determined defect the test shall be continued;
- (h) in case of a determined defect and in any case after the maximum number of falls specified in tables 6 and 7, the test of the unit shall be terminated.

Table 6

Test intervals for determining if the smartphone unit is defective

Falls per unit	Non-foldable device	Foldable device
45	1 st check for defects	not applicable
35 un-extended state + 15 additional falls in fully extended state	not applicable	1 st check for defects
90	2 nd check for defects	not applicable
70 un-extended state + 25 additional falls in fully extended state	not applicable	2 nd check for defects

180	3 rd check for defects	not applicable
140 un-extended state + 35 additional falls in fully extended state	not applicable	3 rd check for defects
270	4 th check for defects	not applicable
210 un-extended state + 45 additional falls in fully extended state	not applicable	4 th check for defects

Table 7

Test intervals for determining if the slate tablet unit is defective

Falls per unit	Non-foldable device	Foldable device
52	1 st check for defects	not applicable
52 un-extended state + 5 additional falls in fully extended state	not applicable	1 st check for defects
104	2 nd check for defects	not applicable
78 un-extended state + 10 additional falls in fully extended state	not applicable	2 nd check for defects
156	3 rd check for defects	not applicable
130 un-extended state + 15 additional falls in fully extended state	not applicable	3 rd check for defects
208	4 th check for defects	not applicable
182 un-extended state + 20 additional falls in fully extended state	not applicable	4 th check for defects

5. METHOD FOR THE CALCULATION OF THE REPAIRABILITY INDEX OF SMARTPHONES AND SLATE TABLETS

The Repairability Index is an aggregated and normalised score, as a calculated value derived from six scoring parameters where:

- S_{DD} is the 'Disassembly Depth' score.
- S_F is the 'Fasteners (type)' score.
- S_T is the 'Tools (type)' score.
- S_{SP} is the 'Spare Parts' score.
- S_{SU} is the 'Software Updates (duration)' score.
- S_{RI} is the 'Repair Information' score.

The same scoring methodology shall apply to both smartphones and slate tablets. The Repairability Index (R) shall be calculated as follows:

$$R = (S_{DD} * 0,25) + (S_F * 0,15) + (S_T * 0,15) + (S_{SP} * 0,15) + (S_{SU} * 0,15) + (S_{RI} * 0,15)$$

The 'Disassembly Depth' (S_{DD}), 'Fasteners (type)' (S_F) and 'Tools (type)' (S_T) scores are based on the aggregation of the following priority part level scores:

- BAT is the battery.
- DA is the display assembly.
- BC is the back cover or back cover assembly.
- FFC is the front-facing camera assembly.
- RFC is the rear-facing camera assembly.
- EC is the external charging port.
- BUT is the mechanical button.
- MIC is the main microphone(s).
- SPK is the speaker.
- FM is the hinge assembly or the mechanical display folding mechanism.

If any of the priority parts listed above is present in a product more than once, only the one which delivers the lowest score shall be considered in the calculation of the 'Disassembly Depth' (S_{DD}), 'Fasteners (type)' (S_F) and 'Tools (type)' (S_T) scores. If a priority part is not present in the product, the highest point level for each score shall be considered for this part.

The 'Disassembly Depth' (S_{DD}) score shall be calculated as follows:

- (a) if the hinge assembly or the mechanical display folding mechanism are not present in the product, the following formula shall be used:

$$S_{DD} = (DD_{BAT} * 0,30) + (DD_{DA} * 0,30) + (DD_{BC} * 0,10) + (DD_{FFC} * 0,05) + (DD_{RFC} * 0,05) + (DD_{EC} * 0,05) + (DD_{BUT} * 0,05) + (DD_{MIC} * 0,05) + (DD_{SPK} * 0,05)$$

- (b) if the hinge assembly or the mechanical display folding mechanism are present, the following formula shall be used:

$$S_{DD} = (DD_{BAT} * 0,25) + (DD_{DA} * 0,25) + (DD_{BC} * 0,09) + (DD_{FFC} * 0,04) + (DD_{RFC} * 0,04) + (DD_{EC} * 0,04) + (DD_{BUT} * 0,04) + (DD_{MIC} * 0,04) + (DD_{SPK} * 0,04) + (DD_{FM} * 0,17)$$

Disassembly Depth (DD) assessment at part level

The Disassembly Depth score (DD_i) for each priority part i (DD_{BAT} ; DD_{DA} ; DD_{BC} ; DD_{FFC} ; DD_{RFC} ; DD_{EC} ; DD_{BUT} ; DD_{MIC} ; DD_{SPK} ; DD_{FM}) shall be calculated based on the number of steps required to remove a part from a product, without damaging the product. The counting of the steps for each part starts from the product fully assembled, with the charger disconnected and any SIM card installed. Points ranging from 1 to 5 are assigned as follows:

- $DD_i \leq 2$ steps = 5 pt.
- 5 steps $\geq DD_i > 2$ steps = 4 pt.
- 10 steps $\geq DD_i > 5$ steps = 3 pt.
- 15 steps $\geq DD_i > 10$ steps = 2 pt.
- $DD_i > 15$ steps = 1 pt.

For the calculation of disassembly steps, the following rules shall apply:

- the disassembly depth count is completed when the target part is separated and individually accessible.
- where multiple tools need to be used simultaneously, the use of each tool counts as a separate step.

- operations related to cleaning, removing traces or heating are counted as steps.
- the disassembly depth shall be calculated on the basis of the repair and maintenance information, and of the description of the disassembly steps for each priority part given in the technical documentation;
- where remote notification or authorisation of serial numbers is necessary for the full functionality of the spare part and the device, each of these actions is counted as five additional disassembly steps.

The **'Fasteners (type)'** (S_F) score is calculated as follow:

- (a) for smartphones or slate tablets, except foldable ones, the following formula shall be used:

$$S_F = (F_{BAT} * 0,30) + (F_{DA} * 0,30) + (F_{BC} * 0,10) + (F_{FFC} * 0,05) + (F_{RFC} * 0,05) + (F_{EC} * 0,05) + (F_{BUT} * 0,05) + (F_{MIC} * 0,05) + (F_{SPK} * 0,05)$$

- (b) for foldable smartphones or foldable slate tablets, the following formula shall be used:

$$S_F = (F_{BAT} * 0,25) + (F_{DA} * 0,25) + (F_{BC} * 0,09) + (F_{FFC} * 0,04) + (F_{RFC} * 0,04) + (F_{EC} * 0,04) + (F_{BUT} * 0,04) + (F_{MIC} * 0,04) + (F_{SPK} * 0,04) + (F_{FM} * 0,17)$$

Fasteners (type) (F) assessment at part level:

The 'Fasteners (type)' scores (F_i) for each priority part i (F_{BAT} , F_{DA} , F_{BC} , F_{FFC} , F_{RFC} , F_{EC} , F_{BUT} , F_{MIC} , F_{SPK} , F_{FM}) are assigned according to the level of removability and reusability of the fasteners used in the device assembly. Points ranging from 1 to 5 are assigned as follows:

- Reusable Fasteners = 5 pt.
- Resupplied Fasteners = 3 pt.
- Removable Fasteners = 1 pt.

The assessment of the type of fasteners is based on the disassembly process to remove the specific priority part, starting from the previous priority part in disassembly sequence already removed.

In case different types of fasteners are encountered in the disassembly of a priority part, the worst score shall be considered.

The F_i scores shall be calculated on the basis of the repair and maintenance information, and of the description of the fasteners for each priority part given in the technical documentation.

The **'Tools (type)'** (S_T) score shall be calculated as follows:

- (a) for smartphones or slate tablets, except foldable ones, the following formula shall be used:

$$S_T = (T_{BAT} * 0,30) + (T_{SCR} * 0,30) + (T_{BC} * 0,10) + (T_{FFC} * 0,05) + (T_{RFC} * 0,05) + (T_{EC} * 0,05) + (T_{BUT} * 0,05) + (T_{MIC} * 0,05) + (T_{SPK} * 0,05)$$

- (b) for foldable smartphones or foldable slate tablets, the following formula shall be used:

$$S_T = (T_{BAT} * 0,25) + (T_{SCR} * 0,25) + (T_{BC} * 0,09) + (T_{FFC} * 0,04) + (T_{RFC} * 0,04) + (T_{EC} * 0,04) + (T_{BUT} * 0,04) + (T_{MIC} * 0,04) + (T_{SPK} * 0,04) + (T_{FM} * 0,17)$$

Tools (type) (T) assessment at part level

The 'Tools (type)' scores (T_i) for each priority part i (T_{BAT} , T_{DA} , T_{BC} , T_{FFC} , T_{RFC} , T_{EC} , T_{BUT} , T_{MIC} , T_{SPK} and T_{FM}) are assigned according to the complexity and availability of the tools needed for its replacement. Points ranging from 1 to 5 are assigned as follows:

- No tools = 5 pt;
- Basic tools = 4 pt.

- A set of tools that is supplied (or offered to be supplied at no additional cost) with the spare part = 3 pt.
- A set of tools that is supplied (or offered to be supplied at no additional cost) with the product = 2 pt.
- Commercially available tools = 1 pt.

The assessment of the type of tools is based on the disassembly process to remove the specific priority part, starting from the previous priority part in disassembly sequence already removed.

Where different types of tools are needed for the disassembly of a priority part, the lowest score shall be considered.

The T_i scores shall be calculated on the basis of the repair and maintenance information, and of the description of the tools for each priority part given in the technical documentation.

Spare parts

The '**Spare Parts**' (S_{SP}) score shall be calculated at product level as follows:

- Spare parts for all priority parts are available to end users and professional repairers = 5 pt;
- Spare parts for display assembly, battery, back cover (or back cover assembly) and cameras are available to end users and professional repairers; spare parts for all other parts are available to professional repairers = 4 pt;
- Spare parts for display assembly, battery and back cover (or back cover assembly) are available to end users and professional repairers; spare parts for all other parts are available to professional repairers = 3 pt;
- Spare parts for display assembly and battery are available to end users and professional repairers; spare parts for all other parts are available to professional repairers = 2 pt;
- Spare parts for display assembly are available to end users and professional repairers; spare parts for all other parts are available to professional repairers = 1 pt;
- Spare parts for the hinge assembly, mechanical display folding mechanism are to be available only in case of foldable smartphones.

Software Updates (duration)

The '**Software Updates (duration)**' (S_{SU}) score shall be calculated at product level as follows:

- Minimum guaranteed availability of security updates, corrective updates and functionality updates to the operating system for at least 7 years = 5 pt.
- Minimum guaranteed availability of security updates, corrective updates and functionality updates to the operating system for 6 years = 3 pt.
- Minimum guaranteed availability of security updates, corrective updates and functionality updates to the operating system for 5 years = 1 pt.
- The above durations refer to years from the date of end of placement on the market of the product model.

Repair Information

The **Repair Information** (S_{RI}) score shall be calculated at product level as follows:

- Public availability of repair and maintenance information, except electronic board diagrams, at no cost for end users and availability of repair and maintenance information, including electronic board diagrams, at no cost for professional repairers = 5 pt.

- Availability of repair and maintenance information at no cost for professional repairers = 3 pt.
 - Availability of repair and maintenance information with a reasonable and proportionate fee for professional repairers = 1 pt.
 - A fee shall be considered reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information.
-

ANNEX Iva

Transitional Methods**References and qualifying notes for smartphones and slate tablets**

Parameter	Source	Reference Test Method/Title	Notes
Fasteners (type) score (S _F) and Tools (type) score (S _T)	CEN	EN 45554:2020	Fasteners and connectors: please refer to Table A.1 of the standard, unless differently specified in this Regulation. Tools: please refer to Table A.2 of the standard, unless differently specified in this Regulation.
EEI	European Commission	EEI test specifications	https://ec.europa.eu/docsroom/documents/50214
Protection against particles and water	IEC	IEC 60529:1989/AMD2:2013/COR1:2019	dust tight and protected against immersion in water up to 1 meter depth: IP67; protected against the ingress of solid foreign objects of size bigger than 1 millimeter and splashing of water: IP44.
Rated capacity and battery endurance in cycles	Cenelec	IEC EN 61960-3:2017	Battery endurance in cycles shall be measured with the following test sequence: 1) one cycle at 0,2 C discharge rate and measure capacity; 2) cycles 2-499 at 0,5 C discharge rate; 3) repeat step 1. To determine the number of cycles beyond 500 cycles, one should then continue with step 4 4) 99 cycles at 0,5 C discharge rate 5) repeat step 1 6) repeat steps 4 and 5 until measured capacity is below 80 %. Tests shall be performed with an external power source, which does not limit the power draw of the battery and leaves it to the specified default charging algorithm to regulate the charging rate.
Scratch hardness	CEN	EN 15771:2010	Scratch hardness shall be tested on the visible display area, without protective cover on the display

Battery endurance test ambient conditions	ECMA	ECMA 383	Ambient temperature (23 ± 5) °C, relative humidity 10 % to 80 %, ambient light (250 ± 50) Lux
Resistance to accidental drops or repeated free fall reliability	IEC	IEC 60068-2-31, Free fall repeated – Procedure 2	<p>Smartphones shall be tested for resistance to accidental drops, fall height 1 meter; the test has to be performed with 5 units consecutively and is passed, if at least 4 units pass the test.</p> <p>The free fall test shall be interrupted as set out in Table 6 to verify, if full functionality of the device is still given.</p> <p>In case of no determined defect the test shall be continued placing the unit under test, in case of smartphones, in the tumble tester in the same orientation the device was found when the test was interrupted.</p> <p>The number of falls passed by at least 4 out of 5 units is the value to be stated in the product information sheet as set out in Annex V.</p>
		IEC 60068-2-31, Free fall – Procedure 1	<p>Slate tablets shall be tested for resistance to accidental drops, fall height 1 meter on 3 mm steel plate backed by 10-19 mm thick hardwood (deviation from procedure 1); 26 controlled orientations with drop on each face, edge and corner, as specified in the test sequence below; the test has to be performed with 5 units consecutively and is passed, if at least 4 units pass the test.</p> <p>In fully extended state, drop the slate tablet consecutively in the following orientations, until the required number of drops is reached. Designations of edges, corners, faces are defined with the largest display facing to the front, in landscape orientation, with the front-facing camera next to the top edge, or, if this does not define the designation unambiguously, with the front-facing camera next to the left edge, approximating the device with a cuboid geometry. Drop on:</p> <ol style="list-style-type: none"> 1. display face 2. lower left front corner 3. lower backside edge 4. front right edge 5. left face 6. lower right backside corner 7. lower right front corner 8. bottom face 9. backside face 10. front left edge 11. top left backside corner 12. backside right edge

			<p>13. top right front corner 14. lower left edge 15. top right edge 16. top left front corner 17. lower right edge 18. top face 19. front lower edge 20. lower left backside corner 21. top left edge 22. front top edge 23. top right backside corner 24. backside left edge 25. right face 26. top backside edge.</p> <p>After a number of falls as set out in Table 7 full functionality of the device shall be verified. In case of no determined defect the test shall be continued:</p> <p>i. with free fall tests in case of non-foldable slate tablets in all 26 orientations twice; ii. with free fall tests in case of foldable slate tablets:</p> <p>(1) after the first check for defects first in all 26 orientations once in un-extended state, then continue with falls in fully extended state in orientations no. 6 to 10; (2) after the second check for defects first in all 26 orientations twice in un-extended state, then continue with falls in fully extended state in orientations no. 11 to 15; (3) after the third check for defects first in all 26 orientations twice in un-extended state, then continue with falls in fully extended state in orientations no. 16 to 20.</p> <p>The number of falls passed by at least 4 out of 5 units is the value to be stated in the product information sheet as set out in Annex V.</p>
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ANNEX V

Product information sheet

Pursuant to Article 3(1), point (b), the supplier shall enter into the product database the information as set out in Table 8.

The user manual or other literature provided with the product shall clearly indicate the link to the model in the product database as a human-readable Uniform Resource Locator (URL) or as QR code or by providing the product registration number.

Table 8

Product information sheet

1. Trade mark ^(a) ^(b)		
2. Model identifier ^(b)		
3. General product parameters:		
Parameter	Value	
4. Device type	[smartphone/tablet]	
5. Operating system	[Android/iOS/other]	
6. Energy efficiency class	[A/B/C/D/E/F/G] ^b	
7. Battery user-replaceable ^(c)	[yes/no]	
8. Battery endurance per cycle (END _{device} [h])	x	
9. Battery endurance in cycles – default settings [cycles]	≥x00	
10. Rated battery capacity (C _{rated} [mAh])	x	
11. Shipped with protective cover	[yes/no]	
12. Repeated free fall reliability test – falls without defect [n]	[≥ x]	
13. Repeated free fall reliability test – falls without defect, tested in fully extended state [n]	[≥ x/n.a.]	
14. Repeated free fall reliability class	[A/B/C/D/E] ^b	
15. Ingress protection rating	IPxx	
16. Specified immersion depth in water, in case of IPx8 [m]	[x,xx/n.a.]	
17. Screen scratch resistance on Mohs hardness scale	x	
18. Charger	Required output power [W]	x
	Receptacle type (at device end)	[USB-A/USB-Micro B/USB-C/other]
Repairability information:		
19. Minimum guaranteed availability of operating system security updates, corrective updates and functionality updates ^(a) ^(b) (years)	x	

20. Repairability Class (based on the index below)	[A/B/C/D/E] ^b
21. Repairability Index ^(b)	x,xx/5
21a. Disassembly Depth (S_{DD}) score ^(b)	x,xx/5
21b. Fasteners (type) score (S_T) ^(b)	x,xx/5
21c. Tools (type) score (S_T) ^(b)	x,xx/5
21d. Spare Part score (S_{SP}) ^(b)	x,xx/5
21e. Software Updates (duration) score (S_{SU}) ^(b)	x,xx/5
21f. Repair Information score (S_{RI}) ^(b)	x,xx/5
22. Weblink to information on spare parts availability for professional repairers and end users ^(a) ^(b) ^(d)	https://xxx
23. Weblink to repair instructions for end-users ^(a) ^(b) ^(e)	https://xxx
24. Weblink to indicative pre-tax prices ^(a) ^(b) ^(f)	https://xxx
Additional information:	
25. Minimum duration of the guarantee offered by the supplier ^(a) ^(b) [months]	x
Supplier's address ^(a) ^(b) ^(g)	

^(a) Changes to these items shall not be considered relevant for the purposes of Article 4(4) of Regulation (EU) 2017/1369.

^(b) This item shall not be considered relevant for the purposes of Article 2(6) of Regulation (EU) 2017/1369.

^(c) The process for battery replacement meets the following criteria:

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

^(d) The suppliers' obligation is to include the weblink to the website where the relevant information will be available. Effective access to the website is nevertheless to be granted in accordance to the timeline and provisions laid down in Annex II, point B 1.1 (1) d of Regulation (EU) 2023/1670, for smartphones, and in Annex II, point D 1.1 (1) d of Regulation (EU) 2023/1670, for slate tablets.

^(e) The suppliers' obligation is to include the weblink to the website where the relevant information will be available. Effective access to the website is nevertheless to be granted in accordance to the timeline and provisions laid down in the last paragraph of Annex II, point B 1.1 (2) of Regulation (EU) 2023/1670, for smartphones, and in the last paragraph of Annex II, point D 1.1 (2) of Regulation (EU) 2023/1670, for slate tablets.

^(f) The suppliers' obligation is to include the weblink to the website where the relevant information will be available. Effective access to the website is nevertheless to be granted in accordance to the timeline and provisions laid down in Annex II, point B 1.1 (4) of Regulation (EU) 2023/1670, for smartphones, and in Annex II, point D 1.1 (4) of Regulation (EU) 2023/1670, for slate tablets.

^(g) The supplier shall not enter these data for each model if automatically provided by the database.

ANNEX VI

Technical documentation

1. The technical documentation referred to in Article 3(1), point (d), shall include:
 - (a) a general description of the model allowing it to be unequivocally and easily identified;
 - (b) references to the harmonised standards applied or other measurement standards used;
 - (c) a description of the disassembly steps for each priority part of Annex IV, point 5, including the tool(s) and fastener(s) needed at each step, if any;
 - (d) specific precautions to be taken when the model is assembled, installed, maintained or tested;
 - (e) the values for the technical parameters set out in Table 9; those values are considered as the declared values for the purpose of the verification procedure set out in Annex IX;
 - (f) the details and the results of calculations performed in accordance with Annex IV;
 - (g) measurement or testing conditions if not described sufficiently in point (b), including battery charging algorithms for the default charging procedure, if applicable;
 - (h) parameters of the initial test procedure for the energy efficiency index, if not described sufficiently under the settings of Annex IV, point 1, and of Annex IVa.

2. These elements shall also constitute the mandatory specific parts of the technical documentation that the supplier shall enter into the database, pursuant to Article 12(5) of Regulation (EU) 2017/1369.

Table 9

Technical parameters of the model and their declared values

	Parameter	Parameter value and precision	Unit
1	Trade mark		TEXT
2	Model identifier		TEXT
3	battery endurance per cycle (END_{device})	x,xx	[h]
4	battery endurance in cycles – default settings	$\geq x00$	[hundreds of cycles]
5	rated battery capacity (C_{rated})	x	[mAh]
6	nominal voltage	x,xx	[V]
7	final voltage for battery endurance in cycles test [V]	x,xx	[V]
8	Energy Efficiency Index (EEI)	x,xx	[n]
9	shipped with protective cover	[yes/no]	-
10	repeated free fall reliability test – falls without defect	$[\geq x/n.a.]$	[n]
11	repeated free fall reliability test – falls without defect, tested in fully extended state	$[\geq x/n.a.]$	[n]
12	ingress protection rating	IPxx	

13	specified immersion depth in water, in case of IPx8	[x,x/n.a.]	[m]
14	screen scratch resistance	x	Mohs hardness scale
15	Minimum guaranteed availability of operating system security updates, corrective updates and functionality updates	x	[years]
16	Repairability Class	[A/B/C/D/E]	[A/B/C/D/E]
17	Repairability index (as calculated from the values below)	x,xx	[n]
18	Disassembly Depth (S_{DD})	x,xx	[n]
19	Fasteners (type) score (S_F)	x,xx	[n]
20	Tools (type) score (S_T)	x,xx	[n]
21	Spare Part score (SS_p)	x,xx	[n]
22	Software Updates (duration) score (S_{SU})	x,xx	[n]
23	Repair Information score (S_{RI})	x,xx	[n]
24	Operating system	[Android/iOS/other]	-
25	Operating system version		TEXT

3. Where the information included in the technical documentation for a smartphone or slate tablet model has been obtained by any of the following methods, or both:
- from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different supplier,
 - by calculation on the basis of design or extrapolation from another model of the same or a different supplier,
- the technical documentation shall include the details of such calculation, the assessment undertaken by suppliers to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different suppliers.

ANNEX VII

Information to be provided in visual advertisements, in technical promotional material and in distance selling, except distance selling on the internet

1. In visual advertisements, for the purposes of ensuring conformity with the requirements laid down in Article 3(1), point (e), and in Article 4(1), point (c), the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.
2. In technical promotional material, for the purposes of ensuring conformity with the requirements laid down in Article 3(1), point (f), and in Article 4(1), point (d), the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.
3. In the case of paper-based distance selling, the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.
4. In the cases referred to in points 1, 2 and 3, the energy efficiency class and the range of energy efficiency classes shall be shown, as indicated in Figure 1, in accordance with the following specifications:
 - (a) an arrow shall be used, containing the letter of the energy efficiency class in 100 % white, Calibri Bold and in a font size at least equivalent to that of the price, when the price is shown;
 - (b) the colour of the arrow shall match the colour of the energy efficiency class;
 - (c) the range of available energy efficiency classes shall be in 100 % black;
 - (d) the size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a border of 0,5 pt in 100 % black placed around the arrow and the letter of the energy efficiency class.

By way of derogation, if the visual advertisement, technical promotional material or paper-based distance selling is printed in monochrome, the arrow may be in monochrome in that visual advertisement, technical promotional material or paper-based distance selling.

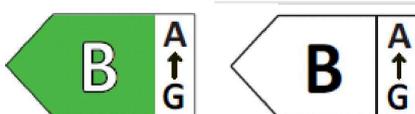


Figure 1: Coloured/monochrome left arrow, with range of energy efficiency classes indicated

5. Telemarketing-based distance selling shall specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label, and the customer shall be given the possibility to access the full label and the product information sheet through a free access website, or by requesting a printed copy.
6. For all the situations mentioned in points 1, 2, 3 and 5, it shall be possible for the customer to obtain, on request, a printed copy of the label and the product information sheet.

ANNEX VIII

Information to be provided in the case of distance selling through the internet

1. The appropriate label made available by suppliers in accordance with Article 3(1), point (g), shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 2 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.
2. The image used for accessing the label in the case of nested display, as indicated in Figure 2, shall:
 - (a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;
 - (b) indicate the energy efficiency class of the product on the arrow in 100 % white, Calibri Bold and in a font size equivalent to that of the price;
 - (c) have the range of available energy efficiency classes in 100 % black;
 - (d) have the following format, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class:



Figure 2: Coloured left arrow, with range of energy efficiency classes indicated

3. In the case of a nested display, the sequence of display of the label shall be as follows:
 - (a) the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product;
 - (b) the image shall link to the label set out in Annex III;
 - (c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;
 - (d) the label shall be displayed by pop up, new tab, new page or inset screen display;
 - (e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;
 - (f) the label shall cease to be displayed by means of a close option or other standard closing mechanism;
 - (g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.
4. The electronic product information sheet made available by the supplier in accordance with Article 3(1), point (h) shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display or by referring to the product database, in which case the link used for accessing the product information sheet shall clearly and legibly indicate 'Product information sheet'. If a nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

ANNEX IX

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 supplier as an allowed tolerance to establish the values in the technical documentation or in interpreting those values with a view to achieving compliance or to communicate better performance by any means. The values and classes published on the label or in the product information sheet shall not be more favourable for the supplier than the values declared in the technical documentation.

Where a model has been designed to be able to detect it is being tested (e.g. by recognizing 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.

The EEI, the battery endurance in cycles and the battery endurance per cycle for compliance verification shall be calculated with the operating system version installed on the unit(s) at the date of their placing on the market.

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

- (1) The Member State authorities shall verify one single unit of the model pursuant to points 2(a), (b) and (c), except for repeated free fall reliability tests, where five units of a model shall be verified pursuant to point 2(d), and except for battery endurance in cycles tests, where five units of a model shall be verified pursuant to point 2(e).
- (2) The model shall be considered to comply with the applicable requirements if:
 - (a) the values given in the technical documentation pursuant to Article 3(3) of Regulation (EU) 2017/1369 (declared values), and, where applicable, the values used to calculate those values, are not more favourable for the supplier than the corresponding values given in the test reports;
 - (b) the values published on the label and in the product information sheet are not more favourable for the supplier than the declared values, and the indicated energy efficiency class, the repeated free fall reliability class and the repairability class are not more favourable for the supplier than the class determined by the declared values;
 - (c) when the Member State authorities test the unit of the model, the determined values (that is the values of the relevant parameters as measured in testing and the values calculated from those measurements) comply with the respective verification tolerances as given in Table 10;
 - (d) when the Member State authorities test five units of the model for the repeated free fall reliability, the determined values (that is the values of the relevant parameters as measured in testing and the values calculated from those measurements) comply with the respective pass rate as given in Table 11;
 - (e) when the Member State authorities test five units of the model for the battery endurance in cycles, the arithmetic mean of the determined values (that is the values of the relevant parameters as measured in testing and the values calculated from those measurements) comply with the respective verification tolerances as given in Table 10.
- (3) If the results referred to in points 2(a), (b) and (e) 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(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing, except for the result of the reparability index. As an alternative, the three additional units selected may be of one or more equivalent models. Concerning the reparability index, if the result referred to in point 2(c) is not achieved, the Member State authorities shall select one additional unit of the same model for testing.
- (5) If the result referred to in point 2(d) is not achieved, the Member State authorities shall select five additional units of the same model for testing. As an alternative, the five additional units selected may be of one or more equivalent models.
- (6) The model shall be considered to comply with the applicable requirements if for the three units tested pursuant to point 4, where applicable, the arithmetic mean of the determined values complies with the respective tolerances given in Table 10, except for the result of the reparability index, where the model shall be considered to comply with the applicable requirements if the determined value complies with the respective tolerance given in Table 10.
- (7) The model shall be considered to comply with the applicable requirements if for the five units tested pursuant to point 5, where applicable, the pass rate complies with the respective values given in Table 11.
- (8) If the results referred to in points 6 or 7 are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation, except for the result of the reparability index, where the model 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 or 8 or the second paragraph of this Annex.

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

The Member State authorities shall only apply the verification tolerances set out in Table 10 and the pass rate set out in Table 11 and shall only use the procedure set out in points 1 to 9 for the requirements referred to in this Annex. For the parameters in Table 10, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 10

Verification tolerances for measured parameters

Parameters	Verification tolerances
battery endurance per cycle (END_{device} [h])	The determined value ^(e) shall not be more than 3 % lower than the declared value.
battery endurance in cycles – default settings [cycles]	The determined value ^(e) shall not be more than 20 cycles lower than the declared value.
rated battery capacity (C_{rated} [mAh])	The determined value ^(e) shall not be more than 10 % higher than the declared value.
nominal voltage [V]	The determined value ^(e) shall not be more than 2 % higher than the declared value.
final voltage for battery endurance in cycles test [V]	The determined value ^(e) shall not be more than 2 % higher than the declared value.
reparability index (R)	The determined value shall not be more than 4 % lower than the declared value.

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

Table 11

Pass rates for resistance to accidental drops

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

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

THE EUROPEAN COMMISSION,

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

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

Whereas:

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

⁽¹⁾ OJ L 285, 31.10.2009, p. 10.

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

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

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

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

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

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

Article 2

Definitions

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

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

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

- (11) 'equivalent model' means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier.
2. For the purposes of Annexes II to V, the definitions set out in Annex I shall apply.

Article 3

Ecodesign requirements

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

Article 4

Conformity assessment

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

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

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

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

Article 5

Verification procedure for market surveillance purposes

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

*Article 6***Circumvention**

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

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

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

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

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

*Article 7***Indicative benchmarks**

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

*Article 8***Review**

The Commission shall review this Regulation in the light of technological progress and present the result of this assessment including, if appropriate, a draft revision proposal, to the Consultation Forum established pursuant to Article 14(1) of Regulation (EU) 2017/1369 of the European Parliament and of the Council ^(⁵) by 20 September 2027.

The review shall in particular assess:

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

⁽⁵⁾ Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

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

Article 9

Amendment to Regulation (EU) 2023/826

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

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

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

Article 10

Entry into force and application

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

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

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

Done at Brussels, 16 June 2023.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX I

Definitions applicable to the Annexes

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

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

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

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

Ecodesign requirements**A. MOBILE PHONES OTHER THAN SMARTPHONES****1. RESOURCE EFFICIENCY REQUIREMENTS****1.1. Design for repair and reuse**

(1) Availability of spare parts:

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

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

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

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

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

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

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

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

(2) Access to repair and maintenance information

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

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

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

(5) Disassembly requirements

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

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

(6) Requirements for preparation for reuse

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

1.2. Design for reliability

From 20 June 2025:

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

1.3. Marking of plastic components

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

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

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

For the following plastic components no marking shall be required:

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

1.4. Recyclability requirements

From 20 June 2025:

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

2. INFORMATION REQUIREMENTS

From 20 June 2025:

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

⁽²⁾ Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

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

B. SMARTPHONES

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts

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

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

(2) Access to repair and maintenance information

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

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

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

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

(3) Maximum delivery time of spare parts

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

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

(4) Information on the price of spare parts

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

(5) Disassembly requirements

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

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

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

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

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

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

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

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

(6) Requirements for preparation for reuse

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

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

(7) Replacement of serialised parts

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

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

1.2. Design for reliability

From 20 June 2025:

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

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

1.3. Marking of plastic components

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

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

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

For the following plastic components no marking shall be required:

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

1.4. Recyclability requirements

From 20 June 2025:

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

2. INFORMATION REQUIREMENTS

From 20 June 2025:

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

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

C. CORDLESS PHONES

1. LOW POWER MODES

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

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

2. RESOURCE EFFICIENCY REQUIREMENTS

2.1. Design for repair and reuse

(1) Availability of spare parts

- (a) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 7 years after the date of end of placement on the market, when present:
- (i) display assembly;
 - (ii) external audio connector(s);
 - (iii) external charging port(s);
 - (iv) mechanical button(s);
 - (v) main microphone(s);
 - (vi) speaker(s);
- (b) From 20 June 2025 or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers and end-users at least the following spare parts, until at least 7 years after the date of end of placement on the market:
- (i) battery or batteries;
 - (ii) battery compartment cover;
 - (iii) charger unless the basestation is equipped with the USB Type-C receptacle, which should remain accessible and operational at all times;
 - (iv) charging cradle;
- (c) Spare parts concerned by points (a) and (b) shall not be assemblies comprising more than one of the listed spare part types;

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

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

(2) Access to repair and maintenance information

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

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

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

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

(3) Maximum delivery time of spare parts

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

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

(4) Information on the price of spare parts

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

(5) Disassembly requirements

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

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

(6) Requirements for preparation for reuse

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

2.2. Marking of plastic components

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

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

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

For the following plastic components no marking shall be required:

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

2.3. Recyclability requirements

From 20 June 2025:

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

3. INFORMATION REQUIREMENTS

From 20 June 2025:

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

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

D. SLATE TABLETS

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts

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

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

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

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

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

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

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

(2) Access to repair and maintenance information

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

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

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

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

(3) Maximum delivery time of spare parts

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

(4) Information on the price of spare parts

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

(5) Disassembly requirements

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

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

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

(6) Requirements for preparation for reuse

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

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

(7) Replacement of serialised parts

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

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

1.2. Design for reliability

From 20 June 2025:

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

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

1.3. Marking of plastic components

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

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

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

For the following plastic components no marking shall be required:

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

1.4. Recyclability requirements

From 20 June 2025:

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

2. INFORMATION REQUIREMENTS

From 20 June 2025:

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

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

Measurements and calculations

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

Table 1

Ingress protection rating levels

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

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

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

Table 2

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

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

ANNEX IIIa

Transitional methods

Table 3

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

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

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

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

ANNEX IV

Verification procedure for market surveillance purposes

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

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

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

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

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

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

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

Table 4

Verification tolerances

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

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

Table 5

Pass rates for resistance to accidental drops

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

ANNEX V

Benchmarks

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

Mobile phones:

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

Cordless phones:

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

Slate tablets:

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

COMMISSION IMPLEMENTING REGULATION (EU) 2023/1671**of 24 August 2023****entering a name in the register of protected designations of origin and protected geographical indications ('Ciliegia di Lari' (PGI))**

THE EUROPEAN COMMISSION,

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

Having regard to Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs ⁽¹⁾, and in particular Article 52(2) thereof,

Whereas:

- (1) Pursuant to point (a) of Article 50(2) of Regulation (EU) No 1151/2012, Italy's application to register the name 'Ciliegia di Lari' was published in the *Official Journal of the European Union* ⁽²⁾.
- (2) As no reasoned statement of opposition under Article 51 of Regulation (EU) No 1151/2012 has been received by the Commission, the name 'Ciliegia di Lari' should therefore be entered in the register,

HAS ADOPTED THIS REGULATION:

Article 1

The name 'Ciliegia di Lari' (PGI) is hereby entered in the register of protected designations of origin and protected geographical indications.

The name specified in the first paragraph denotes a product in Class 1.6 – 'Fruit, vegetables and cereals fresh or processed' of Annex XI to Commission Implementing Regulation (EU) No 668/2014 ⁽³⁾.*Article 2*This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

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

Done at Brussels, 24 August 2023.

For the Commission,
On behalf of the President,
Janusz WOJCIECHOWSKI
Member of the Commission

⁽¹⁾ OJ L 343, 14.12.2012, p. 1.

⁽²⁾ OJ C 158, 4.5.2023, p. 11.

⁽³⁾ Commission Implementing Regulation (EU) No 668/2014 of 13 June 2014 laying down rules for the application of Regulation (EU) No 1151/2012 of the European Parliament and of the Council on quality schemes for agricultural products and foodstuffs (OJ L 179, 19.6.2014, p. 36).

COMMISSION IMPLEMENTING REGULATION (EU) 2023/1672**of 30 August 2023****laying down technical information for the calculation of technical provisions and basic own funds for reporting with reference dates from 30 June 2023 until 29 September 2023 in accordance with Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

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

Having regard to Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) ⁽¹⁾, and in particular the third subparagraph of Article 77e(2) thereof,

Whereas:

- (1) In order to ensure uniform conditions for the calculation of technical provisions and basic own funds by insurance and reinsurance undertakings for the purposes of Directive 2009/138/EC, technical information on relevant risk-free interest rate term structures, fundamental spreads for the calculation of the matching adjustment and volatility adjustments should be laid down for every reference date.
- (2) Insurance and re-insurance undertakings should use the technical information, which is based on market data related to the end of the last month preceding the first reporting reference date to which this Regulation applies. On 6 July 2023, the European Insurance and Occupational Pensions Authority provided the Commission with the technical information related to end of June 2023 market data. That information was published on 6 July 2023 in accordance with Article 77e(1) of Directive 2009/138/EC.
- (3) Given the need for the immediate availability of the technical information, it is important that this Regulation enters into force as a matter of urgency.
- (4) For prudential reasons it is necessary that insurance and reinsurance undertakings use the same technical information for calculating technical provisions and basic own funds irrespective of the date on which they report to their competent authorities. This Regulation should therefore apply from the first reporting reference date to which this Regulation applies.
- (5) To provide legal certainty as soon as possible, it is duly justified on imperative grounds of urgency related to the availability of the relevant risk-free interest rate term structure that measures provided for in this Regulation be adopted in accordance with Article 8, in conjunction with Article 4, of Regulation (EU) No 182/2011 of the European Parliament and of the Council ⁽²⁾,

HAS ADOPTED THIS REGULATION:

Article 1

1. Insurance and reinsurance undertakings shall use the technical information referred to in paragraph 2 when calculating technical provisions and basic own funds for reporting with reference dates from 30 June 2023 until 29 September 2023.

⁽¹⁾ OJ L 335, 17.12.2009, p. 1.

⁽²⁾ Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers (OJ L 55, 28.2.2011, p. 13).

2. For each relevant currency, the technical information used to calculate the best estimate in accordance with Article 77 of Directive 2009/138/EC, the matching adjustment in accordance with Article 77c of that Directive and the volatility adjustment in accordance with Article 77d of that Directive shall be the following:

- (a) the relevant risk-free interest rate term structures set out in Annex I;
- (b) the fundamental spreads for the calculation of the matching adjustment set out in Annex II;
- (c) for each relevant national insurance market, the volatility adjustments set out in Annex III.

Article 2

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

It shall apply from 30 June 2023.

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

Done at Brussels, 30 August 2023.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX I

Relevant risk-free interest rate term structures to calculate the best estimate, without any matching adjustment or volatility adjustment

Term to maturity (in years)	Euro (in %)	Czech koruna (in %)	Danish krone (in %)	Forint (in %)	Krona (in %)	Lev (in %)
1	3,983	6,675	3,973	10,109	4,127	3,933
2	3,772	5,586	3,762	9,347	3,935	3,722
3	3,501	4,936	3,491	8,668	3,656	3,451
4	3,282	4,551	3,272	8,087	3,426	3,232
5	3,132	4,309	3,122	7,626	3,255	3,083
6	3,037	4,162	3,027	7,273	3,131	2,987
7	2,970	4,072	2,960	7,009	3,043	2,920
8	2,926	4,018	2,916	6,821	2,983	2,877
9	2,897	3,988	2,887	6,696	2,947	2,847
10	2,879	3,972	2,870	6,612	2,933	2,830
11	2,869	3,968	2,860	6,564	2,939	2,820
12	2,859	3,970	2,849	6,538	2,957	2,809
13	2,851	3,975	2,841	6,531	2,979	2,801
14	2,839	3,979	2,829	6,539	3,003	2,790
15	2,819	3,982	2,809	6,553	3,026	2,770
16	2,788	3,981	2,778	6,555	3,049	2,739
17	2,752	3,979	2,742	6,545	3,070	2,702
18	2,716	3,974	2,706	6,526	3,090	2,666
19	2,684	3,968	2,674	6,499	3,108	2,635
20	2,660	3,960	2,650	6,467	3,124	2,611
21	2,644	3,952	2,635	6,431	3,139	2,596
22	2,636	3,944	2,627	6,393	3,153	2,589
23	2,634	3,935	2,625	6,353	3,166	2,588
24	2,636	3,926	2,627	6,312	3,177	2,591
25	2,642	3,916	2,633	6,270	3,188	2,597
26	2,650	3,907	2,641	6,228	3,198	2,606
27	2,660	3,898	2,651	6,186	3,208	2,618
28	2,671	3,888	2,663	6,145	3,216	2,630
29	2,684	3,879	2,676	6,105	3,224	2,644
30	2,697	3,870	2,689	6,066	3,232	2,658
31	2,710	3,861	2,703	6,027	3,239	2,673
32	2,724	3,852	2,717	5,990	3,245	2,688
33	2,738	3,844	2,731	5,954	3,252	2,703
34	2,753	3,835	2,746	5,919	3,257	2,718
35	2,767	3,827	2,760	5,885	3,263	2,733
36	2,781	3,819	2,774	5,852	3,268	2,747
37	2,794	3,811	2,788	5,820	3,273	2,762

38	2,808	3,804	2,801	5,789	3,278	2,776
39	2,821	3,797	2,815	5,760	3,282	2,790
40	2,834	3,790	2,828	5,731	3,286	2,804
41	2,846	3,783	2,840	5,704	3,290	2,817
42	2,859	3,776	2,853	5,678	3,294	2,830
43	2,870	3,770	2,865	5,652	3,298	2,842
44	2,882	3,763	2,876	5,628	3,301	2,854
45	2,893	3,757	2,888	5,604	3,304	2,866
46	2,904	3,752	2,899	5,581	3,308	2,878
47	2,915	3,746	2,909	5,559	3,311	2,889
48	2,925	3,740	2,920	5,538	3,314	2,899
49	2,935	3,735	2,930	5,518	3,316	2,910
50	2,944	3,730	2,939	5,498	3,319	2,920
51	2,953	3,725	2,949	5,479	3,322	2,930
52	2,962	3,720	2,958	5,461	3,324	2,939
53	2,971	3,715	2,967	5,443	3,326	2,948
54	2,980	3,711	2,975	5,426	3,329	2,957
55	2,988	3,706	2,983	5,409	3,331	2,966
56	2,996	3,702	2,991	5,393	3,333	2,974
57	3,003	3,698	2,999	5,378	3,335	2,982
58	3,011	3,694	3,007	5,363	3,337	2,990
59	3,018	3,690	3,014	5,349	3,339	2,997
60	3,025	3,686	3,021	5,335	3,341	3,005
61	3,032	3,682	3,028	5,321	3,343	3,012
62	3,038	3,679	3,035	5,308	3,344	3,019
63	3,045	3,675	3,041	5,295	3,346	3,026
64	3,051	3,672	3,047	5,283	3,348	3,032
65	3,057	3,668	3,053	5,271	3,349	3,038
66	3,063	3,665	3,059	5,259	3,351	3,045
67	3,069	3,662	3,065	5,248	3,352	3,050
68	3,074	3,659	3,071	5,237	3,354	3,056
69	3,080	3,656	3,076	5,226	3,355	3,062
70	3,085	3,653	3,081	5,216	3,356	3,067
71	3,090	3,650	3,086	5,206	3,358	3,073
72	3,095	3,648	3,091	5,196	3,359	3,078
73	3,100	3,645	3,096	5,186	3,360	3,083
74	3,104	3,642	3,101	5,177	3,361	3,088
75	3,109	3,640	3,106	5,168	3,363	3,093
76	3,113	3,637	3,110	5,159	3,364	3,097
77	3,118	3,635	3,115	5,151	3,365	3,102
78	3,122	3,633	3,119	5,142	3,366	3,106
79	3,126	3,630	3,123	5,134	3,367	3,111
80	3,130	3,628	3,127	5,126	3,368	3,115

81	3,134	3,626	3,131	5,119	3,369	3,119
82	3,138	3,624	3,135	5,111	3,370	3,123
83	3,142	3,622	3,139	5,104	3,371	3,127
84	3,145	3,620	3,142	5,096	3,372	3,131
85	3,149	3,618	3,146	5,089	3,373	3,135
86	3,152	3,616	3,150	5,083	3,374	3,138
87	3,156	3,614	3,153	5,076	3,375	3,142
88	3,159	3,612	3,156	5,069	3,376	3,145
89	3,162	3,610	3,160	5,063	3,376	3,149
90	3,166	3,608	3,163	5,057	3,377	3,152
91	3,169	3,607	3,166	5,050	3,378	3,155
92	3,172	3,605	3,169	5,044	3,379	3,158
93	3,175	3,603	3,172	5,039	3,380	3,162
94	3,178	3,602	3,175	5,033	3,380	3,165
95	3,181	3,600	3,178	5,027	3,381	3,168
96	3,183	3,599	3,181	5,022	3,382	3,171
97	3,186	3,597	3,184	5,016	3,382	3,173
98	3,189	3,596	3,186	5,011	3,383	3,176
99	3,191	3,594	3,189	5,006	3,384	3,179
100	3,194	3,593	3,192	5,001	3,384	3,182
101	3,196	3,591	3,194	4,996	3,385	3,184
102	3,199	3,590	3,197	4,991	3,386	3,187
103	3,201	3,588	3,199	4,986	3,386	3,190
104	3,204	3,587	3,201	4,981	3,387	3,192
105	3,206	3,586	3,204	4,977	3,388	3,195
106	3,208	3,585	3,206	4,972	3,388	3,197
107	3,211	3,583	3,208	4,968	3,389	3,199
108	3,213	3,582	3,211	4,964	3,389	3,202
109	3,215	3,581	3,213	4,959	3,390	3,204
110	3,217	3,580	3,215	4,955	3,390	3,206
111	3,219	3,578	3,217	4,951	3,391	3,208
112	3,221	3,577	3,219	4,947	3,391	3,210
113	3,223	3,576	3,221	4,943	3,392	3,213
114	3,225	3,575	3,223	4,939	3,393	3,215
115	3,227	3,574	3,225	4,935	3,393	3,217
116	3,229	3,573	3,227	4,932	3,393	3,219
117	3,231	3,572	3,229	4,928	3,394	3,221
118	3,233	3,571	3,231	4,924	3,394	3,223
119	3,235	3,570	3,233	4,921	3,395	3,225
120	3,237	3,569	3,235	4,917	3,395	3,226
121	3,238	3,568	3,236	4,914	3,396	3,228
122	3,240	3,567	3,238	4,910	3,396	3,230
123	3,242	3,566	3,240	4,907	3,397	3,232

124	3,243	3,565	3,241	4,904	3,397	3,234
125	3,245	3,564	3,243	4,900	3,398	3,235
126	3,247	3,563	3,245	4,897	3,398	3,237
127	3,248	3,562	3,246	4,894	3,398	3,239
128	3,250	3,561	3,248	4,891	3,399	3,240
129	3,251	3,561	3,250	4,888	3,399	3,242
130	3,253	3,560	3,251	4,885	3,400	3,244
131	3,254	3,559	3,253	4,882	3,400	3,245
132	3,256	3,558	3,254	4,879	3,400	3,247
133	3,257	3,557	3,256	4,876	3,401	3,248
134	3,259	3,556	3,257	4,874	3,401	3,250
135	3,260	3,556	3,258	4,871	3,401	3,251
136	3,262	3,555	3,260	4,868	3,402	3,253
137	3,263	3,554	3,261	4,865	3,402	3,254
138	3,264	3,553	3,263	4,863	3,403	3,256
139	3,266	3,553	3,264	4,860	3,403	3,257
140	3,267	3,552	3,265	4,857	3,403	3,258
141	3,268	3,551	3,267	4,855	3,404	3,260
142	3,270	3,550	3,268	4,852	3,404	3,261
143	3,271	3,550	3,269	4,850	3,404	3,262
144	3,272	3,549	3,270	4,848	3,404	3,264
145	3,273	3,548	3,272	4,845	3,405	3,265
146	3,275	3,548	3,273	4,843	3,405	3,266
147	3,276	3,547	3,274	4,840	3,405	3,267
148	3,277	3,546	3,275	4,838	3,406	3,269
149	3,278	3,546	3,276	4,836	3,406	3,270
150	3,279	3,545	3,278	4,834	3,406	3,271

Term to maturity (in years)	Pound sterling (in %)	Romanian leu (in %)	Zloty (in %)	Króna (in %)	Norwegian krone (in %)	Swiss franc (in %)
1	6,062	6,161	5,941	8,902	4,873	1,991
2	5,960	6,280	5,698	8,245	4,722	1,955
3	5,630	6,408	5,594	7,724	4,492	1,901
4	5,309	6,500	5,529	7,283	4,273	1,852
5	5,028	6,573	5,498	6,919	4,099	1,814
6	4,795	6,632	5,498	6,611	3,975	1,789
7	4,601	6,673	5,516	6,347	3,884	1,774
8	4,454	6,700	5,544	6,120	3,816	1,766
9	4,340	6,720	5,577	5,926	3,762	1,764
10	4,250	6,729	5,606	5,762	3,720	1,767
11	4,185	6,714	5,614	5,623	3,685	1,774
12	4,137	6,679	5,605	5,501	3,657	1,784

13	4,096	6,629	5,582	5,394	3,634	1,796
14	4,061	6,568	5,551	5,298	3,614	1,809
15	4,027	6,501	5,513	5,212	3,597	1,824
16	3,996	6,429	5,471	5,134	3,583	1,838
17	3,965	6,355	5,425	5,062	3,570	1,853
18	3,936	6,279	5,379	4,997	3,559	1,867
19	3,909	6,202	5,331	4,936	3,550	1,882
20	3,884	6,127	5,283	4,880	3,541	1,896
21	3,861	6,052	5,235	4,828	3,534	1,910
22	3,838	5,978	5,187	4,779	3,527	1,924
23	3,816	5,907	5,141	4,733	3,521	1,937
24	3,794	5,837	5,095	4,691	3,516	1,950
25	3,772	5,769	5,051	4,650	3,511	1,963
26	3,749	5,704	5,008	4,612	3,507	1,975
27	3,724	5,641	4,966	4,577	3,503	1,987
28	3,699	5,580	4,926	4,543	3,499	1,998
29	3,671	5,522	4,887	4,511	3,496	2,009
30	3,642	5,466	4,849	4,481	3,493	2,020
31	3,611	5,412	4,813	4,452	3,491	2,030
32	3,579	5,360	4,778	4,424	3,488	2,040
33	3,547	5,310	4,744	4,398	3,486	2,049
34	3,514	5,262	4,712	4,374	3,484	2,058
35	3,483	5,217	4,681	4,350	3,482	2,067
36	3,452	5,173	4,651	4,327	3,480	2,076
37	3,422	5,130	4,623	4,306	3,479	2,084
38	3,394	5,090	4,595	4,285	3,477	2,092
39	3,367	5,051	4,569	4,266	3,476	2,100
40	3,342	5,014	4,543	4,247	3,475	2,107
41	3,319	4,978	4,519	4,229	3,473	2,114
42	3,297	4,944	4,495	4,211	3,472	2,121
43	3,278	4,911	4,472	4,195	3,471	2,128
44	3,259	4,879	4,450	4,179	3,470	2,134
45	3,243	4,849	4,429	4,163	3,469	2,140
46	3,228	4,819	4,409	4,149	3,469	2,146
47	3,215	4,791	4,390	4,135	3,468	2,152
48	3,204	4,764	4,371	4,121	3,467	2,158
49	3,194	4,738	4,353	4,108	3,466	2,163
50	3,186	4,713	4,335	4,095	3,466	2,168
51	3,180	4,689	4,319	4,083	3,465	2,173
52	3,175	4,665	4,302	4,071	3,465	2,178
53	3,171	4,643	4,287	4,060	3,464	2,183
54	3,168	4,621	4,271	4,049	3,464	2,188
55	3,166	4,600	4,257	4,038	3,463	2,192

56	3,165	4,579	4,243	4,028	3,463	2,197
57	3,165	4,560	4,229	4,018	3,462	2,201
58	3,165	4,541	4,216	4,008	3,462	2,205
59	3,165	4,522	4,203	3,999	3,462	2,209
60	3,166	4,505	4,190	3,990	3,461	2,213
61	3,167	4,487	4,178	3,981	3,461	2,216
62	3,169	4,471	4,167	3,973	3,461	2,220
63	3,171	4,455	4,156	3,965	3,460	2,223
64	3,173	4,439	4,145	3,957	3,460	2,227
65	3,175	4,424	4,134	3,949	3,460	2,230
66	3,177	4,409	4,124	3,942	3,459	2,233
67	3,179	4,395	4,114	3,934	3,459	2,237
68	3,182	4,381	4,104	3,927	3,459	2,240
69	3,184	4,367	4,094	3,920	3,459	2,243
70	3,187	4,354	4,085	3,914	3,459	2,246
71	3,190	4,341	4,076	3,907	3,458	2,248
72	3,192	4,329	4,068	3,901	3,458	2,251
73	3,195	4,317	4,059	3,895	3,458	2,254
74	3,198	4,305	4,051	3,889	3,458	2,256
75	3,200	4,294	4,043	3,883	3,458	2,259
76	3,203	4,283	4,035	3,877	3,458	2,261
77	3,206	4,272	4,028	3,872	3,457	2,264
78	3,209	4,261	4,020	3,866	3,457	2,266
79	3,211	4,251	4,013	3,861	3,457	2,268
80	3,214	4,241	4,006	3,856	3,457	2,271
81	3,216	4,231	3,999	3,851	3,457	2,273
82	3,219	4,222	3,992	3,846	3,457	2,275
83	3,221	4,212	3,986	3,841	3,457	2,277
84	3,224	4,203	3,979	3,837	3,457	2,279
85	3,226	4,194	3,973	3,832	3,456	2,281
86	3,229	4,186	3,967	3,828	3,456	2,283
87	3,231	4,177	3,961	3,823	3,456	2,285
88	3,233	4,169	3,955	3,819	3,456	2,287
89	3,236	4,161	3,950	3,815	3,456	2,289
90	3,238	4,153	3,944	3,811	3,456	2,290
91	3,240	4,145	3,939	3,807	3,456	2,292
92	3,242	4,138	3,933	3,803	3,456	2,294
93	3,245	4,130	3,928	3,799	3,456	2,296
94	3,247	4,123	3,923	3,796	3,456	2,297
95	3,249	4,116	3,918	3,792	3,456	2,299
96	3,251	4,109	3,913	3,788	3,455	2,300
97	3,253	4,102	3,908	3,785	3,455	2,302
98	3,255	4,095	3,904	3,781	3,455	2,303

99	3,257	4,089	3,899	3,778	3,455	2,305
100	3,259	4,082	3,895	3,775	3,455	2,306
101	3,260	4,076	3,890	3,772	3,455	2,308
102	3,262	4,070	3,886	3,768	3,455	2,309
103	3,264	4,064	3,882	3,765	3,455	2,310
104	3,266	4,058	3,877	3,762	3,455	2,312
105	3,267	4,052	3,873	3,759	3,455	2,313
106	3,269	4,046	3,869	3,756	3,455	2,314
107	3,271	4,041	3,865	3,754	3,455	2,316
108	3,273	4,035	3,862	3,751	3,455	2,317
109	3,274	4,030	3,858	3,748	3,455	2,318
110	3,276	4,025	3,854	3,745	3,455	2,319
111	3,277	4,020	3,850	3,743	3,455	2,321
112	3,279	4,014	3,847	3,740	3,455	2,322
113	3,280	4,009	3,843	3,737	3,454	2,323
114	3,282	4,005	3,840	3,735	3,454	2,324
115	3,283	4,000	3,836	3,732	3,454	2,325
116	3,285	3,995	3,833	3,730	3,454	2,326
117	3,286	3,990	3,830	3,728	3,454	2,327
118	3,287	3,986	3,827	3,725	3,454	2,328
119	3,289	3,981	3,823	3,723	3,454	2,329
120	3,290	3,977	3,820	3,721	3,454	2,330
121	3,291	3,972	3,817	3,718	3,454	2,331
122	3,293	3,968	3,814	3,716	3,454	2,332
123	3,294	3,964	3,811	3,714	3,454	2,333
124	3,295	3,960	3,808	3,712	3,454	2,334
125	3,297	3,956	3,806	3,710	3,454	2,335
126	3,298	3,952	3,803	3,708	3,454	2,336
127	3,299	3,948	3,800	3,706	3,454	2,337
128	3,300	3,944	3,797	3,704	3,454	2,338
129	3,301	3,940	3,794	3,702	3,454	2,339
130	3,302	3,936	3,792	3,700	3,454	2,339
131	3,304	3,932	3,789	3,698	3,454	2,340
132	3,305	3,929	3,787	3,696	3,454	2,341
133	3,306	3,925	3,784	3,694	3,454	2,342
134	3,307	3,922	3,782	3,692	3,454	2,343
135	3,308	3,918	3,779	3,691	3,454	2,344
136	3,309	3,915	3,777	3,689	3,454	2,344
137	3,310	3,911	3,774	3,687	3,454	2,345
138	3,311	3,908	3,772	3,685	3,454	2,346
139	3,312	3,905	3,770	3,684	3,454	2,347
140	3,313	3,901	3,767	3,682	3,454	2,347
141	3,314	3,898	3,765	3,680	3,454	2,348

142	3,315	3,895	3,763	3,679	3,453	2,349
143	3,316	3,892	3,761	3,677	3,453	2,349
144	3,317	3,889	3,759	3,675	3,453	2,350
145	3,318	3,886	3,756	3,674	3,453	2,351
146	3,319	3,883	3,754	3,672	3,453	2,352
147	3,319	3,880	3,752	3,671	3,453	2,352
148	3,320	3,877	3,750	3,669	3,453	2,353
149	3,321	3,874	3,748	3,668	3,453	2,354
150	3,322	3,871	3,746	3,666	3,453	2,354

Term to maturity (in years)	Australian dollar (in %)	Baht (in %)	Canadian dollar (in %)	Chilean peso (in %)	Colombian peso (in %)	Hong Kong dollar (in %)
1	4,726	1,957	5,218	7,432	9,838	4,813
2	4,609	2,085	4,917	6,130	9,793	4,522
3	4,418	2,150	4,475	5,600	9,755	4,282
4	4,300	2,193	4,090	5,397	9,764	4,127
5	4,259	2,232	3,830	5,299	9,805	4,009
6	4,265	2,273	3,690	5,248	9,858	3,944
7	4,284	2,322	3,614	5,220	9,926	3,898
8	4,312	2,383	3,568	5,203	9,998	3,849
9	4,338	2,450	3,535	5,191	10,067	3,806
10	4,358	2,523	3,507	5,180	10,135	3,778
11	4,385	2,602	3,482	5,167	10,158	3,767
12	4,412	2,682	3,457	5,154	10,136	3,768
13	4,431	2,759	3,434	5,139	10,081	3,775
14	4,442	2,830	3,412	5,124	10,001	3,783
15	4,446	2,894	3,391	5,109	9,904	3,791
16	4,444	2,948	3,372	5,094	9,794	3,796
17	4,435	2,995	3,355	5,079	9,674	3,798
18	4,419	3,035	3,338	5,064	9,549	3,799
19	4,394	3,070	3,324	5,050	9,420	3,798
20	4,361	3,101	3,310	5,036	9,290	3,796
21	4,318	3,128	3,298	5,022	9,159	3,793
22	4,270	3,152	3,287	5,009	9,029	3,789
23	4,219	3,173	3,278	4,996	8,902	3,784
24	4,167	3,191	3,269	4,983	8,777	3,780
25	4,116	3,208	3,262	4,971	8,655	3,775
26	4,066	3,223	3,256	4,960	8,537	3,769
27	4,020	3,237	3,250	4,948	8,422	3,764
28	3,977	3,249	3,246	4,937	8,311	3,758
29	3,937	3,260	3,243	4,927	8,205	3,752
30	3,902	3,270	3,240	4,917	8,102	3,747

31	3,871	3,279	3,239	4,907	8,003	3,741
32	3,843	3,287	3,238	4,897	7,909	3,736
33	3,818	3,295	3,238	4,888	7,818	3,730
34	3,796	3,302	3,238	4,879	7,730	3,725
35	3,776	3,308	3,239	4,871	7,647	3,719
36	3,758	3,314	3,240	4,863	7,567	3,714
37	3,742	3,319	3,241	4,855	7,490	3,709
38	3,728	3,324	3,243	4,847	7,416	3,704
39	3,715	3,329	3,245	4,840	7,346	3,699
40	3,703	3,333	3,247	4,833	7,278	3,694
41	3,692	3,337	3,249	4,826	7,213	3,690
42	3,682	3,341	3,251	4,819	7,151	3,685
43	3,673	3,344	3,254	4,813	7,091	3,681
44	3,665	3,348	3,256	4,806	7,034	3,676
45	3,657	3,351	3,259	4,800	6,979	3,672
46	3,650	3,354	3,261	4,795	6,926	3,668
47	3,644	3,356	3,264	4,789	6,876	3,664
48	3,638	3,359	3,266	4,784	6,827	3,660
49	3,632	3,361	3,269	4,778	6,780	3,657
50	3,627	3,363	3,271	4,773	6,735	3,653
51	3,622	3,366	3,274	4,768	6,691	3,649
52	3,617	3,368	3,276	4,764	6,649	3,646
53	3,613	3,369	3,279	4,759	6,609	3,643
54	3,609	3,371	3,281	4,754	6,570	3,639
55	3,605	3,373	3,284	4,750	6,532	3,636
56	3,602	3,375	3,286	4,746	6,496	3,633
57	3,599	3,376	3,288	4,742	6,461	3,630
58	3,595	3,378	3,291	4,738	6,427	3,627
59	3,592	3,379	3,293	4,734	6,394	3,625
60	3,589	3,380	3,295	4,730	6,363	3,622
61	3,587	3,382	3,297	4,727	6,332	3,619
62	3,584	3,383	3,299	4,723	6,302	3,617
63	3,582	3,384	3,302	4,720	6,274	3,614
64	3,579	3,385	3,304	4,716	6,246	3,612
65	3,577	3,386	3,306	4,713	6,219	3,609
66	3,575	3,388	3,308	4,710	6,193	3,607
67	3,573	3,389	3,309	4,707	6,167	3,605
68	3,571	3,390	3,311	4,704	6,143	3,602
69	3,569	3,390	3,313	4,701	6,119	3,600
70	3,567	3,391	3,315	4,698	6,095	3,598
71	3,565	3,392	3,317	4,696	6,073	3,596
72	3,564	3,393	3,318	4,693	6,051	3,594
73	3,562	3,394	3,320	4,690	6,030	3,592

74	3,560	3,395	3,322	4,688	6,009	3,590
75	3,559	3,396	3,323	4,685	5,989	3,589
76	3,557	3,396	3,325	4,683	5,969	3,587
77	3,556	3,397	3,327	4,681	5,950	3,585
78	3,554	3,398	3,328	4,678	5,931	3,583
79	3,553	3,398	3,330	4,676	5,913	3,582
80	3,552	3,399	3,331	4,674	5,895	3,580
81	3,550	3,400	3,332	4,672	5,878	3,578
82	3,549	3,400	3,334	4,670	5,861	3,577
83	3,548	3,401	3,335	4,668	5,844	3,575
84	3,547	3,402	3,336	4,666	5,828	3,574
85	3,545	3,402	3,338	4,664	5,812	3,572
86	3,544	3,403	3,339	4,662	5,797	3,571
87	3,543	3,403	3,340	4,660	5,782	3,570
88	3,542	3,404	3,341	4,658	5,767	3,568
89	3,541	3,404	3,343	4,657	5,753	3,567
90	3,540	3,405	3,344	4,655	5,739	3,566
91	3,539	3,405	3,345	4,653	5,725	3,564
92	3,538	3,406	3,346	4,651	5,712	3,563
93	3,537	3,406	3,347	4,650	5,699	3,562
94	3,536	3,407	3,348	4,648	5,686	3,561
95	3,535	3,407	3,349	4,647	5,673	3,560
96	3,534	3,408	3,350	4,645	5,661	3,559
97	3,533	3,408	3,351	4,644	5,649	3,557
98	3,533	3,409	3,352	4,642	5,637	3,556
99	3,532	3,409	3,353	4,641	5,626	3,555
100	3,531	3,410	3,354	4,639	5,614	3,554
101	3,530	3,410	3,355	4,638	5,603	3,553
102	3,529	3,410	3,356	4,637	5,593	3,552
103	3,529	3,411	3,357	4,635	5,582	3,551
104	3,528	3,411	3,358	4,634	5,571	3,550
105	3,527	3,411	3,359	4,633	5,561	3,549
106	3,526	3,412	3,360	4,631	5,551	3,548
107	3,526	3,412	3,361	4,630	5,541	3,547
108	3,525	3,413	3,361	4,629	5,532	3,547
109	3,524	3,413	3,362	4,628	5,522	3,546
110	3,524	3,413	3,363	4,627	5,513	3,545
111	3,523	3,414	3,364	4,626	5,504	3,544
112	3,522	3,414	3,364	4,624	5,495	3,543
113	3,522	3,414	3,365	4,623	5,486	3,542
114	3,521	3,415	3,366	4,622	5,477	3,541
115	3,520	3,415	3,367	4,621	5,468	3,541
116	3,520	3,415	3,367	4,620	5,460	3,540

117	3,519	3,415	3,368	4,619	5,452	3,539
118	3,519	3,416	3,369	4,618	5,444	3,538
119	3,518	3,416	3,370	4,617	5,436	3,538
120	3,517	3,416	3,370	4,616	5,428	3,537
121	3,517	3,417	3,371	4,615	5,420	3,536
122	3,516	3,417	3,371	4,614	5,413	3,535
123	3,516	3,417	3,372	4,613	5,405	3,535
124	3,515	3,417	3,373	4,612	5,398	3,534
125	3,515	3,418	3,373	4,612	5,391	3,533
126	3,514	3,418	3,374	4,611	5,384	3,533
127	3,514	3,418	3,375	4,610	5,377	3,532
128	3,513	3,418	3,375	4,609	5,370	3,531
129	3,513	3,419	3,376	4,608	5,363	3,531
130	3,512	3,419	3,376	4,607	5,356	3,530
131	3,512	3,419	3,377	4,606	5,350	3,530
132	3,511	3,419	3,377	4,606	5,343	3,529
133	3,511	3,420	3,378	4,605	5,337	3,528
134	3,510	3,420	3,379	4,604	5,331	3,528
135	3,510	3,420	3,379	4,603	5,324	3,527
136	3,509	3,420	3,380	4,602	5,318	3,527
137	3,509	3,421	3,380	4,602	5,312	3,526
138	3,509	3,421	3,381	4,601	5,306	3,526
139	3,508	3,421	3,381	4,600	5,301	3,525
140	3,508	3,421	3,382	4,600	5,295	3,524
141	3,507	3,421	3,382	4,599	5,289	3,524
142	3,507	3,422	3,383	4,598	5,284	3,523
143	3,507	3,422	3,383	4,597	5,278	3,523
144	3,506	3,422	3,383	4,597	5,273	3,522
145	3,506	3,422	3,384	4,596	5,267	3,522
146	3,505	3,422	3,384	4,595	5,262	3,521
147	3,505	3,423	3,385	4,595	5,257	3,521
148	3,505	3,423	3,385	4,594	5,252	3,520
149	3,504	3,423	3,386	4,594	5,247	3,520
150	3,504	3,423	3,386	4,593	5,242	3,519

Term to maturity (in years)	Indian rupee (in %)	Mexican peso (in %)	New Taiwan dollar (in %)	New Zealand dollar (in %)	Rand (in %)	Real (in %)
1	6,884	11,422	0,896	5,794	8,805	11,351
2	7,001	9,985	0,930	5,430	8,628	10,235
3	7,072	9,101	0,961	5,025	8,608	10,046
4	7,120	8,635	0,985	4,758	8,720	10,102

5	7,130	8,401	1,005	4,595	8,923	10,229
6	7,146	8,295	1,023	4,512	9,207	10,362
7	7,160	8,248	1,039	4,461	9,490	10,482
8	7,176	8,224	1,054	4,426	9,752	10,593
9	7,197	8,201	1,067	4,406	9,990	10,674
10	7,212	8,166	1,080	4,404	10,204	10,740
11	7,211	8,113	1,109	4,419	10,391	10,759
12	7,198	8,045	1,153	4,444	10,551	10,735
13	7,177	7,967	1,206	4,474	10,678	10,679
14	7,149	7,883	1,264	4,505	10,772	10,599
15	7,118	7,795	1,324	4,536	10,827	10,502
16	7,083	7,705	1,386	4,565	10,841	10,393
17	7,047	7,615	1,447	4,589	10,822	10,275
18	7,010	7,524	1,508	4,608	10,776	10,151
19	6,972	7,435	1,567	4,622	10,710	10,024
20	6,934	7,348	1,624	4,629	10,628	9,896
21	6,897	7,263	1,680	4,629	10,534	9,767
22	6,860	7,180	1,733	4,623	10,432	9,640
23	6,824	7,099	1,785	4,613	10,324	9,515
24	6,789	7,022	1,835	4,599	10,212	9,392
25	6,755	6,947	1,882	4,583	10,099	9,273
26	6,722	6,875	1,927	4,565	9,984	9,157
27	6,689	6,805	1,971	4,546	9,871	9,045
28	6,658	6,739	2,013	4,526	9,758	8,936
29	6,628	6,675	2,052	4,505	9,648	8,832
30	6,599	6,614	2,091	4,483	9,540	8,731
31	6,571	6,555	2,127	4,462	9,435	8,634
32	6,544	6,498	2,162	4,441	9,333	8,541
33	6,518	6,445	2,195	4,419	9,235	8,452
34	6,493	6,393	2,227	4,398	9,139	8,367
35	6,469	6,343	2,258	4,378	9,047	8,285
36	6,446	6,296	2,287	4,358	8,959	8,207
37	6,424	6,250	2,315	4,338	8,873	8,131
38	6,402	6,207	2,342	4,319	8,792	8,059
39	6,382	6,165	2,368	4,300	8,713	7,990
40	6,362	6,125	2,393	4,282	8,637	7,924
41	6,343	6,086	2,416	4,264	8,564	7,860
42	6,325	6,049	2,439	4,247	8,494	7,799
43	6,307	6,014	2,461	4,230	8,427	7,741
44	6,290	5,980	2,482	4,214	8,363	7,685
45	6,273	5,947	2,503	4,199	8,301	7,631
46	6,258	5,916	2,522	4,184	8,241	7,579
47	6,242	5,885	2,541	4,169	8,184	7,530

48	6,228	5,856	2,559	4,155	8,129	7,482
49	6,214	5,828	2,576	4,142	8,075	7,436
50	6,200	5,801	2,593	4,129	8,024	7,391
51	6,187	5,775	2,609	4,116	7,975	7,349
52	6,174	5,750	2,625	4,104	7,928	7,308
53	6,162	5,726	2,640	4,092	7,882	7,268
54	6,150	5,703	2,655	4,080	7,838	7,230
55	6,138	5,680	2,669	4,069	7,796	7,193
56	6,127	5,658	2,682	4,058	7,754	7,158
57	6,116	5,637	2,695	4,048	7,715	7,123
58	6,106	5,617	2,708	4,038	7,677	7,090
59	6,096	5,597	2,721	4,028	7,639	7,058
60	6,086	5,578	2,732	4,019	7,604	7,027
61	6,077	5,560	2,744	4,009	7,569	6,997
62	6,067	5,542	2,755	4,001	7,535	6,968
63	6,059	5,525	2,766	3,992	7,503	6,940
64	6,050	5,508	2,777	3,983	7,471	6,912
65	6,042	5,492	2,787	3,975	7,441	6,886
66	6,033	5,476	2,797	3,967	7,411	6,860
67	6,025	5,461	2,806	3,960	7,383	6,835
68	6,018	5,446	2,816	3,952	7,355	6,811
69	6,010	5,431	2,825	3,945	7,328	6,788
70	6,003	5,417	2,834	3,938	7,301	6,765
71	5,996	5,404	2,842	3,931	7,276	6,743
72	5,989	5,390	2,851	3,925	7,251	6,721
73	5,982	5,377	2,859	3,918	7,227	6,700
74	5,976	5,365	2,867	3,912	7,203	6,680
75	5,970	5,353	2,875	3,906	7,180	6,660
76	5,963	5,341	2,882	3,900	7,158	6,641
77	5,957	5,329	2,889	3,894	7,136	6,622
78	5,952	5,318	2,897	3,888	7,115	6,603
79	5,946	5,307	2,903	3,883	7,095	6,586
80	5,940	5,296	2,910	3,877	7,075	6,568
81	5,935	5,286	2,917	3,872	7,055	6,551
82	5,930	5,275	2,923	3,867	7,036	6,535
83	5,924	5,265	2,930	3,862	7,017	6,518
84	5,919	5,256	2,936	3,857	6,999	6,503
85	5,914	5,246	2,942	3,852	6,981	6,487
86	5,910	5,237	2,948	3,847	6,964	6,472
87	5,905	5,228	2,954	3,843	6,947	6,457
88	5,900	5,219	2,959	3,838	6,931	6,443
89	5,896	5,210	2,965	3,834	6,914	6,429
90	5,891	5,202	2,970	3,830	6,899	6,415

91	5,887	5,194	2,975	3,825	6,883	6,402
92	5,883	5,185	2,980	3,821	6,868	6,389
93	5,879	5,177	2,985	3,817	6,853	6,376
94	5,875	5,170	2,990	3,813	6,839	6,363
95	5,871	5,162	2,995	3,810	6,825	6,351
96	5,867	5,155	3,000	3,806	6,811	6,339
97	5,863	5,147	3,005	3,802	6,797	6,327
98	5,859	5,140	3,009	3,799	6,784	6,316
99	5,856	5,133	3,014	3,795	6,771	6,304
100	5,852	5,126	3,018	3,792	6,758	6,293
101	5,849	5,120	3,022	3,788	6,745	6,282
102	5,845	5,113	3,026	3,785	6,733	6,272
103	5,842	5,107	3,030	3,782	6,721	6,261
104	5,839	5,100	3,034	3,778	6,709	6,251
105	5,835	5,094	3,038	3,775	6,698	6,241
106	5,832	5,088	3,042	3,772	6,686	6,231
107	5,829	5,082	3,046	3,769	6,675	6,221
108	5,826	5,076	3,050	3,766	6,664	6,212
109	5,823	5,070	3,053	3,763	6,653	6,202
110	5,820	5,065	3,057	3,761	6,643	6,193
111	5,817	5,059	3,061	3,758	6,633	6,184
112	5,814	5,054	3,064	3,755	6,622	6,175
113	5,812	5,048	3,068	3,752	6,612	6,167
114	5,809	5,043	3,071	3,750	6,603	6,158
115	5,806	5,038	3,074	3,747	6,593	6,150
116	5,804	5,033	3,077	3,744	6,584	6,142
117	5,801	5,028	3,081	3,742	6,574	6,134
118	5,798	5,023	3,084	3,739	6,565	6,126
119	5,796	5,018	3,087	3,737	6,556	6,118
120	5,793	5,013	3,090	3,735	6,547	6,110
121	5,791	5,009	3,093	3,732	6,539	6,103
122	5,789	5,004	3,096	3,730	6,530	6,095
123	5,786	5,000	3,099	3,728	6,522	6,088
124	5,784	4,995	3,101	3,725	6,513	6,081
125	5,782	4,991	3,104	3,723	6,505	6,074
126	5,779	4,986	3,107	3,721	6,497	6,067
127	5,777	4,982	3,110	3,719	6,489	6,060
128	5,775	4,978	3,112	3,717	6,481	6,053
129	5,773	4,974	3,115	3,715	6,474	6,046
130	5,771	4,970	3,117	3,713	6,466	6,040
131	5,769	4,966	3,120	3,711	6,459	6,033
132	5,767	4,962	3,122	3,709	6,452	6,027
133	5,765	4,958	3,125	3,707	6,444	6,021

134	5,763	4,954	3,127	3,705	6,437	6,015
135	5,761	4,951	3,130	3,703	6,430	6,009
136	5,759	4,947	3,132	3,701	6,423	6,003
137	5,757	4,943	3,134	3,699	6,417	5,997
138	5,755	4,940	3,137	3,697	6,410	5,991
139	5,753	4,936	3,139	3,696	6,403	5,985
140	5,751	4,933	3,141	3,694	6,397	5,980
141	5,750	4,929	3,143	3,692	6,391	5,974
142	5,748	4,926	3,145	3,690	6,384	5,969
143	5,746	4,923	3,148	3,689	6,378	5,963
144	5,744	4,919	3,150	3,687	6,372	5,958
145	5,743	4,916	3,152	3,685	6,366	5,953
146	5,741	4,913	3,154	3,684	6,360	5,948
147	5,739	4,910	3,156	3,682	6,354	5,942
148	5,738	4,907	3,158	3,681	6,348	5,937
149	5,736	4,903	3,160	3,679	6,343	5,932
150	5,735	4,900	3,162	3,678	6,337	5,927

Term to maturity (in years)	Renminbi-yuan (in %)	Ringgit (in %)	Russian rouble (in %)	Singapore dollar (in %)	South Korean won (in %)	Turkish lira (in %)
1	1,924	3,235	9,415	3,861	3,787	12,896
2	2,027	3,342	9,679	3,690	3,669	13,780
3	2,161	3,440	9,921	3,564	3,561	14,803
4	2,276	3,518	10,175	3,454	3,495	15,728
5	2,371	3,591	10,424	3,364	3,439	16,477
6	2,448	3,661	10,654	3,298	3,402	17,036
7	2,515	3,726	10,866	3,249	3,380	17,446
8	2,577	3,786	11,069	3,213	3,369	17,737
9	2,637	3,842	11,234	3,186	3,362	17,922
10	2,697	3,892	11,365	3,168	3,355	18,011
11	2,756	3,938	11,465	3,155	3,348	18,022
12	2,815	3,981	11,533	3,147	3,340	17,971
13	2,873	4,019	11,568	3,143	3,332	17,871
14	2,928	4,055	11,566	3,141	3,324	17,729
15	2,982	4,089	11,528	3,141	3,317	17,554
16	3,034	4,124	11,460	3,143	3,311	17,350
17	3,083	4,156	11,369	3,145	3,305	17,124
18	3,130	4,185	11,260	3,149	3,300	16,880
19	3,175	4,209	11,138	3,152	3,296	16,623
20	3,217	4,227	11,006	3,157	3,293	16,355
21	3,258	4,238	10,868	3,161	3,292	16,082
22	3,297	4,244	10,727	3,166	3,290	15,805

23	3,334	4,245	10,583	3,171	3,290	15,527
24	3,369	4,242	10,440	3,176	3,290	15,251
25	3,402	4,236	10,297	3,182	3,291	14,978
26	3,434	4,228	10,157	3,187	3,292	14,710
27	3,465	4,219	10,019	3,192	3,293	14,449
28	3,494	4,208	9,885	3,197	3,294	14,194
29	3,522	4,196	9,754	3,202	3,296	13,948
30	3,548	4,184	9,628	3,207	3,298	13,709
31	3,574	4,170	9,506	3,212	3,300	13,479
32	3,598	4,157	9,388	3,217	3,302	13,258
33	3,621	4,144	9,274	3,221	3,304	13,045
34	3,643	4,130	9,165	3,226	3,306	12,841
35	3,664	4,116	9,060	3,230	3,308	12,645
36	3,685	4,103	8,960	3,235	3,310	12,458
37	3,704	4,090	8,863	3,239	3,313	12,278
38	3,723	4,077	8,770	3,243	3,315	12,106
39	3,741	4,064	8,681	3,247	3,317	11,942
40	3,758	4,051	8,596	3,251	3,319	11,784
41	3,774	4,039	8,514	3,255	3,321	11,633
42	3,790	4,027	8,435	3,258	3,323	11,489
43	3,805	4,016	8,360	3,262	3,325	11,350
44	3,820	4,005	8,288	3,265	3,327	11,218
45	3,834	3,994	8,218	3,269	3,329	11,090
46	3,848	3,983	8,151	3,272	3,331	10,968
47	3,861	3,973	8,087	3,275	3,333	10,851
48	3,873	3,963	8,026	3,278	3,335	10,739
49	3,885	3,953	7,966	3,281	3,337	10,631
50	3,897	3,944	7,909	3,284	3,339	10,527
51	3,908	3,935	7,854	3,287	3,341	10,427
52	3,919	3,926	7,801	3,290	3,342	10,331
53	3,930	3,917	7,750	3,293	3,344	10,239
54	3,940	3,909	7,701	3,295	3,346	10,150
55	3,950	3,901	7,654	3,298	3,347	10,064
56	3,959	3,893	7,608	3,300	3,349	9,981
57	3,969	3,886	7,564	3,303	3,350	9,901
58	3,978	3,879	7,521	3,305	3,352	9,824
59	3,986	3,871	7,480	3,307	3,353	9,750
60	3,994	3,865	7,440	3,309	3,355	9,678
61	4,003	3,858	7,401	3,311	3,356	9,608
62	4,010	3,852	7,364	3,314	3,358	9,541
63	4,018	3,845	7,328	3,316	3,359	9,475
64	4,025	3,839	7,293	3,318	3,360	9,412
65	4,033	3,833	7,259	3,319	3,361	9,351

66	4,040	3,828	7,226	3,321	3,363	9,292
67	4,046	3,822	7,194	3,323	3,364	9,234
68	4,053	3,817	7,163	3,325	3,365	9,178
69	4,059	3,811	7,133	3,327	3,366	9,124
70	4,066	3,806	7,103	3,328	3,367	9,072
71	4,072	3,801	7,075	3,330	3,368	9,021
72	4,078	3,796	7,047	3,332	3,369	8,971
73	4,083	3,792	7,020	3,333	3,371	8,923
74	4,089	3,787	6,994	3,335	3,372	8,876
75	4,094	3,783	6,969	3,336	3,373	8,830
76	4,100	3,778	6,944	3,338	3,374	8,785
77	4,105	3,774	6,920	3,339	3,374	8,742
78	4,110	3,770	6,896	3,340	3,375	8,700
79	4,115	3,766	6,873	3,342	3,376	8,659
80	4,119	3,762	6,851	3,343	3,377	8,619
81	4,124	3,758	6,829	3,344	3,378	8,580
82	4,129	3,754	6,808	3,346	3,379	8,542
83	4,133	3,751	6,787	3,347	3,380	8,505
84	4,137	3,747	6,767	3,348	3,381	8,468
85	4,142	3,743	6,747	3,349	3,381	8,433
86	4,146	3,740	6,728	3,350	3,382	8,398
87	4,150	3,737	6,709	3,352	3,383	8,365
88	4,154	3,733	6,691	3,353	3,384	8,332
89	4,158	3,730	6,673	3,354	3,384	8,299
90	4,162	3,727	6,655	3,355	3,385	8,268
91	4,165	3,724	6,638	3,356	3,386	8,237
92	4,169	3,721	6,621	3,357	3,387	8,207
93	4,172	3,718	6,605	3,358	3,387	8,177
94	4,176	3,715	6,588	3,359	3,388	8,149
95	4,179	3,713	6,573	3,360	3,388	8,120
96	4,183	3,710	6,557	3,361	3,389	8,093
97	4,186	3,707	6,542	3,362	3,390	8,066
98	4,189	3,705	6,527	3,363	3,390	8,039
99	4,192	3,702	6,513	3,363	3,391	8,013
100	4,195	3,699	6,499	3,364	3,392	7,988
101	4,198	3,697	6,485	3,365	3,392	7,963
102	4,201	3,695	6,471	3,366	3,393	7,938
103	4,204	3,692	6,458	3,367	3,393	7,915
104	4,207	3,690	6,444	3,368	3,394	7,891
105	4,210	3,688	6,431	3,368	3,394	7,868
106	4,213	3,685	6,419	3,369	3,395	7,845
107	4,215	3,683	6,406	3,370	3,395	7,823
108	4,218	3,681	6,394	3,371	3,396	7,802

109	4,220	3,679	6,382	3,371	3,396	7,780
110	4,223	3,677	6,371	3,372	3,397	7,759
111	4,225	3,675	6,359	3,373	3,397	7,739
112	4,228	3,673	6,348	3,373	3,398	7,718
113	4,230	3,671	6,337	3,374	3,398	7,699
114	4,233	3,669	6,326	3,375	3,399	7,679
115	4,235	3,667	6,315	3,375	3,399	7,660
116	4,237	3,665	6,305	3,376	3,400	7,641
117	4,240	3,663	6,294	3,377	3,400	7,623
118	4,242	3,661	6,284	3,377	3,400	7,605
119	4,244	3,660	6,274	3,378	3,401	7,587
120	4,246	3,658	6,264	3,378	3,401	7,569
121	4,248	3,656	6,254	3,379	3,402	7,552
122	4,250	3,654	6,245	3,380	3,402	7,535
123	4,252	3,653	6,236	3,380	3,402	7,518
124	4,254	3,651	6,226	3,381	3,403	7,502
125	4,256	3,650	6,217	3,381	3,403	7,486
126	4,258	3,648	6,208	3,382	3,404	7,470
127	4,260	3,646	6,200	3,382	3,404	7,454
128	4,262	3,645	6,191	3,383	3,404	7,439
129	4,264	3,643	6,183	3,383	3,405	7,423
130	4,266	3,642	6,174	3,384	3,405	7,409
131	4,267	3,640	6,166	3,384	3,405	7,394
132	4,269	3,639	6,158	3,385	3,406	7,379
133	4,271	3,637	6,150	3,385	3,406	7,365
134	4,273	3,636	6,142	3,386	3,406	7,351
135	4,274	3,635	6,134	3,386	3,407	7,337
136	4,276	3,633	6,127	3,387	3,407	7,324
137	4,277	3,632	6,119	3,387	3,407	7,310
138	4,279	3,631	6,112	3,388	3,408	7,297
139	4,281	3,629	6,104	3,388	3,408	7,284
140	4,282	3,628	6,097	3,389	3,408	7,271
141	4,284	3,627	6,090	3,389	3,408	7,258
142	4,285	3,626	6,083	3,390	3,409	7,246
143	4,287	3,624	6,076	3,390	3,409	7,234
144	4,288	3,623	6,069	3,390	3,409	7,221
145	4,290	3,622	6,063	3,391	3,410	7,210
146	4,291	3,621	6,056	3,391	3,410	7,198
147	4,293	3,620	6,049	3,392	3,410	7,186
148	4,294	3,618	6,043	3,392	3,410	7,175
149	4,295	3,617	6,037	3,392	3,411	7,163
150	4,297	3,616	6,030	3,393	3,411	7,152

Term to maturity (in years)	US dollar (in %)	Yen (in %)
1	5,379	- 0,007
2	4,788	0,063
3	4,357	0,118
4	4,069	0,165
5	3,882	0,223
6	3,756	0,294
7	3,667	0,369
8	3,602	0,442
9	3,555	0,508
10	3,521	0,568
11	3,498	0,623
12	3,484	0,673
13	3,475	0,721
14	3,467	0,766
15	3,460	0,810
16	3,452	0,851
17	3,441	0,890
18	3,426	0,925
19	3,406	0,957
20	3,379	0,984
21	3,347	1,006
22	3,310	1,023
23	3,272	1,036
24	3,235	1,044
25	3,198	1,047
26	3,164	1,047
27	3,133	1,045
28	3,106	1,046
29	3,083	1,052
30	3,064	1,065
31	3,049	1,085
32	3,039	1,112
33	3,031	1,143
34	3,026	1,177
35	3,023	1,214
36	3,022	1,252
37	3,022	1,291
38	3,024	1,331
39	3,026	1,371
40	3,029	1,410
41	3,033	1,450

42	3,037	1,489
43	3,042	1,527
44	3,047	1,564
45	3,052	1,601
46	3,057	1,637
47	3,063	1,672
48	3,068	1,706
49	3,074	1,739
50	3,079	1,771
51	3,085	1,802
52	3,090	1,832
53	3,096	1,862
54	3,101	1,890
55	3,107	1,918
56	3,112	1,945
57	3,117	1,971
58	3,122	1,996
59	3,127	2,021
60	3,132	2,045
61	3,136	2,068
62	3,141	2,090
63	3,146	2,112
64	3,150	2,133
65	3,154	2,154
66	3,159	2,174
67	3,163	2,193
68	3,167	2,212
69	3,171	2,230
70	3,174	2,248
71	3,178	2,266
72	3,182	2,283
73	3,185	2,299
74	3,189	2,315
75	3,192	2,331
76	3,196	2,346
77	3,199	2,361
78	3,202	2,375
79	3,205	2,389
80	3,208	2,403
81	3,211	2,417
82	3,214	2,430
83	3,217	2,443
84	3,219	2,455

85	3,222	2,467
86	3,225	2,479
87	3,227	2,491
88	3,230	2,502
89	3,232	2,513
90	3,235	2,524
91	3,237	2,535
92	3,239	2,545
93	3,242	2,556
94	3,244	2,566
95	3,246	2,575
96	3,248	2,585
97	3,250	2,594
98	3,252	2,604
99	3,254	2,613
100	3,256	2,621
101	3,258	2,630
102	3,260	2,639
103	3,262	2,647
104	3,264	2,655
105	3,265	2,663
106	3,267	2,671
107	3,269	2,679
108	3,270	2,686
109	3,272	2,694
110	3,274	2,701
111	3,275	2,708
112	3,277	2,715
113	3,278	2,722
114	3,280	2,729
115	3,281	2,736
116	3,283	2,742
117	3,284	2,749
118	3,286	2,755
119	3,287	2,761
120	3,288	2,767
121	3,290	2,773
122	3,291	2,779
123	3,292	2,785
124	3,294	2,791
125	3,295	2,797
126	3,296	2,802
127	3,297	2,808

128	3,298	2,813
129	3,300	2,818
130	3,301	2,823
131	3,302	2,829
132	3,303	2,834
133	3,304	2,839
134	3,305	2,844
135	3,306	2,848
136	3,307	2,853
137	3,308	2,858
138	3,309	2,863
139	3,310	2,867
140	3,311	2,872
141	3,312	2,876
142	3,313	2,880
143	3,314	2,885
144	3,315	2,889
145	3,316	2,893
146	3,317	2,897
147	3,318	2,902
148	3,319	2,906
149	3,320	2,910
150	3,321	2,913

ANNEX II

Fundamental spreads for the calculation of the matching adjustment

The fundamental spreads set out in this Annex are expressed in basis points and do not include any increase in accordance with Article 77c(1)(c) of Directive 2009/138/EC.

1. EXPOSURES TO CENTRAL GOVERNMENTS AND CENTRAL BANKS

The fundamental spreads apply to exposures denominated in all currencies.

The fundamental spreads for durations from 11 to 30 years are equal to the fundamental spreads for duration 10 years.

Duration (in years)	Austria	Belgium	Bulgaria	Croatia	Czech Republic	Cyprus	Denmark
1	0	0	27	5	0	21	0
2	0	0	35	5	0	35	0
3	0	0	40	5	0	40	0
4	0	1	43	5	2	42	0
5	0	2	47	5	3	45	0
6	0	3	50	5	5	47	0
7	1	4	53	5	8	49	0
8	2	5	54	5	10	49	0
9	2	6	56	5	11	47	0
10	3	7	58	5	12	46	0

Duration (in years)	Estonia	Finland	France	Germany	Greece	Hungary	Ireland
1	0	0	0	0	347	4	13
2	0	0	0	0	217	4	18
3	0	0	0	0	193	4	21
4	1	0	0	0	170	4	22
5	2	0	0	0	156	4	23
6	3	0	0	0	154	4	24
7	4	0	0	0	152	4	25
8	5	0	1	0	156	3	26
9	6	0	2	0	158	1	27
10	7	0	3	0	160	4	27

Duration (in years)	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland
1	6	3	4	0	13	0	4
2	14	8	10	0	19	0	4
3	18	11	13	0	21	0	4
4	21	13	15	0	22	0	4
5	23	15	17	0	23	0	4

6	25	17	19	0	25	0	4
7	27	18	20	0	25	0	4
8	29	19	22	0	27	0	4
9	30	20	23	1	27	0	4
10	32	21	24	1	27	0	4

Duration (in years)	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
1	21	8	10	14	4	0	0
2	35	15	13	17	10	0	0
3	40	17	15	22	13	0	0
4	42	18	17	26	15	0	0
5	45	19	18	29	17	0	0
6	47	21	19	33	19	0	0
7	49	22	21	34	20	0	0
8	49	23	22	36	22	0	0
9	47	24	22	36	23	0	0
10	46	22	23	37	24	0	0

Duration (in years)	Iceland	Liechtenstein	Norway	Switzerland	Australia	Brazil	Canada
1	5	0	0	0	0	12	0
2	5	0	0	0	0	12	0
3	5	0	0	0	0	12	0
4	5	0	0	0	0	12	0
5	5	0	0	0	0	12	0
6	5	0	0	0	0	12	0
7	5	0	0	0	0	12	0
8	5	0	0	0	0	12	0
9	5	0	0	0	0	12	0
10	5	0	0	0	0	12	0

Duration (in years)	Chile	China	Colombia	Hong Kong	India	Japan	Malaysia
1	16	0	11	0	10	0	0
2	18	1	17	0	10	0	0
3	17	2	27	0	10	0	0
4	16	3	33	0	10	0	0
5	15	3	35	0	10	0	0
6	14	3	38	0	10	0	0
7	13	4	39	0	10	0	0

8	14	7	38	0	10	0	0
9	15	5	35	0	10	0	0
10	13	5	37	0	10	1	0

Duration (in years)	Mexico	New Zealand	Russia	Singapore	South Africa	South Korea	Thailand
1	8	0	0	0	7	8	1
2	9	0	0	0	10	11	0
3	10	0	0	0	11	11	0
4	10	0	0	0	13	13	0
5	11	0	2	0	13	15	0
6	10	0	5	0	15	15	0
7	10	0	7	0	17	15	0
8	10	0	11	0	19	15	0
9	10	0	16	0	20	15	0
10	10	0	16	0	22	15	0

Duration (in years)	Taiwan	Turkey	United States
1	4	0	0
2	4	0	0
3	4	0	0
4	4	0	0
5	4	0	0
6	4	0	0
7	4	0	0
8	4	0	0
9	4	0	0
10	4	0	0

2. EXPOSURES TO FINANCIAL INSTITUTIONS

2.1. Euro

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	6	19	42	109	224	509	1 252
2	6	19	42	109	224	509	1 007
3	7	21	43	104	221	505	820
4	9	24	46	107	220	504	678
5	10	26	51	110	219	504	569
6	11	28	54	115	219	504	504

7	12	30	56	117	219	504	504
8	12	31	56	116	219	504	504
9	13	32	56	116	219	504	504
10	13	33	57	115	219	504	504
11	14	34	57	116	219	504	504
12	14	35	57	116	219	504	504
13	14	35	57	116	219	504	504
14	15	36	57	116	219	504	504
15	15	36	57	116	219	504	504
16	15	36	57	116	219	504	504
17	15	36	57	116	219	504	504
18	15	36	57	116	219	504	504
19	15	36	57	116	219	504	504
20	16	36	57	116	219	504	504
21	16	36	57	116	219	504	504
22	18	36	57	116	219	504	504
23	18	36	57	116	219	504	504
24	19	36	57	116	219	504	504
25	19	36	57	116	219	504	504
26	20	36	57	116	219	504	504
27	21	36	57	116	219	504	504
28	21	36	57	116	219	504	504
29	22	36	57	116	219	504	504
30	23	36	57	116	219	504	504

2.2. Czech koruna

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	18	31	54	122	236	521	1 302
2	20	33	55	123	237	522	1 038
3	21	35	57	118	234	518	841
4	22	37	59	120	232	517	694
5	22	38	63	122	232	516	582
6	23	40	66	126	231	515	515
7	23	41	67	128	230	515	515
8	22	41	66	126	229	514	514
9	22	41	65	125	229	513	513
10	22	42	65	124	228	513	513
11	22	42	65	124	228	512	512
12	22	42	64	123	227	512	512
13	21	42	64	122	226	511	511

14	21	42	63	122	226	510	510
15	21	42	63	122	225	510	510
16	20	41	62	121	225	510	510
17	20	41	62	121	225	510	510
18	20	41	62	121	225	510	510
19	20	41	62	121	225	510	510
20	20	42	63	121	225	510	510
21	21	42	63	122	226	510	510
22	21	42	63	122	226	510	510
23	21	42	63	122	226	511	511
24	21	42	63	122	226	511	511
25	21	42	63	122	226	510	510
26	21	42	63	122	226	510	510
27	21	42	63	122	226	510	510
28	21	42	63	122	226	510	510
29	23	42	63	122	225	510	510
30	24	42	63	121	225	510	510

2.3. Danish krone

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	6	19	42	109	224	508	1 251
2	6	19	42	109	224	508	1 007
3	7	21	43	104	220	505	820
4	9	24	46	107	219	504	678
5	10	26	51	110	219	504	569
6	11	28	54	114	219	504	504
7	12	30	56	117	219	504	504
8	12	31	56	116	219	504	504
9	12	32	56	115	219	504	504
10	13	33	56	115	219	504	504
11	14	34	57	115	219	504	504
12	14	35	57	115	219	504	504
13	14	35	57	115	219	504	504
14	14	36	57	115	219	504	504
15	14	36	57	115	219	504	504
16	14	36	57	115	219	504	504
17	14	36	57	115	219	504	504
18	14	36	57	115	219	504	504
19	15	36	57	115	219	504	504
20	16	36	57	115	219	504	504

21	16	36	57	115	219	504	504
22	18	36	57	115	219	504	504
23	18	36	57	115	219	504	504
24	19	36	57	115	219	504	504
25	19	36	57	115	219	504	504
26	20	36	57	115	219	504	504
27	21	36	57	115	219	504	504
28	21	36	57	115	219	504	504
29	22	36	57	115	219	504	504
30	23	36	57	115	219	504	504

2.4. Forint

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	80	93	115	183	297	582	1 368
2	76	89	112	179	294	579	1 095
3	80	94	115	176	293	577	888
4	79	94	116	177	290	574	732
5	78	94	119	178	288	572	612
6	78	95	121	181	286	571	571
7	77	95	121	182	284	569	569
8	76	95	120	180	283	568	568
9	75	95	119	178	282	567	567
10	73	93	116	175	279	564	564
11	71	91	114	173	277	561	561
12	70	91	113	172	275	560	560
13	70	91	112	171	275	559	559
14	70	91	112	171	274	559	559
15	69	90	112	170	274	559	559
16	69	90	111	170	274	558	558
17	68	90	111	169	273	558	558
18	68	89	110	169	273	558	558
19	67	88	110	168	272	557	557
20	67	88	109	168	272	556	556
21	66	87	108	167	271	556	556
22	65	87	108	166	270	555	555
23	64	86	107	165	269	554	554
24	63	85	106	164	268	553	553
25	62	84	105	163	267	552	552
26	61	83	104	162	266	551	551
27	60	82	103	161	265	550	550

28	59	81	102	160	264	549	549
29	58	79	100	159	263	548	548
30	57	78	99	158	262	547	547

2.5. Krona

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	10	23	46	114	228	513	1 254
2	12	25	47	115	230	514	1 009
3	14	28	50	111	227	512	822
4	16	31	53	114	227	511	679
5	17	34	58	117	227	511	570
6	18	36	62	122	227	511	511
7	19	37	63	124	226	511	511
8	19	38	63	123	226	511	511
9	19	38	62	122	226	510	510
10	19	39	62	121	225	510	510
11	19	40	63	121	225	510	510
12	20	41	63	121	225	510	510
13	20	41	63	121	225	510	510
14	20	42	63	121	225	510	510
15	21	42	63	122	225	510	510
16	20	42	63	121	225	510	510
17	21	42	63	122	226	510	510
18	21	42	63	122	226	510	510
19	21	42	63	122	226	511	511
20	22	43	64	123	227	511	511
21	22	43	64	123	227	512	512
22	22	44	65	123	227	512	512
23	23	44	65	124	227	512	512
24	23	44	65	124	227	512	512
25	23	44	65	124	227	512	512
26	23	44	65	124	227	512	512
27	22	44	65	123	227	512	512
28	22	44	65	123	227	512	512
29	22	43	64	123	227	512	512
30	23	43	64	123	227	512	512

2.6. Lev

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	5	18	41	109	223	508	1 251
2	5	18	41	109	223	508	1 006
3	7	21	42	103	220	504	819
4	8	23	45	106	219	503	677
5	9	25	50	109	219	503	569
6	10	27	54	114	219	503	503
7	12	30	55	116	219	503	503
8	12	30	55	115	219	503	503
9	12	31	55	115	219	503	503
10	12	32	56	115	219	503	503
11	13	33	56	115	219	503	503
12	13	34	56	115	219	503	503
13	14	35	56	115	219	503	503
14	14	35	56	115	219	503	503
15	14	35	56	115	219	503	503
16	14	35	56	115	219	503	503
17	14	35	56	115	219	503	503
18	14	35	56	115	219	503	503
19	15	35	56	115	219	503	503
20	16	35	56	115	219	503	503
21	16	35	56	115	219	503	503
22	18	35	56	115	219	503	503
23	18	35	56	115	219	503	503
24	19	35	56	115	219	503	503
25	19	35	56	115	219	503	503
26	20	35	56	115	219	503	503
27	21	35	56	115	219	503	503
28	21	35	56	115	219	503	503
29	22	35	56	115	219	503	503
30	23	35	56	115	219	503	503

2.7. Pound sterling

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	7	24	52	139	242	527	1 291
2	7	24	52	139	242	527	1 040
3	8	26	52	127	239	523	847

4	10	28	54	119	237	521	699
5	12	30	56	110	236	520	586
6	14	34	59	104	235	519	519
7	16	36	60	98	233	518	518
8	18	38	59	92	232	517	517
9	20	44	62	87	231	516	516
10	20	44	61	85	231	515	515
11	19	43	59	85	230	514	514
12	19	43	60	87	229	514	514
13	19	43	60	87	228	513	513
14	19	43	60	87	228	512	512
15	19	43	60	87	227	512	512
16	19	43	60	87	226	510	510
17	19	44	60	87	225	510	510
18	19	44	60	87	224	509	509
19	19	44	60	87	224	509	509
20	19	44	60	87	225	509	509
21	19	44	60	87	225	509	509
22	19	44	60	87	224	509	509
23	19	44	60	87	224	509	509
24	19	44	60	87	223	508	508
25	20	44	60	87	223	507	507
26	20	44	60	87	222	507	507
27	21	44	60	87	221	506	506
28	21	44	60	87	221	506	506
29	23	44	60	87	220	505	505
30	24	44	60	87	220	505	505

2.8. Romanian leu

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	84	97	119	187	302	586	1 293
2	83	95	118	186	300	585	1 044
3	83	97	118	180	296	580	854
4	82	97	120	181	293	578	709
5	82	98	123	182	291	576	597
6	81	98	124	185	289	574	574
7	80	98	124	185	287	572	572
8	78	97	122	182	285	570	570
9	76	96	120	179	283	568	568
10	76	96	119	178	282	567	567

11	75	95	118	177	281	565	565
12	74	95	117	175	279	564	564
13	73	94	115	174	278	562	562
14	71	93	114	172	276	561	561
15	70	91	112	171	275	560	560
16	69	90	111	170	274	559	559
17	68	89	110	169	273	558	558
18	67	88	109	168	272	557	557
19	66	88	109	167	271	556	556
20	66	87	108	167	270	555	555
21	65	86	107	166	269	554	554
22	64	85	106	165	268	553	553
23	63	84	105	164	267	552	552
24	61	83	104	162	266	551	551
25	60	82	103	161	265	550	550
26	59	80	101	160	264	549	549
27	58	79	100	159	263	548	548
28	57	78	99	158	262	547	547
29	56	77	98	157	261	545	545
30	55	76	97	156	260	544	544

2.9. Zloty

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	57	70	92	160	275	559	1 288
2	56	69	92	159	274	559	1 037
3	57	71	93	154	270	554	846
4	57	72	95	156	268	553	700
5	57	74	98	157	267	551	589
6	57	74	100	160	265	550	550
7	57	75	101	162	264	549	549
8	56	74	100	159	263	547	547
9	54	74	98	157	261	546	546
10	54	74	97	156	260	545	545
11	54	74	97	156	259	544	544
12	53	74	96	155	259	543	543
13	53	74	95	154	258	543	543
14	53	74	95	153	257	542	542
15	52	73	94	153	257	541	541
16	51	72	93	152	256	541	541
17	51	72	93	152	255	540	540

18	50	71	92	151	255	540	540
19	50	71	92	151	255	539	539
20	50	71	92	151	254	539	539
21	49	70	91	150	254	539	539
22	49	70	91	150	254	538	538
23	48	69	90	149	253	538	538
24	48	69	90	149	252	537	537
25	47	68	89	148	252	536	536
26	46	67	88	147	251	536	536
27	45	67	88	146	250	535	535
28	45	66	87	146	250	534	534
29	44	65	86	145	249	534	534
30	43	64	86	144	248	533	533

2.10. Króna

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	91	104	126	194	308	593	1 345
2	90	103	126	194	308	593	1 078
3	90	104	126	187	303	588	875
4	90	105	128	188	301	586	722
5	91	107	131	190	300	585	605
6	91	108	134	194	299	584	584
7	92	110	136	197	299	584	584
8	92	111	136	196	299	584	584
9	92	111	136	195	299	584	584
10	93	113	136	195	299	584	584
11	93	113	136	195	299	583	583
12	93	113	135	194	298	583	583
13	92	113	134	193	297	582	582
14	91	112	133	192	296	581	581
15	90	111	132	191	295	580	580
16	89	110	131	190	294	578	578
17	88	109	130	189	293	577	577
18	87	108	129	188	292	576	576
19	86	107	128	187	291	575	575
20	85	106	127	186	290	574	574
21	84	105	126	184	288	573	573
22	82	103	124	183	287	572	572
23	81	102	123	182	286	570	570
24	79	100	121	180	284	569	569

25	78	99	120	179	283	567	567
26	76	97	118	177	281	566	566
27	75	96	117	176	279	564	564
28	73	94	115	174	278	563	563
29	72	93	114	173	276	561	561
30	70	91	112	171	275	560	560

2.11. Norwegian krone

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	31	44	66	134	249	533	1 268
2	32	44	67	135	249	534	1 021
3	32	46	68	129	245	530	832
4	33	48	70	131	243	528	688
5	33	49	74	133	242	527	577
6	34	51	77	137	242	526	526
7	34	52	78	139	241	526	526
8	33	52	77	137	240	525	525
9	33	52	76	135	239	524	524
10	32	52	76	135	239	523	523
11	32	53	75	134	238	523	523
12	32	53	75	134	237	522	522
13	32	53	74	133	237	521	521
14	31	53	74	132	236	521	521
15	31	52	73	132	236	520	520
16	30	51	72	131	235	520	520
17	30	51	72	131	235	520	520
18	30	51	72	131	235	519	519
19	30	51	72	131	234	519	519
20	30	51	72	131	235	519	519
21	30	51	72	131	235	519	519
22	30	51	72	131	235	519	519
23	30	51	72	131	234	519	519
24	29	51	72	130	234	519	519
25	29	50	71	130	234	519	519
26	29	50	71	130	234	518	518
27	29	50	71	129	233	518	518
28	28	49	70	129	233	518	518
29	28	49	70	129	233	517	517
30	28	49	70	129	232	517	517

2.12. Swiss franc

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	4	23	91	206	490	1 214
2	1	5	24	92	206	491	979
3	2	5	26	87	203	488	799
4	3	6	29	89	202	487	662
5	4	9	34	93	202	487	556
6	5	11	37	97	202	487	487
7	5	13	39	100	202	487	487
8	7	14	39	99	202	487	487
9	7	15	39	98	202	487	487
10	8	16	39	98	202	487	487
11	9	18	40	99	203	488	488
12	9	17	39	98	202	487	487
13	10	19	40	99	203	487	487
14	12	19	40	99	202	487	487
15	12	18	39	97	201	486	486
16	13	17	38	97	201	485	485
17	14	17	38	97	201	485	485
18	14	17	38	97	201	485	485
19	15	18	38	97	201	486	486
20	15	18	39	98	202	486	486
21	16	19	39	98	202	487	487
22	18	19	39	98	202	487	487
23	18	21	39	98	202	486	486
24	19	21	39	98	202	486	486
25	19	22	39	98	201	486	486
26	20	22	39	97	201	486	486
27	20	23	39	97	201	486	486
28	21	24	40	97	201	486	486
29	22	24	41	97	201	486	486
30	22	26	42	97	201	486	486

2.13. Australian dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	44	57	80	147	262	546	1 265
2	44	57	80	147	262	546	1 019
3	45	59	81	142	258	543	831

4	46	61	83	144	257	541	688
5	46	62	87	146	256	540	578
6	47	64	90	150	255	540	540
7	47	65	91	152	254	539	539
8	46	65	90	150	253	538	538
9	45	65	89	148	252	537	537
10	45	65	89	148	252	536	536
11	45	66	88	147	251	536	536
12	45	66	88	146	250	535	535
13	45	66	87	146	250	534	534
14	44	65	87	145	249	534	534
15	44	65	86	145	249	533	533
16	43	64	85	144	248	533	533
17	43	64	85	144	247	532	532
18	42	63	84	143	247	532	532
19	42	63	84	143	247	531	531
20	42	63	84	143	246	531	531
21	41	62	83	142	246	531	531
22	41	62	83	142	246	530	530
23	40	61	82	141	245	530	530
24	40	61	82	141	244	529	529
25	39	60	81	140	244	528	528
26	38	59	80	139	243	528	528
27	37	59	80	138	242	527	527
28	37	58	79	138	241	526	526
29	36	57	78	137	241	525	525
30	35	56	77	136	240	525	525

2.14. Baht

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	16	29	52	120	234	519	1 214
2	20	33	55	123	238	522	980
3	24	38	60	121	237	522	801
4	28	43	65	126	239	523	664
5	30	47	71	130	240	524	559
6	30	47	73	133	238	523	523
7	34	52	78	139	241	526	526
8	33	52	77	137	240	525	525
9	34	54	78	137	241	526	526
10	36	56	80	138	242	527	527

11	38	58	81	140	243	528	528
12	39	60	81	140	244	529	529
13	39	60	82	141	244	529	529
14	40	61	82	141	245	530	530
15	40	61	82	141	245	530	530
16	40	61	82	141	245	529	529
17	40	61	82	141	245	530	530
18	40	61	82	141	244	529	529
19	39	60	82	140	244	529	529
20	39	61	82	140	244	529	529
21	39	61	82	140	244	529	529
22	39	60	81	140	244	529	529
23	39	60	81	140	244	528	528
24	39	60	81	139	243	528	528
25	38	59	80	139	243	528	528
26	38	59	80	139	242	527	527
27	37	58	79	138	242	527	527
28	37	58	79	138	241	526	526
29	36	57	78	137	241	526	526
30	36	57	78	136	240	525	525

2.15. Canadian dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	18	31	54	122	236	521	1 275
2	19	32	55	122	237	522	1 025
3	21	35	57	118	234	519	833
4	23	38	60	121	234	518	687
5	24	40	65	124	233	518	576
6	25	42	68	128	233	518	518
7	26	44	70	131	233	518	518
8	26	45	70	130	233	518	518
9	26	46	70	129	233	518	518
10	27	47	70	129	233	518	518
11	28	48	71	129	233	518	518
12	28	49	71	130	233	518	518
13	28	49	71	130	233	518	518
14	29	50	71	130	233	518	518
15	29	50	71	130	233	518	518
16	28	50	71	129	233	518	518

17	28	50	71	129	233	518	518
18	28	50	71	129	233	518	518
19	28	50	71	129	233	518	518
20	29	50	71	129	233	518	518
21	28	50	71	129	233	518	518
22	28	49	70	129	233	518	518
23	28	49	70	129	233	517	517
24	27	48	70	128	232	517	517
25	27	48	69	128	232	516	516
26	26	48	69	127	231	516	516
27	26	47	68	127	231	515	515
28	25	47	68	126	230	515	515
29	25	46	67	126	230	515	515
30	25	46	67	126	229	514	514

2.16. Chilean peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	53	66	89	156	271	555	1 317
2	55	68	90	158	273	557	1 047
3	58	72	94	155	271	556	850
4	61	76	98	159	271	556	702
5	63	79	103	162	272	557	590
6	64	81	107	168	272	557	557
7	65	83	109	170	272	557	557
8	65	84	109	169	272	557	557
9	65	84	109	168	272	557	557
10	66	86	109	168	272	557	557
11	66	86	109	168	272	556	556
12	66	87	109	167	271	556	556
13	65	86	108	167	270	555	555
14	65	86	107	166	270	554	554
15	64	85	106	165	269	554	554
16	64	85	106	164	268	553	553
17	63	84	105	164	268	552	552
18	62	83	105	163	267	552	552
19	62	83	104	163	267	551	551
20	61	82	103	162	266	551	551
21	60	82	103	161	265	550	550
22	60	81	102	161	264	549	549
23	59	80	101	160	264	548	548

24	58	79	100	159	263	547	547
25	57	78	99	158	262	546	546
26	56	77	98	157	261	546	546
27	55	76	97	156	260	545	545
28	54	75	96	155	259	544	544
29	53	74	95	154	258	543	543
30	52	74	95	153	257	542	542

2.17. Colombian peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	84	97	119	187	302	586	1 363
2	89	102	124	192	307	591	1 100
3	91	105	127	188	305	589	898
4	93	108	131	191	304	589	745
5	97	113	137	196	306	591	627
6	99	116	142	202	307	592	592
7	101	119	145	205	308	592	592
8	102	121	146	206	309	594	594
9	103	122	147	206	310	595	595
10	104	124	147	206	310	595	595
11	104	124	147	206	310	594	594
12	104	124	146	205	309	594	594
13	103	124	145	204	308	593	593
14	102	123	144	203	306	591	591
15	100	121	143	201	305	590	590
16	99	120	141	200	304	588	588
17	98	119	140	199	302	587	587
18	96	117	138	197	301	586	586
19	95	116	137	196	300	584	584
20	93	115	136	194	298	583	583
21	92	113	134	193	297	581	581
22	90	112	133	191	295	580	580
23	89	110	131	190	294	578	578
24	87	108	129	188	292	576	576
25	85	106	127	186	290	575	575
26	84	105	126	184	288	573	573
27	82	103	124	183	287	571	571
28	80	101	122	181	285	570	570
29	79	100	121	179	283	568	568
30	77	98	119	178	282	566	566

2.18. Hong Kong dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	12	25	48	115	230	515	1 267
2	15	28	50	118	233	517	1 019
3	18	32	54	115	231	516	830
4	21	36	58	119	232	516	686
5	23	39	64	123	233	517	577
6	25	42	68	128	233	518	518
7	26	44	70	131	233	518	518
8	26	45	70	130	233	518	518
9	26	46	70	129	233	518	518
10	27	47	70	129	233	518	518
11	27	48	70	129	233	518	518
12	27	48	70	129	233	517	517
13	27	48	69	128	232	517	517
14	27	48	69	128	231	516	516
15	26	47	68	127	231	516	516
16	25	47	68	126	230	515	515
17	25	46	67	126	230	515	515
18	25	46	67	126	230	514	514
19	25	46	67	126	230	514	514
20	25	46	67	126	230	515	515
21	25	46	67	126	230	515	515
22	25	46	67	126	230	515	515
23	25	46	67	126	230	515	515
24	25	46	67	126	230	515	515
25	25	46	67	126	230	514	514
26	25	46	67	126	229	514	514
27	24	46	67	125	229	514	514
28	24	45	66	125	229	514	514
29	24	45	66	125	229	513	513
30	24	45	66	125	229	513	513

2.19. Indian rupee

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	94	107	130	197	312	596	1 306
2	95	108	131	198	313	598	1 055
3	97	111	133	194	310	595	863

4	99	114	136	197	310	594	716
5	100	116	141	200	310	594	602
6	101	118	144	204	309	594	594
7	102	120	146	207	309	594	594
8	102	120	146	206	309	594	594
9	101	121	145	204	308	593	593
10	100	120	144	203	307	592	592
11	100	120	143	201	305	590	590
12	98	119	141	200	304	588	588
13	97	118	139	198	302	587	587
14	95	117	138	196	300	585	585
15	94	115	136	195	299	583	583
16	92	113	134	193	297	581	581
17	91	112	133	191	295	580	580
18	89	110	131	190	294	579	579
19	88	109	130	189	293	577	577
20	87	108	129	188	292	576	576
21	86	107	128	187	291	575	575
22	85	106	127	186	289	574	574
23	83	105	126	184	288	573	573
24	82	103	124	183	287	572	572
25	81	102	123	182	286	571	571
26	80	101	122	181	285	569	569
27	79	100	121	180	283	568	568
28	77	99	120	178	282	567	567
29	76	98	119	177	281	566	566
30	75	96	117	176	280	565	565

2.20. Mexican peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	306	319	342	409	524	809	1 394
2	88	101	124	191	306	590	1 108
3	91	105	127	188	304	589	896
4	94	109	132	192	305	590	739
5	96	113	137	196	306	590	619
6	98	115	141	201	306	591	591
7	100	118	144	204	307	591	591
8	100	119	144	204	307	592	592
9	101	120	144	204	308	592	592

10	101	121	144	203	307	592	592
11	102	122	145	203	307	592	592
12	102	123	145	203	307	592	592
13	103	124	145	204	308	592	592
14	103	124	145	204	308	593	593
15	104	125	146	205	309	593	593
16	105	126	147	206	310	594	594
17	106	127	148	207	310	595	595
18	106	128	149	207	311	596	596
19	107	128	149	208	312	597	597
20	108	129	150	208	312	597	597
21	107	129	150	208	312	597	597
22	107	128	149	208	312	597	597
23	106	127	149	207	311	596	596
24	105	126	148	206	310	595	595
25	104	125	146	205	309	594	594
26	103	124	145	204	308	592	592
27	102	123	144	202	306	591	591
28	100	121	142	201	305	590	590
29	99	120	141	200	303	588	588
30	97	118	139	198	302	587	587

2.21. New Taiwan dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	11	34	102	216	501	1 194
2	1	11	34	101	216	501	963
3	2	13	35	96	212	497	787
4	3	15	37	98	211	495	652
5	4	17	41	100	210	495	549
6	5	18	44	104	209	494	494
7	5	19	45	106	209	493	493
8	7	19	45	104	208	492	492
9	7	19	44	103	207	491	491
10	8	20	43	102	206	491	491
11	9	21	44	102	206	491	491
12	9	22	44	102	206	491	491
13	10	22	44	102	206	491	491
14	12	23	44	103	207	491	491
15	12	23	44	103	207	492	492
16	13	23	45	103	207	492	492

17	14	24	45	104	208	492	492
18	14	25	46	105	208	493	493
19	15	25	46	105	209	494	494
20	15	26	47	106	210	495	495
21	16	27	48	107	211	495	495
22	17	28	49	108	211	496	496
23	18	28	49	108	212	497	497
24	19	29	50	109	212	497	497
25	19	29	50	109	213	498	498
26	20	29	51	109	213	498	498
27	20	30	51	110	213	498	498
28	21	30	51	110	214	498	498
29	21	30	51	110	214	499	499
30	22	30	52	110	214	499	499

2.22. New Zealand dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	51	63	86	154	268	553	1 286
2	51	64	87	155	269	554	1 033
3	52	66	88	149	265	550	840
4	53	68	90	151	264	548	694
5	54	70	95	154	263	548	583
6	54	71	97	158	263	547	547
7	54	72	98	159	261	546	546
8	54	73	98	158	261	546	546
9	53	73	97	156	260	545	545
10	53	73	96	155	259	544	544
11	52	72	95	154	258	542	542
12	51	72	94	153	256	541	541
13	50	71	93	151	255	540	540
14	49	70	91	150	254	539	539
15	48	69	90	149	253	537	537
16	47	68	89	148	251	536	536
17	46	67	88	147	251	535	535
18	45	66	87	146	250	534	534
19	44	65	86	145	249	534	534
20	44	65	86	145	249	533	533
21	43	64	85	144	248	533	533
22	43	64	85	144	247	532	532
23	42	63	84	143	247	531	531

24	41	62	84	142	246	531	531
25	41	62	83	142	245	530	530
26	40	61	82	141	245	529	529
27	39	60	81	140	244	529	529
28	39	60	81	140	243	528	528
29	38	59	80	139	243	527	527
30	37	59	80	138	242	527	527

2.23. Rand

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	113	126	149	217	331	616	1 343
2	115	128	150	218	333	617	1 082
3	118	132	154	215	331	615	884
4	120	135	158	218	331	616	733
5	123	139	164	223	332	617	618
6	124	141	168	228	333	617	617
7	126	144	170	230	333	618	618
8	126	144	170	230	333	618	618
9	126	145	169	229	333	617	617
10	126	146	169	228	332	617	617
11	126	146	169	228	331	616	616
12	125	146	168	226	330	615	615
13	124	145	166	225	329	613	613
14	122	143	165	223	327	612	612
15	121	142	163	222	325	610	610
16	118	140	161	219	323	608	608
17	117	138	159	218	322	606	606
18	115	136	157	216	320	604	604
19	113	134	155	214	318	602	602
20	111	132	154	212	316	601	601
21	110	131	152	211	314	599	599
22	108	129	150	209	313	597	597
23	106	127	148	207	311	595	595
24	104	125	146	205	309	594	594
25	102	123	144	203	307	592	592
26	100	122	143	201	305	590	590
27	99	120	141	200	303	588	588
28	97	118	139	198	302	586	586
29	95	116	137	196	300	585	585
30	93	115	136	194	298	583	583

2.24. Real

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	167	180	202	270	385	669	1 393
2	175	188	211	279	393	678	1 111
3	181	195	217	278	394	679	905
4	184	199	222	282	395	680	750
5	186	202	227	286	395	680	680
6	186	203	229	290	395	679	679
7	187	205	231	291	394	678	678
8	186	204	229	289	393	677	677
9	185	204	228	288	392	676	676
10	184	204	228	287	391	675	675
11	183	204	226	285	389	674	674
12	181	202	224	283	387	671	671
13	179	200	222	280	384	669	669
14	176	198	219	277	381	666	666
15	174	195	216	275	378	663	663
16	171	192	213	272	376	660	660
17	168	189	210	269	373	657	657
18	165	186	207	266	370	654	654
19	162	183	204	263	367	652	652
20	159	180	201	260	364	649	649
21	156	177	198	257	361	646	646
22	153	174	195	254	358	643	643
23	150	171	192	251	355	640	640
24	147	168	189	248	352	636	636
25	144	165	186	245	349	633	633
26	141	162	183	242	346	630	630
27	138	159	180	239	343	628	628
28	135	156	177	236	340	625	625
29	132	154	175	233	337	622	622
30	130	151	172	231	335	619	619

2.25. Renminbi-yuan

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	31	44	67	134	249	533	1 213
2	32	45	67	135	250	534	979
3	33	47	69	130	247	531	801

4	35	50	72	133	246	530	665
5	36	52	77	136	245	530	560
6	36	53	79	140	244	529	529
7	37	55	81	141	244	529	529
8	36	54	80	140	243	528	528
9	35	55	79	138	242	527	527
10	35	55	79	137	241	526	526
11	35	56	78	137	241	526	526
12	35	56	78	136	240	525	525
13	35	56	77	136	240	525	525
14	35	56	77	136	239	524	524
15	34	56	77	135	239	524	524
16	34	56	77	135	239	524	524
17	34	56	77	135	239	524	524
18	35	56	77	136	239	524	524
19	35	56	77	136	240	524	524
20	35	56	77	136	240	524	524
21	35	56	77	136	240	524	524
22	35	56	77	136	240	524	524
23	35	56	77	136	239	524	524
24	34	56	77	135	239	524	524
25	34	55	76	135	239	524	524
26	34	55	76	135	239	523	523
27	34	55	76	134	238	523	523
28	33	54	75	134	238	523	523
29	33	54	75	134	238	522	522
30	32	54	75	133	237	522	522

2.26. Ringgit

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	29	42	65	132	247	531	1 237
2	31	44	66	134	249	533	999
3	34	48	70	131	247	531	817
4	36	51	74	134	247	532	678
5	39	55	79	138	248	533	571
6	40	57	83	143	248	533	533
7	42	60	86	146	249	533	533
8	42	60	86	145	249	533	533
9	42	61	86	145	249	534	534
10	43	63	86	145	249	534	534

11	44	64	87	146	250	534	534
12	45	65	87	146	250	535	535
13	45	66	87	146	250	535	535
14	45	66	87	146	250	535	535
15	45	66	87	146	250	535	535
16	45	66	87	146	250	534	534
17	45	66	87	146	250	535	535
18	45	66	87	146	250	535	535
19	45	66	88	146	250	535	535
20	46	67	88	147	250	535	535
21	46	67	88	147	251	535	535
22	46	67	88	147	250	535	535
23	45	67	88	146	250	535	535
24	45	66	87	146	250	534	534
25	44	66	87	145	249	534	534
26	44	65	86	145	249	533	533
27	43	65	86	144	248	533	533
28	43	64	85	144	248	532	532
29	42	63	84	143	247	532	532
30	42	63	84	143	246	531	531

2.27. Russian rouble

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	127	140	163	230	345	629	1 355
2	125	138	161	229	343	628	1 097
3	126	140	162	223	339	623	899
4	127	142	164	225	337	622	747
5	127	143	168	227	337	621	630
6	127	144	170	231	335	620	620
7	128	146	172	232	335	619	619
8	127	146	171	231	334	619	619
9	126	145	170	229	333	618	618
10	126	146	169	228	332	617	617
11	126	146	169	228	332	616	616
12	125	146	168	227	331	615	615
13	124	145	167	226	329	614	614
14	123	145	166	224	328	613	613
15	122	143	164	222	326	611	611
16	120	141	162	221	324	609	609
17	117	138	159	218	322	607	607

18	115	136	157	216	320	605	605
19	113	134	155	214	318	603	603
20	111	132	153	212	316	601	601
21	109	130	151	210	314	598	598
22	107	128	149	208	311	596	596
23	104	126	147	205	309	594	594
24	102	123	144	203	307	592	592
25	100	121	142	201	305	590	590
26	98	119	140	199	303	587	587
27	96	117	138	197	301	585	585
28	94	115	136	195	299	583	583
29	92	113	134	193	296	581	581
30	90	111	132	191	295	579	579

2.28. Singapore dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	1	14	37	105	219	504	1 249
2	3	16	39	106	221	505	1 005
3	6	20	41	102	219	503	820
4	8	23	45	106	219	503	679
5	10	26	51	110	219	504	570
6	12	29	55	115	220	504	504
7	13	31	57	118	220	505	505
8	13	32	57	117	220	505	505
9	13	32	57	116	220	505	505
10	13	33	57	116	220	504	504
11	14	34	57	116	219	504	504
12	14	35	57	115	219	504	504
13	14	35	56	115	219	504	504
14	14	35	56	115	219	503	503
15	14	35	56	115	219	503	503
16	13	34	56	114	218	503	503
17	14	35	56	114	218	503	503
18	14	35	56	114	218	503	503
19	15	35	56	115	219	503	503
20	16	35	56	115	219	504	504
21	16	36	57	116	219	504	504
22	18	36	57	116	220	504	504
23	18	36	57	116	220	505	505
24	19	36	57	116	220	505	505

25	20	36	58	116	220	505	505
26	20	37	58	116	220	505	505
27	21	37	58	116	220	505	505
28	21	37	58	116	220	505	505
29	22	37	58	116	220	505	505
30	23	37	58	116	220	505	505

2.29. South Korean won

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	35	48	71	138	253	537	1 248
2	35	48	71	139	253	538	1 005
3	36	50	71	133	249	533	820
4	36	51	73	134	247	531	679
5	36	52	77	136	246	530	571
6	38	55	82	142	247	531	531
7	36	54	80	141	243	528	528
8	39	58	83	143	246	531	531
9	39	58	82	141	245	530	530
10	34	54	77	136	240	525	525
11	30	51	74	132	236	521	521
12	28	49	71	129	233	518	518
13	26	47	68	127	231	516	516
14	24	45	66	125	229	514	514
15	23	44	65	124	228	512	512
16	21	43	64	122	226	511	511
17	21	42	63	122	226	510	510
18	20	41	62	121	225	510	510
19	20	41	62	121	225	509	509
20	20	41	62	121	225	509	509
21	20	41	62	121	225	509	509
22	20	41	62	121	225	509	509
23	20	41	62	121	224	509	509
24	20	41	62	120	224	509	509
25	20	41	62	120	224	509	509
26	20	40	61	120	224	509	509
27	21	40	61	120	224	509	509
28	21	40	61	120	224	508	508
29	22	40	61	120	224	508	508
30	23	40	61	120	223	508	508

2.30. Turkish lira

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	210	223	246	314	428	713	1 423
2	207	220	243	310	425	709	1 160
3	204	217	239	300	417	701	959
4	200	215	238	298	411	696	803
5	197	213	238	297	406	691	691
6	193	210	236	296	401	686	686
7	190	208	234	295	397	682	682
8	185	204	229	289	393	677	677
9	182	201	225	284	388	673	673
10	178	198	221	280	384	669	669
11	174	195	217	276	380	665	665
12	171	192	213	272	376	661	661
13	167	188	209	268	372	657	657
14	163	185	206	264	368	653	653
15	160	181	202	261	365	649	649
16	156	177	198	257	361	646	646
17	153	174	195	254	358	642	642
18	150	171	192	251	355	639	639
19	147	168	189	248	352	636	636
20	144	165	186	245	349	633	633
21	141	162	183	242	346	631	631
22	138	159	180	239	343	628	628
23	135	156	177	236	340	625	625
24	132	154	175	233	337	622	622
25	130	151	172	231	334	619	619
26	127	148	169	228	332	616	616
27	124	146	167	225	329	614	614
28	122	143	164	223	327	611	611
29	119	141	162	220	324	609	609
30	117	138	159	218	322	607	607

2.31. US dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	8	25	47	100	235	519	1 278
2	8	25	47	100	235	519	1 024
3	10	28	50	96	233	517	832

4	12	33	54	95	233	517	687
5	16	38	59	97	233	518	577
6	18	42	63	95	234	519	519
7	19	44	63	90	234	519	519
8	18	43	62	89	234	519	519
9	19	45	65	92	234	519	519
10	21	48	67	96	234	519	519
11	23	50	68	99	234	519	519
12	24	52	70	99	234	519	519
13	26	54	70	100	234	519	519
14	26	55	71	100	234	519	519
15	26	55	71	100	234	519	519
16	26	55	71	100	234	519	519
17	26	55	71	100	234	519	519
18	26	55	71	100	234	519	519
19	26	55	71	100	234	519	519
20	26	55	71	100	234	519	519
21	26	55	71	100	235	519	519
22	26	55	71	100	235	519	519
23	26	55	71	100	234	519	519
24	26	55	71	100	234	519	519
25	26	55	71	100	234	519	519
26	26	55	71	100	234	518	518
27	26	55	71	100	233	518	518
28	26	55	71	100	233	518	518
29	26	55	71	100	233	517	517
30	26	55	71	100	232	517	517

2.32. Yen

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	4	14	82	196	481	1 177
2	1	5	13	80	195	479	950
3	2	5	13	74	190	475	776
4	2	6	15	75	188	473	644
5	4	6	19	78	187	472	542
6	5	7	22	82	187	472	472
7	5	9	23	84	187	471	471
8	7	9	23	83	186	471	471
9	7	10	23	83	186	471	471
10	8	10	24	83	187	471	471

11	9	11	24	83	187	471	471
12	9	11	24	83	187	471	471
13	10	13	24	83	187	472	472
14	11	14	25	83	187	472	472
15	12	14	25	84	188	472	472
16	13	15	26	84	188	472	472
17	13	15	27	84	188	473	473
18	14	17	28	85	189	473	473
19	15	17	29	85	189	474	474
20	15	18	30	86	190	474	474
21	16	18	32	86	190	475	475
22	16	19	33	87	191	475	475
23	18	20	34	87	191	475	475
24	19	21	35	87	191	476	476
25	19	22	36	87	191	476	476
26	20	22	37	87	191	476	476
27	20	23	38	87	191	475	475
28	21	23	40	87	191	475	475
29	21	24	41	87	191	475	475
30	22	24	42	87	191	475	475

3. OTHER EXPOSURES

3.1. Euro

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	2	14	20	41	158	306	3 148
2	2	14	20	41	158	347	2 358
3	1	14	22	46	153	361	1 785
4	1	15	25	50	150	361	1 382
5	2	17	29	52	150	352	1 096
6	4	20	31	55	150	338	889
7	5	22	33	57	150	322	735
8	6	23	34	59	150	305	618
9	6	24	35	62	150	288	526
10	6	25	37	64	150	271	453
11	7	25	38	65	150	254	393
12	7	25	38	65	150	243	344
13	7	26	38	65	150	243	303
14	7	26	38	65	150	243	268
15	7	26	40	65	150	243	243
16	7	26	42	65	150	243	243

17	7	26	45	65	150	243	243
18	7	26	47	65	150	243	243
19	7	26	49	65	150	243	243
20	8	26	52	65	150	243	243
21	8	26	54	65	150	243	243
22	9	26	56	65	150	243	243
23	9	26	59	65	150	243	243
24	9	26	61	65	150	243	243
25	10	26	64	65	150	243	243
26	10	26	66	67	150	243	243
27	11	26	69	68	150	243	243
28	11	26	71	70	150	243	243
29	11	26	74	72	150	243	243
30	12	26	76	73	150	243	243

3.2. Czech koruna

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	14	26	32	53	170	318	3 284
2	15	27	34	55	171	357	2 437
3	15	27	36	59	166	370	1 837
4	14	28	38	63	163	368	1 419
5	15	29	41	64	162	359	1 124
6	15	31	42	66	162	345	911
7	16	33	43	67	161	328	753
8	15	33	44	69	160	311	632
9	15	33	45	71	160	293	538
10	15	33	46	73	159	276	463
11	15	33	46	73	158	259	402
12	14	33	45	73	158	251	352
13	14	32	45	72	157	250	310
14	13	32	44	71	157	250	274
15	13	31	44	71	156	249	249
16	12	31	43	71	156	249	249
17	12	31	45	71	156	249	249
18	12	31	48	70	156	249	249
19	12	31	51	71	156	249	249
20	13	31	52	71	156	249	249
21	13	32	55	71	156	249	249
22	13	32	58	71	157	250	250
23	13	32	60	71	157	250	250

24	13	32	63	71	157	250	250
25	13	32	65	71	157	250	250
26	13	32	68	71	157	250	250
27	13	32	70	71	157	250	250
28	13	32	73	71	156	249	249
29	13	31	75	73	156	249	249
30	13	31	77	75	156	249	249

3.3. Danish krone

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	1	13	20	41	157	306	3 148
2	1	13	20	41	157	347	2 358
3	1	14	22	46	152	361	1 785
4	1	15	25	50	150	361	1 382
5	2	17	28	52	150	352	1 096
6	4	20	31	55	150	338	889
7	5	22	32	57	150	322	735
8	5	23	34	59	150	305	618
9	6	24	35	62	150	288	526
10	6	25	37	64	150	271	453
11	7	25	37	65	150	254	393
12	7	25	38	65	150	243	344
13	7	25	38	65	150	243	303
14	7	25	38	65	150	243	268
15	7	25	40	65	150	243	243
16	7	25	42	65	150	243	243
17	7	25	45	65	150	243	243
18	7	25	47	65	150	243	243
19	7	25	49	65	150	243	243
20	8	25	52	65	150	243	243
21	8	25	54	65	150	243	243
22	9	25	56	65	150	243	243
23	9	25	59	65	150	243	243
24	9	25	61	65	150	243	243
25	10	25	64	65	150	243	243
26	10	25	66	67	150	243	243
27	11	25	69	68	150	243	243
28	11	25	71	70	150	243	243
29	11	25	74	72	150	243	243
30	12	26	76	73	150	243	243

3.4. Forint

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	75	87	94	115	231	333	3 461
2	72	84	90	111	228	376	2 581
3	73	86	95	118	225	390	1 947
4	72	85	95	120	220	388	1 501
5	71	85	97	120	218	377	1 186
6	70	86	97	122	217	362	959
7	70	87	97	122	215	344	791
8	69	87	97	123	214	325	663
9	69	87	98	125	213	306	564
10	66	84	96	123	210	303	485
11	64	82	95	122	208	301	421
12	63	81	94	121	206	299	368
13	62	81	93	120	206	299	324
14	62	80	93	120	205	298	298
15	62	80	93	120	205	298	298
16	61	80	92	119	205	298	298
17	61	79	92	119	204	297	297
18	60	79	91	118	204	297	297
19	60	78	91	118	203	296	296
20	59	78	90	117	203	296	296
21	58	77	89	117	202	295	295
22	58	76	89	116	201	294	294
23	57	75	88	115	200	293	293
24	56	74	87	114	199	292	292
25	55	73	86	113	198	291	291
26	54	72	85	112	197	290	290
27	53	71	84	111	196	289	289
28	52	70	83	110	195	288	288
29	51	69	82	109	194	287	287
30	50	68	80	108	193	286	286

3.5. Krona

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	6	18	24	45	162	306	3 156
2	7	19	26	47	163	348	2 364
3	8	21	29	53	159	362	1 790

4	9	22	32	57	157	361	1 385
5	10	25	36	59	158	352	1 098
6	11	27	38	62	158	339	891
7	12	29	40	64	157	323	737
8	12	30	40	66	157	306	619
9	12	30	42	68	157	288	527
10	12	31	43	70	156	271	453
11	12	31	43	71	156	255	394
12	13	31	44	71	156	249	345
13	13	31	44	71	156	249	304
14	13	31	44	71	156	249	269
15	13	31	44	71	156	249	249
16	13	31	44	71	156	249	249
17	13	32	45	71	156	249	249
18	13	32	47	71	157	250	250
19	14	32	49	72	157	250	250
20	14	33	52	72	157	250	250
21	14	33	55	73	158	251	251
22	15	33	56	73	158	251	251
23	15	33	59	73	158	251	251
24	15	33	61	73	158	251	251
25	15	33	64	73	158	251	251
26	15	33	66	73	158	251	251
27	15	33	69	73	158	251	251
28	15	33	71	73	158	251	251
29	15	33	74	73	158	251	251
30	14	33	76	75	158	251	251

3.6. Lev

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	1	13	19	40	157	305	3 146
2	1	13	19	40	157	346	2 356
3	1	13	22	45	152	361	1 784
4	1	14	24	49	149	360	1 381
5	2	16	28	51	149	352	1 095
6	3	19	30	54	149	338	889
7	5	21	32	56	149	322	735
8	5	22	33	59	149	305	617
9	5	23	35	61	149	288	526
10	6	24	36	63	149	271	453

11	6	24	37	64	149	254	393
12	6	24	37	64	149	242	344
13	6	25	37	64	149	242	303
14	6	25	37	64	149	242	268
15	6	25	40	64	149	242	242
16	6	25	42	64	149	242	242
17	6	25	45	64	149	242	242
18	6	25	47	64	149	242	242
19	7	25	49	64	149	242	242
20	8	25	52	64	149	242	242
21	8	25	54	64	149	242	242
22	9	25	56	64	149	242	242
23	9	25	59	64	149	242	242
24	9	25	61	64	150	243	243
25	10	25	64	65	150	243	243
26	10	25	66	67	150	243	243
27	11	25	69	68	150	243	243
28	11	25	71	70	150	243	243
29	11	25	74	72	150	243	243
30	12	26	76	73	150	243	243

3.7. Pound sterling

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	10	21	44	176	315	3 253
2	0	10	21	44	176	358	2 441
3	1	10	23	49	171	373	1 848
4	1	13	26	54	168	372	1 429
5	2	16	28	58	167	362	1 132
6	2	18	33	59	165	348	917
7	4	21	36	60	164	331	757
8	6	24	37	59	163	313	635
9	9	31	42	59	162	295	540
10	11	34	42	58	161	277	465
11	10	33	42	57	161	260	403
12	9	32	42	57	160	253	353
13	8	31	42	58	159	252	310
14	8	31	43	58	158	251	275
15	9	31	43	58	158	251	251
16	9	31	44	58	156	249	249
17	9	31	45	58	156	249	249

18	9	32	48	58	155	248	248
19	9	32	51	58	155	248	248
20	9	32	52	58	155	248	248
21	9	32	55	58	156	249	249
22	9	32	58	60	155	248	248
23	9	32	60	62	155	248	248
24	10	32	63	64	154	247	247
25	10	32	65	65	153	246	246
26	10	32	68	67	153	246	246
27	11	32	70	69	152	245	245
28	11	32	73	71	152	245	245
29	11	32	75	73	151	244	244
30	12	32	77	75	151	244	244

3.8. Romanian leu

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	79	91	98	119	235	330	3 258
2	78	90	97	117	234	359	2 451
3	76	89	98	121	228	376	1 865
4	75	89	99	124	224	377	1 448
5	74	89	100	123	222	369	1 152
6	74	90	101	125	220	356	936
7	73	90	100	125	218	340	775
8	71	89	100	125	216	322	651
9	70	88	99	126	214	307	555
10	69	87	100	127	213	306	478
11	68	86	99	126	211	304	415
12	66	85	98	125	210	303	363
13	65	84	96	123	209	302	319
14	64	82	95	122	207	300	300
15	63	81	93	121	206	299	299
16	61	80	92	120	205	298	298
17	60	79	91	119	204	297	297
18	60	78	90	118	203	296	296
19	59	77	90	117	202	295	295
20	58	76	89	116	201	294	294
21	57	76	88	115	200	293	293
22	56	75	87	114	199	292	292
23	55	73	86	113	198	291	291

24	54	72	85	112	197	290	290
25	53	71	84	111	196	289	289
26	52	70	82	110	195	288	288
27	50	69	81	109	194	287	287
28	49	68	80	107	193	286	286
29	48	67	79	106	192	285	285
30	47	66	80	105	191	284	284

3.9. Zloty

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	52	64	71	92	208	314	3 247
2	52	64	70	91	207	357	2 433
3	51	64	72	95	202	372	1 845
4	50	64	74	99	199	373	1 431
5	50	64	76	99	198	364	1 136
6	50	65	77	101	196	350	923
7	50	67	77	101	195	334	764
8	49	66	77	103	194	317	642
9	48	66	77	104	192	299	547
10	47	65	78	105	191	284	471
11	47	65	78	105	190	283	409
12	46	65	77	104	189	282	358
13	45	64	76	104	189	282	315
14	45	63	76	103	188	281	281
15	44	63	75	102	188	281	281
16	43	62	74	102	187	280	280
17	43	62	74	101	186	279	279
18	42	61	73	101	186	279	279
19	42	61	73	100	185	278	278
20	42	60	73	100	185	278	278
21	42	60	72	100	185	278	278
22	41	60	72	99	184	277	277
23	41	59	71	99	184	277	277
24	40	58	71	98	183	276	276
25	39	58	70	97	183	276	276
26	38	57	69	97	182	275	275
27	38	56	71	96	181	274	274
28	37	56	74	95	180	273	273
29	36	55	76	94	180	273	273
30	36	54	79	94	179	272	272

3.10. Króna

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	86	98	105	126	242	337	3 399
2	86	98	104	125	242	370	2 537
3	84	97	105	129	235	385	1 916
4	83	97	107	131	232	383	1 479
5	83	98	109	132	231	373	1 170
6	84	100	111	135	230	358	947
7	85	102	112	137	230	340	781
8	85	102	113	139	230	323	655
9	86	103	115	142	230	323	556
10	86	104	117	144	230	323	478
11	86	104	117	144	230	323	414
12	85	104	116	144	229	322	362
13	84	103	115	143	228	321	321
14	83	102	114	142	227	320	320
15	82	101	113	140	226	319	319
16	81	100	112	139	225	318	318
17	80	99	111	138	224	317	317
18	79	98	110	137	223	316	316
19	78	97	109	136	222	315	315
20	77	96	108	135	220	313	313
21	76	94	107	134	219	312	312
22	74	93	105	133	218	311	311
23	73	92	104	131	216	309	309
24	72	90	102	130	215	308	308
25	70	89	101	128	213	306	306
26	68	87	99	127	212	305	305
27	67	85	98	125	210	303	303
28	65	84	96	124	209	302	302
29	64	83	95	122	207	300	300
30	62	81	93	121	206	299	299

3.11. Norwegian krone

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	26	38	45	66	182	310	3 193
2	27	39	46	66	183	352	2 394
3	26	39	47	71	177	366	1 814

4	25	39	49	74	174	366	1 404
5	25	40	52	75	173	357	1 113
6	26	42	53	77	173	343	903
7	27	44	54	78	172	327	746
8	26	44	55	80	171	310	627
9	26	44	55	82	170	292	534
10	26	44	56	83	170	275	459
11	25	44	56	84	169	262	399
12	25	43	56	83	168	261	349
13	24	43	55	82	168	261	307
14	24	42	55	82	167	260	272
15	23	42	54	81	167	260	260
16	23	41	53	81	166	259	259
17	22	41	53	80	166	259	259
18	22	41	53	80	165	258	258
19	22	40	53	80	165	258	258
20	22	41	53	80	165	258	258
21	22	41	55	80	166	259	259
22	22	41	57	80	165	258	258
23	22	40	60	80	165	258	258
24	22	40	63	80	165	258	258
25	21	40	64	80	165	258	258
26	21	40	67	79	165	258	258
27	21	39	69	79	164	257	257
28	20	39	71	79	164	257	257
29	20	39	75	78	164	257	257
30	20	38	77	78	163	256	256

3.12. Swiss franc

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	0	4	23	139	297	3 050
2	0	1	6	23	140	337	2 287
3	1	1	9	28	135	352	1 736
4	1	3	12	32	133	353	1 346
5	1	4	15	35	133	344	1 069
6	2	4	17	38	133	331	868
7	2	6	20	40	133	316	719
8	2	7	21	42	133	299	604
9	4	7	24	45	133	283	515
10	4	9	27	47	133	266	443

11	4	9	29	48	134	250	385
12	4	10	32	47	133	234	337
13	5	11	34	48	134	227	297
14	5	11	37	48	133	226	263
15	6	13	39	47	132	225	234
16	6	13	41	46	131	224	224
17	6	15	44	49	131	224	224
18	6	15	46	50	132	225	225
19	7	16	48	52	132	225	225
20	7	17	51	54	132	225	225
21	8	18	53	57	133	226	226
22	9	18	56	58	133	226	226
23	9	20	58	60	133	226	226
24	9	20	60	62	132	225	225
25	10	22	63	63	132	225	225
26	10	22	65	65	134	225	225
27	10	23	68	67	135	225	225
28	11	24	70	69	137	225	225
29	11	25	72	71	137	225	225
30	12	26	75	73	139	225	225

3.13. Australian dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	39	51	58	79	195	309	3 186
2	39	52	58	79	195	351	2 389
3	39	52	60	84	190	366	1 811
4	38	52	62	87	187	366	1 403
5	39	53	65	88	187	357	1 114
6	39	55	66	90	186	344	905
7	40	57	67	92	185	328	749
8	39	57	68	93	184	311	630
9	39	57	68	95	183	294	537
10	39	57	69	96	183	277	462
11	38	57	69	96	182	275	401
12	38	56	69	96	181	274	351
13	37	56	68	95	181	274	310
14	37	55	68	95	180	273	274
15	36	55	67	94	179	272	272
16	35	54	66	93	179	272	272
17	35	53	66	93	178	271	271

18	34	53	65	93	178	271	271
19	34	53	65	92	177	270	270
20	34	52	65	92	177	270	270
21	34	52	64	92	177	270	270
22	33	52	64	91	176	269	269
23	32	51	63	91	176	269	269
24	32	50	63	90	175	268	268
25	31	50	65	89	175	268	268
26	30	49	68	89	174	267	267
27	30	48	70	88	173	266	266
28	29	47	73	87	172	265	265
29	28	47	75	86	172	265	265
30	27	46	77	86	171	264	264

3.14. Baht

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	12	24	30	51	168	297	3 048
2	15	27	34	55	171	338	2 291
3	18	31	39	63	169	353	1 741
4	20	34	44	69	169	354	1 351
5	23	37	49	72	171	346	1 074
6	23	38	49	74	169	333	873
7	27	44	55	79	172	318	723
8	27	44	55	80	171	302	609
9	28	46	57	84	172	285	519
10	29	48	60	87	173	269	447
11	31	49	62	89	174	267	389
12	31	50	62	90	175	268	341
13	32	50	63	90	175	268	300
14	32	51	63	90	176	269	269
15	32	51	63	91	176	269	269
16	32	51	63	90	176	269	269
17	32	51	63	91	176	269	269
18	32	50	63	90	175	268	268
19	32	50	63	90	175	268	268
20	32	50	63	90	175	268	268
21	32	50	63	90	175	268	268
22	31	50	62	90	175	268	268
23	31	50	62	89	175	268	268

24	31	49	62	89	174	267	267
25	30	49	64	89	174	267	267
26	30	48	66	88	173	266	266
27	29	48	69	88	173	266	266
28	29	47	71	87	172	265	265
29	28	47	74	86	172	265	265
30	28	46	76	86	171	264	264

3.15. Canadian dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	14	26	32	53	170	311	3 210
2	15	27	33	54	170	353	2 403
3	15	28	36	60	166	367	1 816
4	15	29	39	64	164	365	1 403
5	16	31	42	66	164	356	1 112
6	18	34	45	69	164	342	901
7	19	36	46	71	164	326	745
8	19	37	48	73	164	309	626
9	20	38	49	76	164	291	533
10	20	39	51	78	164	274	459
11	21	39	52	79	164	257	398
12	21	39	52	79	164	257	348
13	21	39	52	79	164	257	307
14	21	39	52	79	164	257	271
15	21	40	52	79	164	257	257
16	21	39	52	79	164	257	257
17	21	39	52	79	164	257	257
18	21	39	52	79	164	257	257
19	21	39	52	79	164	257	257
20	21	39	52	79	164	257	257
21	21	39	55	79	164	257	257
22	20	39	57	79	164	257	257
23	20	39	60	78	163	256	256
24	20	38	61	78	163	256	256
25	19	38	64	77	162	255	255
26	19	37	66	77	162	255	255
27	18	37	69	76	162	255	255
28	18	36	71	76	161	254	254
29	17	36	74	75	161	254	254
30	17	36	76	75	160	253	253

3.16. Chilean peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	48	60	67	88	204	321	3 323
2	50	62	69	90	206	360	2 460
3	52	65	73	97	204	373	1 857
4	53	67	77	102	202	373	1 437
5	55	70	81	104	203	364	1 140
6	57	73	84	108	203	350	925
7	58	75	86	110	203	334	765
8	58	76	87	112	203	316	643
9	59	76	88	115	203	298	547
10	59	77	90	117	203	296	471
11	59	77	90	117	203	296	409
12	59	77	90	117	202	295	357
13	58	77	89	116	201	294	315
14	57	76	88	115	201	294	294
15	56	75	87	115	200	293	293
16	56	74	87	114	199	292	292
17	55	74	86	113	199	292	292
18	55	73	86	113	198	291	291
19	54	73	85	112	197	290	290
20	53	72	84	112	197	290	290
21	53	71	84	111	196	289	289
22	52	71	83	110	195	288	288
23	51	70	82	109	194	287	287
24	50	69	81	108	194	287	287
25	49	68	80	107	193	286	286
26	48	67	79	106	192	285	285
27	47	66	78	106	191	284	284
28	46	65	77	105	190	283	283
29	46	64	76	104	189	282	282
30	45	63	79	103	188	281	281

3.17. Colombian peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	79	91	98	119	235	332	3 447
2	84	96	103	124	240	378	2 592
3	85	98	107	130	237	395	1 969

4	86	100	110	134	235	396	1 527
5	89	104	115	138	237	387	1 213
6	91	107	118	143	238	373	986
7	94	110	121	145	239	356	816
8	95	112	123	149	240	338	686
9	96	114	126	152	241	334	584
10	97	115	128	155	241	334	503
11	97	116	128	155	241	334	437
12	96	115	127	155	240	333	382
13	95	114	126	153	239	332	336
14	94	113	125	152	237	330	330
15	93	111	124	151	236	329	329
16	91	110	122	149	235	328	328
17	90	108	121	148	233	326	326
18	89	107	119	147	232	325	325
19	87	106	118	145	231	324	324
20	86	104	117	144	229	322	322
21	84	103	115	142	228	321	321
22	83	101	114	141	226	319	319
23	81	100	112	139	224	317	317
24	79	98	110	137	223	316	316
25	78	96	108	136	221	314	314
26	76	94	107	134	219	312	312
27	74	93	105	132	218	311	311
28	72	91	103	131	216	309	309
29	71	89	102	129	214	307	307
30	69	88	100	127	213	306	306

3.18. Hong Kong dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	8	20	26	47	163	309	3 190
2	10	22	29	50	166	351	2 388
3	12	25	33	57	163	365	1 808
4	14	27	37	62	162	365	1 401
5	16	30	42	65	163	356	1 111
6	17	33	44	69	164	343	902
7	19	36	46	71	164	327	746
8	19	37	48	73	164	309	627
9	20	38	49	76	164	292	534
10	20	38	51	78	164	275	459

11	20	39	51	78	164	258	399
12	20	39	51	78	163	256	349
13	20	38	50	78	163	256	307
14	19	37	50	77	162	255	272
15	18	37	49	77	162	255	255
16	18	36	49	76	161	254	254
17	17	36	48	76	161	254	254
18	17	36	48	75	161	254	254
19	17	36	50	75	161	254	254
20	17	36	52	76	161	254	254
21	17	36	55	76	161	254	254
22	17	36	57	76	161	254	254
23	17	36	60	76	161	254	254
24	17	36	63	75	161	254	254
25	17	36	65	75	161	254	254
26	17	35	68	75	160	253	253
27	17	35	70	75	160	253	253
28	16	35	73	75	160	253	253
29	16	35	75	74	160	253	253
30	16	35	77	75	159	252	252

3.19. Indian rupee

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	89	101	108	129	245	340	3 295
2	91	103	109	130	246	363	2 480
3	91	104	112	136	242	380	1 885
4	91	105	115	140	240	381	1 464
5	92	107	119	142	240	372	1 163
6	94	109	121	145	240	359	944
7	95	112	122	147	240	342	782
8	95	112	123	149	240	333	657
9	95	113	124	151	239	332	560
10	94	112	124	151	238	331	482
11	93	111	123	151	236	329	418
12	91	110	122	149	235	328	366
13	89	108	120	148	233	326	326
14	88	106	119	146	231	324	324
15	86	105	117	144	229	322	322
16	84	103	115	142	228	321	321
17	83	101	114	141	226	319	319

18	81	100	112	140	225	318	318
19	80	99	111	138	224	317	317
20	79	98	110	137	223	316	316
21	78	97	109	136	222	315	315
22	77	96	108	135	220	313	313
23	76	94	107	134	219	312	312
24	75	93	105	133	218	311	311
25	73	92	104	131	217	310	310
26	72	91	103	130	216	309	309
27	71	89	102	129	214	307	307
28	70	88	101	128	213	306	306
29	69	87	100	127	212	305	305
30	67	86	98	126	211	304	304

3.20. Mexican peso

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	302	314	320	341	457	552	3 530
2	83	95	102	123	239	380	2 614
3	85	98	106	130	236	393	1 967
4	87	101	111	135	236	391	1 518
5	89	103	115	138	237	381	1 202
6	91	107	118	142	237	367	974
7	93	109	120	144	238	349	805
8	94	111	122	147	238	331	676
9	94	112	124	150	238	331	575
10	94	113	125	152	238	331	495
11	95	113	125	153	238	331	429
12	95	113	126	153	238	331	375
13	95	114	126	153	239	332	332
14	96	114	126	154	239	332	332
15	96	115	127	154	240	333	333
16	97	116	128	155	240	333	333
17	98	116	129	156	241	334	334
18	99	117	130	157	242	335	335
19	99	118	130	158	243	336	336
20	100	118	131	158	243	336	336
21	100	118	131	158	243	336	336
22	99	118	130	158	243	336	336
23	99	117	130	157	242	335	335

24	98	116	129	156	241	334	334
25	96	115	127	155	240	333	333
26	95	114	126	153	239	332	332
27	94	112	125	152	237	330	330
28	92	111	123	151	236	329	329
29	91	109	122	149	234	327	327
30	89	108	120	148	233	326	326

3.21. New Taiwan dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	6	12	33	150	292	2 996
2	0	6	12	33	150	332	2 248
3	1	6	14	38	144	347	1 708
4	1	6	16	41	142	348	1 325
5	1	8	19	42	141	340	1 054
6	2	9	20	45	140	327	856
7	2	11	22	46	139	312	709
8	2	11	22	48	139	296	596
9	4	11	24	49	138	279	508
10	4	12	27	51	137	263	438
11	4	12	29	52	137	247	380
12	4	12	31	52	137	232	333
13	5	12	34	52	137	230	294
14	5	13	37	52	137	230	260
15	6	13	38	53	138	231	232
16	6	13	41	53	138	231	231
17	6	15	44	53	139	232	232
18	6	15	45	54	139	232	232
19	7	16	48	55	140	233	233
20	7	17	51	56	141	234	234
21	8	18	53	56	142	235	235
22	9	18	55	58	142	235	235
23	9	20	58	60	143	236	236
24	9	20	60	61	143	236	236
25	10	22	63	63	144	237	237
26	10	22	65	65	144	237	237
27	10	23	68	67	144	237	237
28	11	24	70	69	145	238	238
29	11	25	72	71	145	238	238
30	12	26	75	73	145	238	238

3.22. New Zealand dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	46	58	65	85	202	314	3 240
2	47	59	65	86	203	355	2 423
3	46	59	67	91	198	370	1 832
4	46	59	70	94	195	369	1 417
5	46	61	72	95	194	360	1 124
6	47	63	74	98	193	346	912
7	47	64	74	99	192	330	754
8	47	64	75	101	192	312	634
9	47	65	76	103	191	295	539
10	46	64	77	104	190	283	464
11	45	63	76	103	189	282	403
12	44	62	75	102	187	280	353
13	43	61	74	101	186	279	311
14	41	60	72	99	185	278	278
15	40	59	71	98	184	277	277
16	39	57	70	97	182	275	275
17	38	57	69	96	181	274	274
18	37	56	68	95	181	274	274
19	36	55	67	95	180	273	273
20	36	55	67	94	179	272	272
21	35	54	66	94	179	272	272
22	35	53	66	93	178	271	271
23	34	53	65	92	178	271	271
24	34	52	65	92	177	270	270
25	33	51	65	91	176	269	269
26	32	51	68	90	176	269	269
27	32	50	70	90	175	268	268
28	31	49	73	89	174	267	267
29	30	49	75	88	174	267	267
30	30	48	77	88	173	266	266

3.23. Rand

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	109	121	127	148	265	359	3 394
2	110	122	129	150	266	372	2 547
3	112	125	133	156	263	389	1 934

4	113	127	137	161	262	390	1 502
5	115	130	141	165	263	382	1 196
6	117	133	144	168	263	369	973
7	119	136	146	170	264	357	807
8	119	136	147	173	264	357	680
9	119	137	149	175	263	356	581
10	119	137	150	177	263	356	501
11	119	137	150	177	262	355	436
12	118	136	149	176	261	354	382
13	116	135	147	174	260	353	353
14	115	133	146	173	258	351	351
15	113	131	144	171	256	349	349
16	111	129	142	169	254	347	347
17	109	128	140	167	252	345	345
18	107	126	138	165	250	343	343
19	105	124	136	163	249	342	342
20	104	122	135	162	247	340	340
21	102	120	133	160	245	338	338
22	100	119	131	158	244	337	337
23	98	117	129	156	242	335	335
24	96	115	127	155	240	333	333
25	94	113	125	153	238	331	331
26	93	111	124	151	236	329	329
27	91	109	122	149	234	327	327
28	89	108	120	147	232	325	325
29	87	106	118	146	231	324	324
30	86	104	117	144	229	322	322

3.24. Real

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	162	174	181	202	318	413	3 526
2	171	183	189	210	327	421	2 621
3	175	188	196	220	326	421	1 986
4	177	191	201	225	326	419	1 541
5	178	193	204	228	326	419	1 225
6	179	195	206	230	325	418	996
7	180	196	207	231	325	418	824
8	179	196	207	233	323	416	693
9	178	196	208	234	322	415	591

10	178	196	208	235	321	414	509
11	176	195	207	234	320	413	442
12	174	193	205	232	318	411	411
13	172	190	203	230	315	408	408
14	169	187	200	227	312	405	405
15	166	184	197	224	309	402	402
16	163	182	194	221	306	399	399
17	160	179	191	218	303	396	396
18	157	176	188	215	301	394	394
19	154	173	185	212	298	391	391
20	151	170	182	210	295	388	388
21	148	167	179	207	292	385	385
22	145	164	176	204	289	382	382
23	142	161	173	200	286	379	379
24	139	158	170	197	283	376	376
25	136	155	167	194	280	373	373
26	133	152	164	191	277	370	370
27	130	149	161	188	274	367	367
28	127	146	158	186	271	364	364
29	125	143	156	183	268	361	361
30	122	141	153	180	265	358	358

3.25. Renminbi-yuan

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	26	39	45	66	182	297	3 046
2	27	39	46	67	183	338	2 289
3	27	40	49	72	179	353	1 740
4	27	41	51	76	176	354	1 352
5	28	43	54	78	176	347	1 076
6	29	45	56	80	175	334	875
7	30	47	57	81	175	319	725
8	29	46	57	83	174	303	610
9	29	47	58	85	173	286	520
10	28	47	59	86	172	269	448
11	28	47	59	86	172	265	389
12	28	46	59	86	171	264	341
13	27	46	58	85	171	264	301
14	27	46	58	85	170	263	267
15	27	45	58	85	170	263	263
16	27	45	58	85	170	263	263

17	27	45	58	85	170	263	263
18	27	45	58	85	170	263	263
19	27	46	58	85	170	263	263
20	27	46	58	85	171	264	264
21	27	46	58	85	171	264	264
22	27	46	58	85	171	264	264
23	27	46	59	85	170	263	263
24	27	45	61	85	170	263	263
25	26	45	64	85	170	263	263
26	26	45	66	84	170	263	263
27	26	44	69	84	169	262	262
28	25	44	71	84	169	262	262
29	25	44	74	83	169	262	262
30	25	43	76	83	168	261	261

3.26. Ringgit

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	24	36	43	64	180	302	3 111
2	26	38	45	66	182	344	2 338
3	28	40	49	72	179	360	1 778
4	29	43	53	77	178	361	1 381
5	31	46	57	80	179	353	1 098
6	33	48	59	84	179	340	893
7	35	51	62	86	180	325	739
8	35	52	63	89	180	308	622
9	35	53	65	92	180	291	530
10	36	55	67	94	180	274	457
11	37	55	68	95	181	274	397
12	37	56	68	96	181	274	348
13	37	56	68	96	181	274	306
14	37	56	68	96	181	274	274
15	37	56	68	95	181	274	274
16	37	56	68	95	181	274	274
17	37	56	68	95	181	274	274
18	37	56	68	96	181	274	274
19	38	56	69	96	181	274	274
20	38	56	69	96	181	274	274
21	38	57	69	96	181	274	274
22	38	56	69	96	181	274	274
23	38	56	69	96	181	274	274

24	37	56	68	95	181	274	274
25	37	55	68	95	180	273	273
26	36	55	68	94	180	273	273
27	36	54	70	94	179	272	272
28	35	54	73	93	179	272	272
29	34	53	75	93	178	271	271
30	34	52	77	92	177	270	270

3.27. Russian rouble

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	122	134	141	162	278	373	3 425
2	121	133	139	160	277	377	2 584
3	120	133	141	164	271	395	1 969
4	119	133	143	168	268	397	1 531
5	120	134	146	169	268	389	1 219
6	120	136	147	171	266	376	992
7	121	137	148	172	266	360	823
8	120	137	148	174	265	358	693
9	119	137	149	176	264	357	591
10	119	138	150	177	263	356	509
11	119	137	150	177	263	356	443
12	118	137	149	176	261	354	387
13	117	136	148	175	260	353	353
14	116	134	147	174	259	352	352
15	114	132	145	172	257	350	350
16	112	130	143	170	255	348	348
17	109	128	140	168	253	346	346
18	107	126	138	166	251	344	344
19	105	124	136	164	249	342	342
20	103	122	134	161	247	340	340
21	101	120	132	159	245	338	338
22	99	117	130	157	242	335	335
23	97	115	128	155	240	333	333
24	95	113	125	153	238	331	331
25	92	111	123	150	236	329	329
26	90	109	121	148	234	327	327
27	88	107	119	146	231	324	324
28	86	105	117	144	229	322	322
29	84	103	115	142	227	320	320
30	82	101	113	140	225	318	318

3.28. Singapore dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	9	15	36	153	305	3 142
2	0	10	17	38	154	346	2 355
3	1	12	21	44	151	361	1 786
4	1	14	24	49	150	361	1 384
5	2	17	28	52	150	353	1 098
6	4	20	31	55	151	339	891
7	6	23	33	58	151	323	737
8	6	24	34	60	151	306	620
9	6	24	36	63	151	289	528
10	7	25	37	64	151	272	454
11	7	25	38	65	150	255	394
12	7	25	38	65	150	243	345
13	6	25	37	64	150	243	304
14	6	25	38	64	150	243	269
15	6	25	40	64	149	242	242
16	6	24	42	64	149	242	242
17	6	24	45	64	149	242	242
18	6	24	47	64	149	242	242
19	7	25	49	64	149	242	242
20	8	25	52	65	150	243	243
21	8	25	55	65	150	243	243
22	9	26	56	65	151	244	244
23	9	26	59	66	151	244	244
24	9	26	61	66	151	244	244
25	10	26	64	66	151	244	244
26	10	26	66	67	151	244	244
27	11	26	69	69	151	244	244
28	11	26	71	71	151	244	244
29	11	26	74	73	151	244	244
30	12	27	76	75	151	244	244

3.29. South Korean won

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	30	42	49	70	186	305	3 139
2	31	43	49	70	187	346	2 353
3	29	42	51	74	181	361	1 785

4	29	42	53	77	178	361	1 384
5	29	43	55	78	177	353	1 099
6	31	47	58	82	177	340	892
7	29	46	57	81	174	324	738
8	33	50	61	86	177	307	621
9	32	50	61	88	176	290	529
10	27	46	58	85	171	273	455
11	23	42	54	82	167	260	395
12	21	39	52	79	164	257	346
13	18	37	49	76	162	255	305
14	17	35	47	75	160	253	270
15	15	34	46	73	159	252	252
16	14	32	45	72	157	250	250
17	13	32	45	71	156	249	249
18	12	31	47	71	156	249	249
19	12	31	49	70	155	248	248
20	12	31	52	70	155	248	248
21	12	31	55	70	155	248	248
22	12	31	57	70	155	248	248
23	12	30	59	70	155	248	248
24	12	30	61	70	155	248	248
25	12	30	64	70	155	248	248
26	12	30	66	70	155	248	248
27	11	30	69	70	155	248	248
28	11	30	71	71	155	248	248
29	11	30	74	73	154	247	247
30	12	29	76	75	154	247	247

3.30. Turkish lira

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	206	218	224	245	362	456	3 608
2	202	214	221	242	358	453	2 743
3	197	210	219	242	349	443	2 107
4	193	207	217	241	342	436	1 650
5	189	204	215	239	337	430	1 320
6	186	202	213	237	332	425	1 077
7	183	200	210	234	328	421	895
8	179	196	207	232	323	416	754
9	175	193	204	231	319	412	643

10	171	190	202	229	315	408	554
11	167	186	198	226	311	404	481
12	163	182	194	222	307	400	421
13	159	178	190	218	303	396	396
14	156	174	187	214	299	392	392
15	152	171	183	210	295	388	388
16	149	167	180	207	292	385	385
17	145	164	176	203	289	382	382
18	142	161	173	200	286	379	379
19	139	158	170	197	283	376	376
20	136	155	167	194	280	373	373
21	133	152	164	191	277	370	370
22	130	149	161	189	274	367	367
23	128	146	158	186	271	364	364
24	125	143	156	183	268	361	361
25	122	140	153	180	265	358	358
26	119	138	150	177	263	356	356
27	117	135	148	175	260	353	353
28	114	133	145	172	258	351	351
29	112	130	143	170	255	348	348
30	109	128	140	167	253	346	346

3.31. US dollar

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	14	25	50	168	312	3 219
2	0	14	25	50	168	352	2 401
3	1	17	28	55	165	366	1 814
4	1	20	31	60	164	365	1 403
5	3	23	36	66	164	356	1 112
6	6	27	39	68	165	342	902
7	8	31	42	70	165	326	746
8	11	34	45	74	165	309	626
9	13	37	49	76	165	291	533
10	14	39	51	77	165	274	459
11	15	41	53	78	165	258	398
12	16	42	54	79	165	258	348
13	16	43	55	80	165	258	307
14	17	44	55	80	165	258	272
15	17	44	55	81	165	258	258

16	17	44	56	81	165	258	258
17	17	44	56	81	165	258	258
18	17	44	56	81	165	258	258
19	17	44	56	81	165	258	258
20	17	44	56	81	165	258	258
21	17	44	56	81	165	258	258
22	17	44	57	81	165	258	258
23	17	44	60	81	165	258	258
24	17	44	61	81	165	258	258
25	17	44	64	81	165	258	258
26	17	44	66	81	165	258	258
27	17	44	69	81	164	257	257
28	17	44	71	81	164	257	257
29	17	44	74	81	164	257	257
30	17	44	76	81	163	256	256

3.32. Yen

Duration (in years)	Credit quality step 0	Credit quality step 1	Credit quality step 2	Credit quality step 3	Credit quality step 4	Credit quality step 5	Credit quality step 6
1	0	0	4	13	130	288	2 952
2	0	1	6	13	128	328	2 215
3	1	1	8	16	122	343	1 683
4	1	3	11	18	119	343	1 307
5	1	4	13	21	118	336	1 039
6	2	4	16	23	118	323	845
7	2	6	19	26	117	309	700
8	2	6	21	29	117	293	589
9	4	7	24	30	117	277	503
10	4	9	27	33	117	260	433
11	4	9	28	35	118	245	377
12	4	9	31	37	118	230	330
13	4	11	34	39	118	215	291
14	5	11	36	41	118	211	258
15	6	13	38	43	118	211	230
16	6	13	41	45	119	212	212
17	6	15	43	47	119	212	212
18	6	15	45	50	120	213	213
19	7	16	48	51	121	213	213
20	7	17	51	54	123	214	214
21	7	18	52	55	125	214	214

22	9	18	55	57	126	214	214
23	9	20	57	59	128	215	215
24	9	20	60	61	129	215	215
25	10	21	61	63	130	215	215
26	10	22	64	65	132	215	215
27	10	23	66	66	133	215	215
28	11	24	69	68	134	215	215
29	11	25	71	70	135	214	214
30	12	25	73	71	137	214	214

ANNEX III

Volatility adjustment to the relevant risk-free interest rate term structure

Currency	National insurance market	Volatility adjustment (in bps)
Euro	Austria	21
Euro	Belgium	21
Euro	Cyprus	21
Euro	Estonia	21
Euro	Finland	21
Euro	France	21
Euro	Germany	21
Euro	Greece	21
Euro	Ireland	21
Euro	Italy	21
Euro	Latvia	21
Euro	Lithuania	21
Euro	Luxembourg	21
Euro	Malta	21
Euro	Netherlands	21
Euro	Portugal	21
Euro	Slovakia	21
Euro	Slovenia	21
Euro	Spain	21
Czech koruna	Czech Republic	14
Danish krone	Denmark	25
Forint	Hungary	13
Krona	Sweden	- 1
Euro	Croatia	21
Lev	Bulgaria	18
Pound sterling	United Kingdom	18
Romanian leu	Romania	11
Zloty	Poland	12
Króna	Iceland	50
Norwegian krone	Norway	24
Swiss franc	Liechtenstein	- 3
Swiss franc	Switzerland	- 3
Australian dollar	Australia	6
Canadian dollar	Canada	19
Renminbi-yuan	China	3
Hong Kong dollar	Hong Kong	3
US dollar	United States	53
Yen	Japan	- 2

III

(Other acts)

EUROPEAN ECONOMIC AREA

EFTA SURVEILLANCE AUTHORITY DECISION No 004/23/COL

of 8 February 2023

amending the substantive rules in the field of State aid by introducing new Guidelines on State aid for broadband networks [2023/1673]

THE EFTA SURVEILLANCE AUTHORITY ('ESA'),

Having regard to the Agreement on the European Economic Area ('the EEA Agreement'), in particular to Articles 61 to 63 and Protocol 26,

Having regard to the Agreement between the EFTA States on the Establishment of a Surveillance Authority and a Court of Justice ('the Surveillance and Court Agreement'), in particular to Article 24 and Article 5(2)(b),

Having regard to Protocol 3 to the Surveillance and Court Agreement ('Protocol 3'), in particular to Article 1(1) of Part I,

Whereas:

Under Article 24 of the Surveillance and Court Agreement, ESA shall give effect to the provisions of the EEA Agreement concerning State aid.

Under Article 5(2)(b) of the Surveillance and Court Agreement, ESA shall issue notices or guidelines on matters dealt with in the EEA Agreement, if that Agreement or the Surveillance and Court Agreement expressly so provides or if ESA considers it necessary.

Under Article 1(1) of Part I of Protocol 3 to the Surveillance and Court Agreement, ESA shall keep under constant review all systems of aid existing in the EFTA States ⁽¹⁾ and propose any appropriate measures required by the progressive development or by the functioning of the EEA Agreement.

ESA's Guidelines on application of State aid rules in relation to rapid deployment of broadband networks ⁽²⁾, as amended ⁽³⁾, correspond to the European Commission's ('the Commission') Communication on EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks ⁽⁴⁾.

⁽¹⁾ Article 1(b) of the Surveillance and Court Agreement states that 'the term "EFTA States" means the Republic of Iceland and the Kingdom of Norway and, under the conditions laid down by Article 1(2) of the Protocol Adjusting the Agreement between the EFTA States on the Establishment of a Surveillance Authority and a Court of Justice, the Principality of Liechtenstein'.

⁽²⁾ ESA's Guidelines on application of State aid rules in relation to rapid deployment of broadband networks introduced by EFTA Surveillance Authority Decision No 73/13/COL of 20 February 2013 amending for the eighty-ninth time the procedural and substantive rules in the field of state aid by introducing a new chapter on the application of state aid rules in relation to the rapid deployment of broadband networks (OJ L 135, 8.5.2014, p. 49).

⁽³⁾ EFTA Surveillance Authority Decision No 302/14/COL of 16 July 2014 amending for the ninety-ninth time the procedural and substantive rules in the field of State aid by modifying certain State aid Guidelines (OJ L 15, 22.1.2015, p. 103).

⁽⁴⁾ Communication from the Commission – EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks (OJ C 25, 26.1.2013, p. 1).

On 12 December 2022, the Commission adopted a revised Communication on Guidelines on State aid for broadband networks ('the 2022 Broadband Guidelines')⁽⁵⁾

The 2022 Broadband Guidelines are also of relevance for the European Economic Area ('EEA').

Uniform application of the EEA State aid rules is to be ensured throughout the European Economic Area in line with the objective of homogeneity established in Article 1 of the EEA Agreement.

According to point II under the heading 'GENERAL' on page 11 of Annex XV to the EEA Agreement, ESA, after consultation with the Commission, is to adopt acts corresponding to those adopted by the Commission.

The 2022 Broadband Guidelines may refer to certain European Union policy instruments and to certain European Union legal acts that have not been incorporated into the EEA Agreement. With a view to ensuring uniform application of State aid provisions and equal conditions of competition throughout the EEA, ESA will generally apply the same points of reference as the Commission when assessing the compatibility of aid with the functioning of the EEA Agreement.

Having consulted the Commission,

Having consulted the EFTA States,

HAS ADOPTED THIS DECISION:

Article 1

(1) The substantive rules in the field of State aid shall be amended by introducing new Guidelines on State aid for broadband networks ('the Broadband Guidelines'). The Broadband Guidelines, in form of the 2022 Broadband Guidelines, are annexed to this Decision and form an integral part of it.

(2) ESA will follow the principles and guidelines set out in the 2022 Broadband Guidelines for the compatibility assessment of all notified aid to broadband networks in respect of which it is called upon to take a decision after 8 February 2023 when the Broadband Guidelines enter into force. Unlawful aid to broadband networks will be assessed in accordance with the rules applicable on the date on which the aid was awarded.

Article 2

ESA applies the 2022 Broadband Guidelines with the following adaptations where applicable, including, but not limited to:

- (a) if there is a reference to 'Member State(s)', ESA reads it as a reference to 'EFTA State(s)'⁽⁶⁾, or where appropriate 'EEA State(s)';
- (b) if there is a reference to the 'European Commission', ESA reads it, where appropriate, as a reference to the 'EFTA Surveillance Authority';
- (c) if there is a reference to 'the Treaty' or 'TFEU', ESA reads it as a reference to 'the EEA Agreement';
- (d) if there is a reference to 'the Union', ESA reads it as a reference to 'the EEA';
- (e) if there is a reference to Article 106 TFEU or sections of that Article, ESA reads it as a reference to Article 59 of the EEA Agreement and the corresponding sections of that Article;

⁽⁵⁾ () C(2022) 9343 final, not yet published in the *Official Journal of the European Union*.

⁽⁶⁾ The 'EFTA States' refers to Iceland, Liechtenstein and Norway.

- (f) if there is a reference to Article 107 TFEU or sections of that Article, ESA reads it as a reference to Article 61 of the EEA Agreement and the corresponding sections of that Article;
- (g) if there is a reference to Article 108 TFEU or sections of that Article, ESA reads it as a reference to Article 1 of Part I of Protocol 3 of the Surveillance and Court Agreement and the corresponding sections of that Article;
- (h) if there is a reference to Council Regulation (EU) 2015/1589 ⁽⁷⁾, ESA reads it as a reference to Part II of Protocol 3 of the Surveillance and Court Agreement;
- (i) if there is a reference to Commission Regulation (EC) No 794/2004 ⁽⁸⁾, ESA reads it as a reference to EFTA Surveillance Authority Decision 195/04/COL;
- (j) if there is a reference to the wording '(in-)compatible with the internal market', ESA reads it as '(in-)compatible with the functioning of the EEA Agreement';
- (k) if there is a reference to Commission Communications, Notices or Guidelines, ESA reads it as a reference to the corresponding ESA Guidelines.

Article 3

- (1) Point 221(a) of the 2022 Broadband Guidelines is replaced by:

'Pursuant to Article 1(1) of Part I of Protocol 3 of the Surveillance and Court Agreement, ESA proposes that EFTA States must amend, where necessary, their existing broadband aid schemes in order to bring them in line with Section 7.1 of these Broadband Guidelines within 12 months after the entry into force of these Broadband Guidelines'.

- (2) Point 221(b) of the 2022 Broadband Guidelines is replaced by:

'EFTA States should give their explicit unconditional agreement to the appropriate measures (including amendments) proposed in point (a) within 2 months of the entry into force of these Broadband Guidelines. In the absence of any reply within the 2 months, ESA will assume that the EFTA State in question does not agree with the proposed measures.'

Done at Brussels, 8 February 2023.

For the EFTA Surveillance Authority

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⁽⁷⁾ Council Regulation (EU) 2015/1589 of 13 July 2015 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 248, 24.9.2015, p. 9).

⁽⁸⁾ Commission Regulation (EC) No 794/2004 of 21 April 2004 implementing Council Regulation (EU) 2015/1589 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 140, 30.4.2004, p. 1).

ANNEX

COMMUNICATION FROM THE COMMISSION
Guidelines on State aid for broadband networks

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1. Introduction

1. Connectivity is a fundamental building block of digital transformation. It is of strategic importance for growth and innovation in all economic sectors of the Union and for social and territorial cohesion.
2. The Union has set ambitious connectivity objectives in the Gigabit Communication ⁽¹⁾, the Communication Shaping Europe's digital future ⁽²⁾, the Digital Compass Communication ⁽³⁾ and in its proposal for a decision of the European Parliament and of the Council establishing the 2030 Policy Programme Path to the Digital Decade ⁽⁴⁾ (DDPP proposal).
3. In the Gigabit Communication, the Commission set out the following connectivity objectives for 2025: (a) all Union households, rural or urban, should have an internet connectivity with a download speed of at least 100 Mbps, upgradable to 1 Gbps; (b) socio-economic drivers, such as digitally intensive enterprises, schools, hospitals and public administration should benefit from a download speed of at least 1 Gbps and an upload speed of at least 1 Gbps; and (c) all urban areas and major transport paths should have uninterrupted 5G coverage ⁽⁵⁾.
4. The Communication Shaping Europe's digital future explains that the expression '100 Mbps, upgradable to Gigabit speed' reflects the Commission's expectation that, as the decade progresses, households will increasingly need 1 Gbps speed ⁽⁶⁾.
5. The Digital Compass Communication states, as the connectivity objective for 2030, that all Union households should be covered by a Gigabit network ⁽⁷⁾, and all populated areas should be covered by 5G ⁽⁸⁾. The DDPP proposal underlines that 'societal needs for upload and download bandwidth are constantly growing. By 2030, networks with gigabit speeds should become available at accessible conditions for all those who need or wish such capacity' ⁽⁹⁾.
6. To achieve the Union's objectives for 2025 and 2030, adequate investment is needed. Such investments primarily come from private investors and may be complemented, where necessary, by public funds, in accordance with State aid rules.
7. The COVID-19 pandemic underlined the importance of performant electronic communications networks for people, businesses and public institutions. On 27 May 2020, the Commission put forward its proposal for a major recovery plan to mitigate the economic and social impact of the pandemic,

⁽¹⁾ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 14 September 2016, *Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society*, COM(2016)587 final.

⁽²⁾ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee the Committee of Regions of 19 February 2020, *Shaping Europe's digital future*, COM(2020)67 final.

⁽³⁾ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee the Committee of Regions of 9 March 2021, *2030 Digital Compass: the European way for the Digital Decade*, COM(2021)118 final.

⁽⁴⁾ Proposal for a Decision of the European Parliament and of the Council establishing the 2030 Policy Programme 'Path to the Digital Decade', COM(2021) 574 final, 2021/0293 (COD).

⁽⁵⁾ Section 3 of the Gigabit Communication.

⁽⁶⁾ Endnote 3 of the Communication on Shaping Europe's digital future.

⁽⁷⁾ At the current stage of development, fibre to the home, fibre to the building and performant cable networks (at least DOCSIS 3.1) are able to deliver 1 Gbps download speed.

⁽⁸⁾ Section 3.2 of the Digital Compass Communication.

⁽⁹⁾ Recital (7) of the DDPP proposal.

NextGenerationEU⁽¹⁰⁾. The Recovery and Resilience Facility (RRF) established by Regulation (EU) 2021/241 of the European Parliament and of the Council⁽¹¹⁾ is part of that plan. One of the key priorities of the RRF is to support the digital transition, through connectivity measures aimed in particular at bridging the 'digital divide' between urban and rural areas and addressing market failures with respect to the deployment of performant networks. Regulation (EU) 2021/241 requires that each Member State devote at least 20 % of the allocated funding to measures fostering the digital transition.

8. Moreover, electronic communications networks can help achieving sustainability goals. The Union's 2050 objective of climate neutrality, as set out in the European Green Deal⁽¹²⁾ and in Regulation (EU) 2021/1119 of the European Parliament and of the Council⁽¹³⁾, cannot be reached without a fundamental digital transformation of society. One of the essential components of the digital transformation of the Union is the development of secured and performant electronic communications networks that help to make an important contribution to the Union's main environmental objectives. At the same time electronic communications networks themselves will have to become more sustainable, energy, and resource efficient.
9. The electronic communications sector has undergone a thorough liberalisation process and is now subject to sectoral regulation. Directive (EU) 2018/1972 of the European Parliament and of the Council⁽¹⁴⁾ provides the regulatory framework for electronic communications.
10. Competition policy, and State aid rules in particular, have an important role to play in fulfilling digital strategy objectives and developing a co-ordinated investment strategy for connectivity. The purpose of State aid control in the broadband sector is to ensure that State aid will result in a higher level of broadband coverage and use than would be the case without State intervention, while supporting higher quality, more affordable services and pro-competitive investments. Any State intervention should limit as much as possible the risk of crowding out private investments, altering commercial investment incentives and ultimately distorting competition contrary to the common interest.
11. In 2020, the Commission launched an evaluation of the 2013 Broadband Guidelines⁽¹⁵⁾ to assess whether they were still fit for purpose. The results⁽¹⁶⁾ showed that although, in principle, the rules had worked effectively, targeted adjustments were needed to reflect recent market and technology developments and take into account legislative developments and current priorities⁽¹⁷⁾.

⁽¹⁰⁾ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic And Social Committee and the Committee of the Regions of 27 May 2020, *Europe's moment: Repair and Prepare for the Next Generation*, COM(2020) 456 final.

⁽¹¹⁾ Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility (OJ L 57, 18.2.2021, p. 17). See also Council Regulation (EU) 2020/2094 of 14 December 2020 establishing a European Union Recovery Instrument to support the recovery in the aftermath of the COVID-19 crisis (OJ L 433 I, 22.12.2020, p. 23).

⁽¹²⁾ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions of 11 December 2019, *The European Green Deal*, COM (2019) 640 final.

⁽¹³⁾ Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (European Climate Law) (OJ L 243, 9.7.2021, p. 1).

⁽¹⁴⁾ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (OJ L 321, 17.12.2018, p. 36).

⁽¹⁵⁾ Communication from the Commission of 26 January 2013, 'EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks' (OJ C 25, 26.1.2013) (the '2013 Broadband Guidelines').

⁽¹⁶⁾ See the Commission staff working document on the results of the evaluation of 7 July 2021, SWD (2021) 195 final.

⁽¹⁷⁾ See the Commission staff working document executive summary of the evaluation of the State Aid rules for broadband infrastructure deployment of 7 July 2021, SWD(2021) 194 final.

2. Scope, definitions, types of broadband networks

2.1 Scope

12. To prevent State aid from unduly distorting or threatening to distort competition in the internal market and significantly affecting trade between Member States, Article 107(1) of the Treaty on the Functioning of the European Union ('the Treaty') lays down the principle that State aid is prohibited. In certain cases, however, such aid may be compatible with the internal market on the basis of Article 107(2) and (3) of the Treaty.
13. Member States are required to notify the Commission of any plans to grant State aid pursuant to Article 108(3) of the Treaty, unless the aid pertains to one of the categories that are exempted from the notification requirement pursuant to Article 109 of the Treaty ⁽¹⁸⁾.
14. These Guidelines provide guidance on how the Commission will assess, on the basis of Article 106(2), Article 107(2), point (a), and Article 107(3), point (c), of the Treaty, the compatibility of State aid for the deployment and take-up of fixed and mobile broadband networks and services.
15. State interventions not fulfilling one of the conditions laid down in Article 107(1) of the Treaty do not constitute State aid. Consequently, they are not subject to the compatibility assessment laid down in these Guidelines.
16. In particular, Union funding that is centrally managed by the institutions, agencies, joint undertakings or other bodies of the Union and that is not directly or indirectly under the control of Member States ⁽¹⁹⁾ does not constitute State aid.
17. Aid for deployment and take-up of broadband networks and services may not be awarded to undertakings in difficulty as set out in the Commission's Guidelines on State aid for rescuing and restructuring non-financial undertakings in difficulty ⁽²⁰⁾.
18. When assessing aid in favour of an undertaking that is subject to an outstanding recovery order following a previous Commission decision that declared an aid illegal and incompatible with the internal market, the Commission will take account of the amount of aid still to be recovered ⁽²¹⁾.

2.2 Definitions

19. For the purposes of these Guidelines, the following definitions apply:
 - (a) 'broadband network' means an electronic communications network, as defined in Article 2, point (1), of Directive (EU) 2018/1972, delivering broadband electronic communications services ('broadband services');
 - (b) 'access network' means the segment of a broadband network that connects the backhaul network with the end users' premises or devices;

⁽¹⁸⁾ For example, Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (OJ L 187, 26.6.2014, p. 1).

⁽¹⁹⁾ Such as funding provided under Regulation (EU) 2021/1153 of the European Parliament and of the Council of 7 July 2021 establishing the Connecting Europe Facility and repealing Regulations (EU) No 1316/2013 and (EU) No 283/2014 (OJ L 249, 14.7.2021, p. 38).

⁽²⁰⁾ Communication from the Commission *Guidelines on State aid for rescuing and restructuring non-financial undertakings in difficulty*, section 2.2 (OJ C 249, 31.7.2014, p. 1).

⁽²¹⁾ See the judgment of 13 September 1995, *TWD v Commission*, joined cases T-244/93 and T-486/93, ECLI:EU:T:1995:160, paragraph 56. See also the Communication from the Commission, *Commission Notice on the recovery of unlawful and incompatible State aid* (OJ C 247, 23.7.2019, p. 1).

- (c) 'fixed access network' means a broadband network providing data transmission services to end users at a fixed location using a variety of technologies, including cable, digital subscriber line (DSL), optical fibres and wireless;
- (d) 'fixed ultrafast access network' means a fixed access network delivering broadband services of at least 100 Mbps download speed ('fixed ultrafast broadband services');
- (e) 'mobile access network' means a wireless communications network that provides connectivity to end users at any location in the area covered by the network using one or several International Mobile Telecommunications (IMT) standards;
- (f) 'backhaul network' means the part of a network that connects the access network to the backbone network. It is the part of the network where the traffic of end users is aggregated;
- (g) 'backbone network' means the core network that interconnects backhaul networks from different geographic areas or regions;
- (h) 'active network' means a broadband network with active components (for instance, transponders, routers and switches, active antennas) and passive components (for instance, ducts, poles, masts, dark fibres, cabinets and manholes);
- (i) 'infrastructure' means a broadband network without any active component and typically comprising physical infrastructure, as defined in Article 2, second paragraph, point (2), of Directive 2014/61/EU of the European Parliament and of the Council ⁽²²⁾, and cables (including dark fibre and copper cables);
- (j) 'peak time' means the time of the day with a typical duration of one hour where the network load is usually at its maximum;
- (k) 'peak-time conditions' means the conditions under which the network is expected to operate at 'peak time';
- (l) 'premises passed' means end users' premises to which, upon request from end users and within 4 weeks from the date of the request, an operator can provide broadband services (regardless of whether those premises are already connected to the network or not). The price charged by the operator for providing such broadband services at end users' premises in this case must not exceed normal connection fees. This means that it must not include any additional or exceptional cost as compared to the standard commercial practice and, in any case, must not exceed the usual price in the Member State concerned. That price must be determined by the competent national authority;
- (m) 'relevant time horizon' means a time horizon used for verifying planned private investments and corresponds to the time frame that the Member State estimates for deploying the planned State-funded network, starting from the moment of publication of the public consultation on the planned State intervention until the entry into operation of the network, namely until the start of the provision of wholesale or retail services on the State-funded network. The relevant time horizon taken into consideration cannot be shorter than 2 years;

⁽²²⁾ Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks (OJ L 155, 23.5.2014, p. 1).

- (n) 'overbuilding' means deploying a State-funded network in addition to one or more existing networks in a certain area;
- (o) 'crowding out' means an economic effect of a State intervention that is conducive to disincentivising, preventing, driving down or even eliminating private investments. This may be the case, for instance, if private investors see the profitability of their prior or planned investment decreasing because of State aid to an alternative investment, which may lead them to decide to reduce, discontinue, alter their investment, withdraw from the market altogether or decide not to enter into a new market or a geographic area;
- (p) 'step change' means a significant improvement achieved by State-funded networks, bringing substantial new investments in the broadband networks and significant new capabilities to the market in terms of broadband services availability, capacity, speed or other relevant characteristics of the network and competition;
- (q) 'digital divide' means the gap between those areas or regions that have access to adequate broadband services and those that do not.

2.3 Types of broadband networks

20. For the purposes of assessing State aid, these Guidelines distinguish between fixed ultrafast access networks, mobile access networks and backhaul networks, as further described in Sections 2.3.1, 2.3.2 and 2.3.3. 'Fixed ultrafast access networks' and 'mobile access networks' are used interchangeably with 'fixed networks' and, respectively, 'mobile networks'. All speeds mentioned in these Guidelines are intended under peak-time conditions.

2.3.1 Fixed ultrafast access networks

21. At the current stage of technological development, there are different types of fixed ultrafast access networks, including: (a) fibre-based networks (FTTx) ⁽²³⁾; and (b) advanced upgraded cable networks using at least the 'DOCSIS 3.0' standard ⁽²⁴⁾. Wireless networks such as certain fixed wireless access networks ⁽²⁵⁾ and satellite networks ⁽²⁶⁾ may also be able to provide fixed ultrafast broadband services.

⁽²³⁾ FTTx refers to different types of networks including fibre to the building (FTTB), fibre to the home (FTTH), fibre to the premises (FTTP) and fibre to the cabinet (FTTC). However, FTTC networks are only able to provide fixed ultrafast services when using, over loops of a certain length, vectoring (technology that improves the performance of VDSL (very high-speed digital subscriber line)).

⁽²⁴⁾ DOCSIS stands for 'data over cable service interface specifications'. It is a globally-recognized telecommunications standard which develops and provides for generations of specifications (DOCSIS 1.0, DOCSIS 1.1, DOCSIS 2.0, DOCSIS 3.0, DOCSIS 3.1, etc.). At the current state of the market, specifications for DOCSIS 4.0 have been developed.

⁽²⁵⁾ For instance, fixed wireless access networks based on 5G technology, also potentially other wireless technologies that include fixed radio solutions, especially the next generation of Wi-Fi (Wi-Fi6).

⁽²⁶⁾ Satellite technology solutions are currently used in some cases in remote or isolated areas in situations where they can provide a suitable level of fixed broadband services. More advanced satellites that are able to significantly improve the quality of broadband services and deliver ultrafast speed are expected to become available in the future (including very high throughput satellites). Satellites also play a role in providing services to public authorities. There are several low earth orbit (LEO) satellite constellations under preparation that are expected to be able to lower the latency.

2.3.2 *Mobile access networks*

22. At the current stage of market and technological development, several generations of mobile technologies coexist ⁽²⁷⁾.
23. The transition to each new mobile generation is generally incremental ⁽²⁸⁾. At the current stage, 4G networks continue to be deployed in some parts of the Union and deployments of 5G non-standalone networks rely on existing 4G Long Term Evolution ('LTE') and LTE-Advanced networks ⁽²⁹⁾. 5G networks are expected to become progressively standalone and not rely on existing 4G networks in the future. 5G standalone networks are expected to enable more performant mobile services, including lower latency and higher transmission capabilities, and enable advanced usage scenarios and applications.
24. To ensure an effective and efficient use of radio spectrum Member States may attach conditions to individual rights of use for radio spectrum, such as coverage and quality of service obligations. Such obligations may include geographical, population and transport paths coverage with certain minimum quality of service requirements ⁽³⁰⁾.

2.3.3 *Backhaul networks*

25. Backhaul networks are necessary inputs to sustain both fixed and mobile access networks. Backhaul networks can be based on copper, optical fibre, microwave and satellite solutions ⁽³¹⁾.

⁽²⁷⁾ All mobile broadband systems (2G, 3G, 4G and 5G) are based on the International Telecommunication Union's International Mobile Telecommunication (IMT) standards. IMT standards are specifications and requirements for high-speed mobile broadband service based on the technological progress in the relevant time frame. Mobile networks incorporate progressively the features and capabilities of new standards. In addition, the amount and type of spectrum used, with different propagation characteristics, have an important impact on the quality of service delivered. For instance, among the three pioneer bands identified for 5G services, it is currently estimated that the 700 MHz frequency band is more suitable for wide area and indoor coverage; 3.6 GHz (3.4-3.8 GHz) is characterised by high capacity but lower coverage than the 700 MHz band; the 26 GHz (24.25-27.5 GHz) is likely to be used to deploy hot-spots in small areas with very high demand (for example transport hubs, entertainment venues, industrial or retail sites or along major roads and railway tracks in rural areas) and will not be used to create wide area coverage. New mobile generations may also use frequency bands initially used by previous generations.

⁽²⁸⁾ Subsequent versions of 2G (so called 2G enhanced or 2.xG) were superior to 2G itself. Incremental upgrades over 3G (3.xG versions) had better performances compared to 3G. Also for 4G, the 4.5G cellular communication system is better than 4G in several aspects. 4.5G is the outcome of the evolution of LTE whose legacy is LTE-Advanced. The initial roll-out of 5G network will likely focus on enhanced mobile broadband services (one of the sets of use cases defined for 5G). 5G standalone networks are expected to provide significant improvements in speed and latency while supporting a greater density of connected devices compared to previous generations and make available new features such as network slicing that in turn will enable new sets of use cases for 5G.

⁽²⁹⁾ 5G non-standalone networks may use new equipment and 5G frequencies to deliver better quality of service but may still use 4G network elements.

⁽³⁰⁾ For instance, to date, coverage obligations attached to some spectrum bands require, depending on types of spectrum, a coverage of a certain percentage of the population or territory and minimum quality requirements in terms of speed and latency. Often, such coverage obligations are to be fulfilled within a period of up to 5 years from the assignment of the relevant spectrum, sometimes up to 7 years.

⁽³¹⁾ In the early generations of mobile networks, the backhaul from the radio base station to the mobile switching centre, was largely provided by point-to-point microwave connections. The deployment of LTE-Advanced and the introduction of 5G have led to higher backhaul requirements and an increasing use of optical fibre networks to connect base stations.

3. Compatibility assessment under Article 106(2) of the Treaty

26. In some cases, Member States may classify the provision of broadband services as a service of a general economic interest ('SGEI') under Article 106(2) of the Treaty ⁽³²⁾ and support the deployment of a network providing such services. Compensation for costs incurred to provide such a service of general economic interest does not amount to State aid if the four cumulative conditions of the Altmark judgment ⁽³³⁾ are met. The compensation for the provision of a service of general economic interest that constitutes aid will be assessed in accordance with the rules applicable to State aid in the form of public service compensation ('the SGEI package') ⁽³⁴⁾.
27. These Guidelines only illustrate the definition of a SGEI by applying the rules laid down in the SGEI package to broadband networks, taking into account sectoral characteristics.
28. On the definition of a genuine SGEI, the Commission has clarified that Member States cannot attach specific public service obligations to services that are already provided or can be provided satisfactorily and under conditions, such as price, objective quality characteristics, continuity and access to the service, consistent with the public interest, as defined by the Member State, by undertakings operating under normal market conditions ⁽³⁵⁾.
29. Applying this principle to the broadband sector, when assessing the absence of manifest error in the classification of an SGEI, the Commission takes into consideration the following elements:
- (a) the State aid intervention must address only areas where it can be demonstrated that private investors are not in a position to provide access to adequate broadband services. In line with Directive (EU) 2018/1972, the level of adequate broadband services is set by each Member State, in the light of national conditions and the minimum bandwidth enjoyed by the majority of consumers within a Member State in order to ensure the bandwidth necessary for an adequate level of social inclusion and participation in the digital economy and society in their territory. The adequate broadband services should be capable of delivering the bandwidth necessary for supporting at least the minimum set of services set out in Annex V to Directive (EU) 2018/1972. A Member State should establish the absence of adequate broadband services

⁽³²⁾ According to case-law, undertakings entrusted with the operation of services of general economic interest must have been assigned that task by an act of a public authority. For instance, a SGEI may be entrusted to an undertaking by granting a public service concession; see judgment of 13 June 2000, *EPAC v Commission*, joined cases T-204/97 and T-270/97, ECLI:EU:T:2000:148, paragraph 126 and judgment of 15 June 2005, *Fred Olsen v Commission*, T-17/02, ECLI:EU:T:2005:218, paragraphs 186, 188-189.

⁽³³⁾ Judgment of 24 July 2003, *Altmark Trans and Regierungspräsidium Magdeburg*, C-280/00, ECLI:EU:C:2003:415, paragraphs 87 to 95.

⁽³⁴⁾ The SGEI package includes the Commission communication on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest (OJ C 8, 11.1.2012, p. 4), the Commission Decision of 20 December 2011 on the application of Article 106(2) of the Treaty on the Functioning of the European Union to State aid in the form of public service compensation granted to certain undertakings entrusted with the operation of services of general economic interest (OJ L 7, 11.1.2012, p. 3), the Commission communication on a European Union framework for State aid in the form of public service compensation (OJ C 8, 11.1.2012, p. 15) and Commission Regulation (EU) No 360/2012 of 25 April 2012 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid granted to undertakings providing services of general economic interest (OJ L 114, 26.4.2012, p. 8). The Commission started in June 2019 to evaluate State aid rules for health and social services of general economic interest (SGEI) and Regulation (EU) No 360/2012.

⁽³⁵⁾ Paragraph 13 of the Commission communication on a European Union framework for State aid in the form of public service compensation (OJ C 8, 11.1.2012, p. 15).

based on mapping and public consultation conducted in accordance with Sections 5.2.2.4.1 and 5.2.2.4.2 ⁽³⁶⁾. The Commission considers that in areas where private investors have already invested or plan to invest in a broadband network providing access to adequate broadband services, setting up a parallel State-funded broadband network cannot be classified as a SGEI within the meaning of Article 106(2) of the Treaty ⁽³⁷⁾;

- (b) the network must offer universal and affordable, in the light of specific national conditions, broadband services ⁽³⁸⁾ for all premises in the target area. Support for connecting businesses only would not be sufficient ⁽³⁹⁾;
- (c) the network must be technologically neutral;
- (d) the SGEI provider should offer open wholesale access in accordance with Section 5.2.4.4 on a non-discriminatory basis ⁽⁴⁰⁾;
- (e) where the provider of the SGEI is also a vertically integrated undertaking, Member States should implement adequate safeguards ⁽⁴¹⁾ to avoid any conflict of interest, undue discrimination and any other hidden indirect advantages ⁽⁴²⁾.

4. Compatibility assessment under Article 107(3), point (c), of the Treaty

30. The Commission will consider State aid for the deployment or take-up of broadband networks and services compatible with the internal market pursuant to Article 107(3), point (c), of the Treaty only if the aid contributes to the development of certain economic activities or of certain economic areas (first condition), and if such aid does not adversely affect trading conditions to an extent contrary to the common interest (second condition).
31. In its compatibility assessment, the Commission will examine the following two aspects:
- (a) under the first condition, the Commission will examine whether the aid is intended to facilitate the development of certain economic activities, and in particular:
 - (i) the economic activity facilitated by the aid;

⁽³⁶⁾ For the implementation of universal service obligations, the provisions of Directive (EU) 2018/1972 apply.

⁽³⁷⁾ See paragraph 49 of the Commission communication on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest. See also paragraph 154 of the judgment of 16 September 2013, *Colt Télécommunications France v Commission*, T-79/10, ECLI:EU:T:2013:463, and Commission Decision C(2016)7005 final of 7 November 2016, case SA.37183 (2015/NN) – France – Plan France Très Haut Débit, recital 263 (OJ C 68, 3.3.2017, p. 1).

⁽³⁸⁾ See Articles 84, 85 and 86 of Directive (EU) 2018/1972.

⁽³⁹⁾ See paragraph 50 of the Commission communication on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest. See also Commission Decision C(2006)436 final of 8 March 2006, case N284/05 – Ireland – Regional broadband Programme: *Metropolitan Area Networks* ('MANs'), phases II and III (OJ C 207, 30.8.2006, p. 3), and Commission Decision C(2007) 3235 final of 10 July 2007, case N890/06 – France – Aide du Sicoval pour un réseau de très haut débit (OJ C 218, 18.9.2007, p. 1).

⁽⁴⁰⁾ For the implementation of universal service obligations, the provisions of Directive (EU) 2018/1972 apply.

⁽⁴¹⁾ Such safeguards may include, depending on the characteristics of each case, limiting the provision of wholesale-only services, an obligation of accounting separation, and may also include the setting up of a structurally and legally separate entity from the vertically integrated undertaking. Such entity should have sole responsibility for complying with and delivering the SGEI mission assigned to it. Indeed, once a broadband network providing universal broadband services has been deployed, undertakings providing retail broadband services that operate on market terms are normally able to provide those services to end users at a competitive price. See Commission Decision C(2016)7005 final of 7 November 2016, case SA.37183 (2015/NN) – France – Plan France Très Haut Débit (OJ C 68, 3.3.2017, p. 1).

⁽⁴²⁾ For the implementation of universal service obligations, the provisions of Directive (EU) 2018/1972 apply.

- (ii) the incentive effect of the aid, namely the potential of the aid to change the behaviour of the undertakings concerned in such a way that they carry out an additional activity, which they would not have carried out without the aid or would have carried out in a restricted or different manner or location;
 - (iii) the existence of a breach of any provision of Union law in relation to the measure at stake;
 - (b) under the second condition, the Commission will weigh up the positive effects of the planned aid and the negative effects that the aid may have on the internal market, in terms of distortions of competition and adverse effects on trade caused by the aid, and will therefore examine:
 - (i) the positive effects of the aid;
 - (ii) whether the aid is needed and targeted to address a situation where it can bring about a material improvement that the market cannot deliver itself, for example, by remedying a market failure or addressing an equity or cohesion concern;
 - (iii) whether the aid is an appropriate policy instrument to meet its objective;
 - (iv) whether the aid is proportionate and limited to the minimum necessary to induce the additional investment or activity in the area concerned;
 - (v) whether the aid is transparent, namely whether Member States, stakeholders, the public and the Commission have easy access to information on the aid awarded;
 - (vi) the negative effects of the aid on competition and trade between Member States.
- 32. As a final step, the Commission will balance the identified negative effects of the aid on the internal market with its positive effects on the supported economic activities.
- 33. The steps in the Commission's assessment of aid for the deployment and take-up of broadband networks and services are set out in further detail in Sections 5 to 8.

5. Aid for the deployment of broadband networks

- 34. The Commission considers the market for fixed broadband services as separate from the market for mobile broadband services⁽⁴³⁾. The rules for assessing aid may therefore differ, depending on the market concerned⁽⁴⁴⁾.
- 5.1 **First condition: facilitation of the development of an economic activity**
 - 5.1.1 *Networks as facilitators of economic activities*
- 35. Member States must identify the economic activities that will be facilitated as a result of the aid, such as the deployment of fixed networks providing performant fixed broadband services or the deployment of mobile networks providing voice and high-performance broadband services. They must also explain how the development of those activities is supported.

⁽⁴³⁾ Where deployment costs of a fixed network are very high, a high-performance mobile network may provide an alternative to a fixed network to a certain extent, depending on specific circumstances. However, there remain significant qualitative differences between the two technologies. Unlike fixed networks, mobile networks allow end users to move while communicating (for instance in a car). However, fixed networks offer a higher degree of stability in particular for data transmission. For the time being, end users typically use both technologies as complements, not substitutes.

⁽⁴⁴⁾ Member States have the possibility to establish a single State aid measure supporting the deployment of a combination of different types of networks (fixed access networks, mobile access networks and backhaul networks) subject to compliance with the rules that apply for each type of network.

36. Aid for the deployment of fixed networks and aid for the deployment of mobile networks can facilitate the development of many economic activities by increasing connectivity and access to the broadband networks and services for the public, businesses and public administrations. Such aid can facilitate the development of economic activities in areas where such activities are either not present or only ensured at a level that does not adequately fulfil end-users' needs.

5.1.2 *Incentive effect*

37. Aid can only be considered as contributing to the development of an economic activity if it has an incentive effect.

38. Aid has an incentive effect if it incentivises the beneficiary to change its behaviour towards the development of a certain economic activity supported by the aid that it would not have carried out within the same time frame or would only have carried out in a limited or different manner or location, if the aid was not granted.

39. The aid must not finance the costs of an activity that an undertaking would carry out in any event. It must not compensate the normal business risk of an economic activity ⁽⁴⁵⁾.

40. Proving an incentive effect of aid for the deployment of fixed or mobile networks means checking, through mapping and public consultation in accordance with Sections 5.2.2.4.1 and 5.2.2.4.2, whether stakeholders have invested or intend to invest in, respectively, fixed or mobile networks in the target areas within the relevant time horizon. If an equivalent investment could be made within the same time frame in the area without the aid, the aid can be considered to lack an incentive effect. For instance, where an undertaking is subject to legal obligations, such as coverage and quality of service obligations attached to the rights of use of certain radio spectrum for mobile deployments, State aid cannot be used to fulfil such obligations as it is unlikely to have an incentive effect, and thus unlikely to be compatible with the internal market. State aid may, however, be considered compatible where and to the extent necessary to provide a quality of service going beyond the requirements resulting from such obligations.

5.1.3 *Compliance with other provisions of Union law*

41. If a State aid, the conditions attached to it (including its financing method where that method forms an integral part of the aid) or the activity it finances entail a violation of a provision or a general principle of Union law, the aid cannot be declared compatible with the internal market ⁽⁴⁶⁾. This may be the case where the award of aid is made dependent, directly or indirectly, on the origin of products or equipment, such as a requirement for the beneficiary to purchase domestically produced products.

5.2 **Second condition: the aid must not unduly affect trading conditions to an extent contrary to the common interest**

5.2.1 *Positive effects of the aid*

42. Member States must describe whether and, if so, how the aid will bring about positive effects.

43. Member States may decide to design State interventions that contribute to reducing the digital divide. They may choose to intervene to correct social or regional inequalities, or to achieve equity objectives, that is to say, as a way of improving access to an essential means of communication and participation in society, thereby

⁽⁴⁵⁾ See judgment of 13 June 2013, *HGA and others v Commission*, C-630/11 P to C-633/11 P, ECLI:EU:C:2013:387, paragraph 104.

⁽⁴⁶⁾ Judgment of 22 September 2020, *Austria v Commission*, C-594/18 P, ECLI:EU:C:2020:742, paragraph 44.

improving social and territorial cohesion. Furthermore, Member States may decide to design State interventions that also contribute to the achievement of objectives of Union digital policy, foster the achievement of Union Green Deal objectives and promote sustainable green investments across all sectors.

5.2.2 *Necessity for State intervention*

44. State aid must be targeted towards situations where aid can bring about a material improvement that the market alone cannot deliver.
45. A State intervention may be necessary if markets, without public intervention, fail to deliver an efficient outcome for society. This may arise, for instance, when certain investments are not being carried out even though the benefit for society outweighs their cost ⁽⁴⁷⁾. In such cases, granting State aid may produce positive effects, and overall efficiency may be improved by adjusting the economic incentives for stakeholders.
46. In the broadband sector, one form of market failure may relate to positive externalities that are not internalised by market operators. For example, while fixed and mobile networks are key enablers for the provision of additional services and for innovation, the overall benefits are likely to be higher than the economic benefits they generate for the networks' investors, especially in remote regions or low-population-density or unpopulated areas. The market may therefore generate insufficient private investment in fixed and mobile networks, in particular in certain areas.
47. Due to economies of density, the deployment of broadband networks is generally more profitable where potential demand is higher and concentrated, that is to say, in densely populated areas. Because of the high fixed costs of investment, unit costs increase significantly as population densities drop. Therefore, when deployed on market terms, broadband networks tend to profitably cover only part of the population. State aid can, under certain conditions, correct market failures, thereby improving the efficiency of markets.
48. A market failure may also exist if the existing or planned network(s) would provide end users with a suboptimal combination of service quality and price ⁽⁴⁸⁾. This may be the case where: (a) certain categories of users may not be provided with a satisfactory service; or (b) especially in the absence of regulated wholesale access tariffs, retail prices may be higher than those charged for the same services offered in more competitive but otherwise comparable areas or regions of the Member State.
49. However, if State aid for the deployment of fixed and mobile networks were to be used in areas where market operators would usually choose to invest or have already invested, this could significantly undermine the incentives for private investors to invest in the first place.

⁽⁴⁷⁾ However, the fact that a specific company may not be capable of carrying out a project without aid does not mean that there is a market failure. For instance, a company's decision not to invest in a project with low profitability may not be an indication of a market failure, but rather of a market that functions well.

⁽⁴⁸⁾ In such cases, the Commission will carefully examine whether the Member State can demonstrate clearly and with verifiable evidence that end users' needs are not met. This could be proven through consumer survey, independent studies etc.

50. Furthermore, where markets provide efficient outcomes but these are deemed unsatisfactory from a cohesion policy point of view, State aid may be necessary to correct social or regional inequalities to obtain a more desirable, equitable market outcome. In such circumstances, a well-targeted State intervention in broadband may contribute to reducing the digital divide ⁽⁴⁹⁾.
51. The mere existence of market failures in a certain context is not sufficient to justify State intervention. State aid should only be directed at the market failure that remains unaddressed by other, less distortive policies and measures, for instance administrative measures or regulatory obligations on the effective and efficient use of radio spectrum, including coverage and quality of service obligations attached to rights of use for radio spectrum.
52. To further minimise the aid's possible distortive effects on competition, State interventions may be subject to a private investment protection period, of up to 7 years ⁽⁵⁰⁾.
- 5.2.2.1 Existence of market failure as regards fixed access networks
53. Aid should target areas where there is no fixed network in place or where none is credibly planned to be deployed within the relevant time horizon that could address end-users' needs.
54. At the current stage of market development and given identified end users' needs, a market failure may be present where the market does not and is not likely to provide end users with a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps ⁽⁵¹⁾.
55. In assessing whether the market is likely to provide a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps, credible plans to deploy such networks within the relevant time horizon should be considered (in accordance with Section 5.2.2.4.3).
56. Consequently, the Commission considers that no market failure is present in areas in which at least one fixed network providing a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps is present or credibly planned or where the present network(s) can be upgraded to provide a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps. A network is considered to be upgradable to such speeds if it can provide such performance on the basis of a marginal investment, such as an upgrade of active components.
57. State intervention to deploy an alternative network in the areas described in paragraph 56 could distort market dynamics. Therefore, the Commission will likely take a negative view on State aid for the deployment of an additional network in such areas.
58. In areas in which at least two independent fixed ultrafast networks are present or credibly planned, broadband services are typically provided under competitive conditions (infrastructure-based competition). Thus, it is likely that one or more such networks will evolve to provide a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps, without the need for a State intervention.

⁽⁴⁹⁾ While there may be several reasons for a digital divide, the existence of adequate broadband networks is a prerequisite for enabling connectivity and closing the gap. The degree of urbanisation is an important factor for access to and use of information and communications technologies. Internet penetration may remain lower in low-populated areas throughout the Union.

⁽⁵⁰⁾ The length of any private investment protection period would depend on the specificities of the protected networks, such as the underlying network technologies, the date when the deployment of the network was completed etc.

⁽⁵¹⁾ While speeds are currently the most relevant quality of service parameters, other parameters (such as latency) may become relevant for certain end users. Such parameters may be taken into account to determine the existence of a market failure.

59. However, the likelihood that networks in the areas described in paragraph 58 will evolve towards providing a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps may also depend on the amount of investment needed to deploy networks delivering those speeds, considering the current stage of technological development. As a consequence, in those areas:
- (a) if none of the existing or credibly planned networks provides a download speed of at least 300 Mbps ⁽⁵²⁾, it is unlikely that they will evolve towards providing a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps. Therefore, a State intervention may be allowed, provided that all compatibility criteria set out in these Guidelines are met;
 - (b) if at least one of the existing or credibly planned networks provides a download speed of at least 300 Mbps but does not provide a download speed of at least 500 Mbps ⁽⁵³⁾, the Commission will carry out a more detailed analysis to assess whether at least one of the existing or credibly planned network(s) will evolve towards providing 1 Gbps download and 150 Mbps upload speeds and whether a State intervention is necessary. Unless the Member State demonstrates that (i) based on mapping and public consultation, a market failure persists in the identified target areas as no networks will evolve towards providing a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps; and (ii) the envisaged State intervention meets all compatibility criteria set out in these Guidelines, the Commission will likely take a negative view of such a State intervention;
 - (c) if at least one of the existing or credibly planned networks provides a download speed of at least 500 Mbps, it is likely that at least one of the existing or credibly planned networks will evolve towards providing a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps. Therefore, State aid is generally unnecessary and the Commission will likely take a negative view of such a State intervention;
 - (d) the Member State may reassess the situation and notify a State intervention for approval after 5 years from the announcement date ⁽⁵⁴⁾ of State interventions under points (b) and (c). The 5-year period aims to offer an opportunity to investors to start deployment of privately-financed networks providing a download speed up at least 1 Gbps and an upload speed of at least 150 Mbps. Such a notification should be based on a new mapping and public consultation showing that a market failure persists and has to demonstrate that the envisaged State intervention meets all compatibility criteria set out in these Guidelines.

5.2.2.2 Existence of market failure as regards mobile access networks

60. The Commission considers that a market failure exists in areas where there is no mobile network, in place or credibly planned to be deployed within the relevant time horizon, which can address end-users' needs ⁽⁵⁵⁾.

⁽⁵²⁾ As an additional safeguard, Member States may also verify that such speed is or will be actually reflected as the minimum download speed, within the meaning of Article 4(1), point (d), of Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC and Regulation (EU) No 531/2012 (OJ L 310, 26.11.2015), in at least one contract available to consumers.

⁽⁵³⁾ See footnote 48.

⁽⁵⁴⁾ Member States must announce the intention to intervene by publishing the list of target areas, the quality of services to be provided at least in terms of download and upload speeds and the thresholds for intervention at least in terms of download and upload speeds of the services that may be overbuilt by the measure. That information must be made available on a publicly accessible website at the level of the target area and at national level.

⁽⁵⁵⁾ See, for instance, Commission Decision C(2021) 3492 final of 21 May 2021, case SA.58099 (2021/N) – Germany – Mobile communications Mecklenburg-Western Pomerania (OJ C 260, 2.7.2021).

61. Present and future communications applications increasingly rely on performant mobile networks that are available on a wide geographical basis ⁽⁵⁶⁾. End users have a need to communicate and access information while on the move. Over time, new economic activities are expected to develop that require seamless online access to performant mobile services. To accompany this change, mobile networks are expected to evolve to provide increasingly better connectivity. In certain circumstances, a lack of, or insufficient mobile connectivity may be detrimental for certain economic activities, such as industry, agriculture, tourism or connected mobility. It may also pose a risk for the public's safety ⁽⁵⁷⁾. This may particularly affect remote regions or low-population-density or unpopulated areas.
62. In an area where there is already at least one mobile network in place or credibly planned to be deployed within the relevant time horizon, which can address end-users' needs, State aid for the deployment of an additional mobile network could unduly distort market dynamics.
63. State aid for the deployment of a mobile network in the areas referred to in paragraph 62 may be considered necessary when it is demonstrated that both the following conditions are fulfilled: (a) the existing or credibly planned mobile network does not provide end users with sufficient quality of services to satisfy their evolving needs; and (b) the State intervention will provide such quality of services, thus bringing about a material improvement that the market cannot deliver ⁽⁵⁸⁾.
64. A State intervention may be necessary in certain circumstances to address specific market failures related to identified use cases even in the presence of a 4G or a 5G mobile network, where that network does not and is not likely to provide end users with sufficient quality of services to satisfy their evolving needs. Such use cases that relate to new economic activities and services may require: (a) seamless online access (for instance for connected and automated mobility along transport paths); (b) certain minimum speeds and capacity; (c) other specific characteristics such as lower latency, network virtualization or the capacity to connect multiple terminals for industry or agriculture.
65. As a matter of principle, even in the presence of a market failure, State aid cannot be granted to and cannot be used for the fulfilment of legal obligations, such as obligations linked to the rights to use spectrum. However, State aid may be granted where and to the extent necessary to provide an additional quality of service that is required to meet end users' demonstrated needs and that goes beyond what is already required to comply with such legal obligations. Such aid may be granted insofar as necessary to cover only the additional costs needed to ensure the increased quality of service.
66. Where, in a given area, there is or there will be, within the relevant time horizon, at least one mobile network that can satisfy the end users' evolving needs (see paragraphs 61, 63 and 64), granting State aid for an additional mobile network with equivalent capabilities would, in principle, lead to an unacceptable distortion of competition, and crowd out private investments. The Commission will likely take a negative view of such State interventions.

⁽⁵⁶⁾ For instance, the Gigabit communication refers to certain applications for the automotive, transport, manufacturing and health sectors as well as for next generation safety and emergency services (for instance connected and automated driving, remote surgery, precision farming).

⁽⁵⁷⁾ For instance, Article 109 of Directive (EU) 2018/1972 provides for the obligation of electronic communications operators to make caller location information available as soon as the call reaches the authority handling the emergency call. It is also mandatory to make network-based and the more accurate handset-derived location information available to the most appropriate public safety answering point.

⁽⁵⁸⁾ See, for instance, Commission Decision C(2020) 8939 final of 16 December 2020, case SA.54684 – Germany – High-capacity mobile infrastructure roll-out in Brandenburg (OJ C 60, 19.2.2021, p. 2); and Commission Decision C(2021) 1532 final of 10 March 2021, case SA.56426 – Germany – High-performance mobile infrastructure roll-out in Lower Saxony (OJ C 144, 23.4.2021, p. 2); Commission Decision C(2021) 3565 final of 25 May 2021, case SA.59574 – Germany – Deployment of high-performance mobile infrastructure in Germany (OJ C 410, 8.10.2021, p. 1).

5.2.2.3 Existence of market failure as regards backhaul networks

67. Backhaul networks are a prerequisite for the deployment of access networks. Backhaul networks have the potential to stimulate competition in the access areas to the benefit of all access networks and technologies. A performant backhaul network may stimulate private investments to connect end users, provided that it ensures wholesale access on open, transparent and non-discriminatory conditions for all access seekers and technologies. In the absence of private investments, State aid for the deployment of backhaul networks may be necessary to foster competition and investments at the access level as it enables access seekers to roll out access networks and offer connectivity services to end users.
68. As backhaul networks transport the traffic of various fixed or mobile access networks, those networks require a significantly higher transmission capacity than individual access networks. Backhaul networks need to cater for significant increases in the capacity required over their lifetime. This is due to the needs of end users and the ongoing rapid upgrade of fixed or mobile access networks with increasing needs for improved data transmission and increased performances (including for new mobile generations). In order to avoid a backhaul network becoming a bottleneck, it may be necessary to increase its capacity to accompany the deployment of performant fixed or mobile access networks. A market failure may thus be present where the existing or planned backhaul capacity cannot cope with the expected development of corresponding fixed or mobile access networks based on current and future end-users' needs. At the current stage of technological development, the increase in demand for capacity can usually be addressed by backhaul networks based on optical fibre or on other technologies that can provide the same level of performance and reliability as fibre-based backhaul networks. A market failure may therefore exist where there is no backhaul network or the existing or credibly planned network is not based on fibre or on other technologies that can provide the same level of performance and reliability as fibre.
69. Irrespective of the underlying technology of the existing backhaul network, a market failure may be present if that backhaul network provides a suboptimal combination of service quality and prices. For instance, a Member State may demonstrate that access conditions over the existing backhaul network could prevent the deployment of new or more performant fixed or mobile access networks because certain categories of access seekers are not adequately served⁽⁵⁹⁾ or because the wholesale access prices may be higher than those charged for the same services in more competitive but otherwise comparable areas of the Member State and the problem could not be solved through sector regulation⁽⁶⁰⁾.

5.2.2.4 Instruments to determine the necessity for State intervention

70. To identify the need for State intervention in a given area, Member States must verify on the basis of a detailed mapping and public consultation, in accordance with Sections 5.2.2.4.1 and 5.2.2.4.2, the performances of fixed access networks, mobile access networks or backhaul networks that exist or are credibly planned to be deployed in the target area in the relevant time horizon.

⁽⁵⁹⁾ This may be the case where the architecture of the existing backhaul network is not in line with backhaul users' needs in terms of capacity or dimensioning.

⁽⁶⁰⁾ For instance, Croatia proposed a State intervention in its national backhaul market that was characterised by capacity constraints, which led to high prices on the downstream market. The existing backhaul network operator was not willing to invest in a capacity increase. As the issue could not be solved by the national regulator, the Commission approved a State aid scheme for investment in fibre backhaul infrastructure. The Commission found that the dominant position had become a bottleneck which constituted a market failure. Commission Decision C(2017) 3657 final of 6 June 2017, case SA.41065 - National Programme for broadband aggregation infrastructure - Croatia (OJ C 237, 21.7.2017, p. 1). See also Commission Decision C(2016) 7005 final of 7 November 2016, case SA.37183 (2015/NN) - France - Plan France très haut débit (OJ C 68, 3.3.2017, p.1) where the Commission approved State aid for the deployment of a fibre backhaul network in areas where there was no backhaul network as well as in areas where the existing backhaul network had insufficient capacities to meet expected needs at reasonable access prices and conditions.

71. Member States have significant discretion to set the target areas. However, they are encouraged to take into account economic, geographical and social conditions when determining those areas.

5.2.2.4.1 Detailed mapping and analysis of coverage

72. Through a detailed mapping, Member States must identify the geographic areas (target areas) that will be eligible under the State aid intervention, based on an objective representation of the performances of the networks that exist or are credibly planned in a certain area.

73. As regards State aid supporting the deployment of fixed access networks or mobile access networks, the mapping must comply with both the following criteria:

(a) the performances must be expressed at least in terms of download speeds, and, where relevant, upload speeds ⁽⁶¹⁾ that are or will be available to end users under peak-time conditions ⁽⁶²⁾; any bottleneck that could prevent achievement of those performances must be duly taken into account (concerning for instance backhaul);

(b) the mapping must be carried out: (i) for fixed wired networks at address level on the basis of premises passed; and (ii) for fixed wireless access networks and mobile networks at address level on the basis of premises passed or on the basis of a maximum 100×100 metre grids ⁽⁶³⁾.

74. Member States may take into account the best practices for applying the mapping methodologies described in Annex I.

75. As regards State aid supporting the deployment of backhaul networks, Member States must map performances of backhaul networks existing or credibly planned within the relevant time horizon. Where a network deployment includes, at the same time the deployment of an access network and of the necessary backhaul network to enable the functioning of the access network, a separate mapping of backhaul networks is not required.

76. Member States must make the methodology and the underlying technical criteria (for instance, utilisation factor and cell load) used to map the target area publicly available.

77. The consultation of the national regulatory authority (NRA) is recommended as set out in Section 5.2.4.6.

5.2.2.4.2 Public consultation

78. Member States must publish for consultation the main characteristics of the planned State intervention and the list of target areas identified through the mapping ⁽⁶⁴⁾. That information must be made available on a publicly accessible website ⁽⁶⁵⁾ at regional and national level.

⁽⁶¹⁾ Where the presence of the market failure cannot already be inferred from the data concerning download speed.

⁽⁶²⁾ The public authorities responsible for the State intervention may also map other performance criteria to characterise the performance of networks at peak-time conditions (such as latency, packet loss, packet error, jitter, service availability). Member States may choose to do so in order to better target the State intervention to address market failures and ensure an adequate step change.

⁽⁶³⁾ Smaller grids (such as 20×20 metre grids) are considered a good practice to ensure target areas are clearly identified.

⁽⁶⁴⁾ This must include: list of target areas based on the mapping, duration of the measure, budget, sources of public financing, identification of the relevant time horizon, eligibility criteria including quality of services to be provided (upload and download speeds), thresholds for intervention, planned wholesale access requirements and pricing or pricing methodology. A public consultation may also include questions to stakeholders about the wholesale access products they would like to see offered on any newly created State-funded network.

⁽⁶⁵⁾ Direct consultation of suppliers or other stakeholders does not fulfil the requirements of a public consultation which must ensure openness and transparency towards any interested parties, in the interest of legal certainty.

79. The public consultation must invite interested parties (a) to comment on the planned State intervention, its design and main characteristics; and (b) to submit substantiated information about the existing networks or networks credibly planned to be deployed in the target area within the relevant time horizon ⁽⁶⁶⁾.
80. When considering the prospective relevant time horizon, Member States must take into account all aspects that can be reasonably expected to impact the duration of the deployment of the new network (namely the time required for the selection procedure, possible legal actions and challenges, time to obtain rights of ways and permits, other obligations stemming from national legislation, availability of civil works capacity, etc.). If the deployment of the planned State-funded network (until its entry into operation) takes longer than estimated, a new mapping and public consultation are necessary.
81. Irrespective of whether the Member State may have already collected information on future investment plans through mapping, the public consultation must always include the results of the most recent mapping. This is necessary in order to minimise possible undue distortions of competition as regards undertakings already providing networks or services in the target areas and those who already have credible investment plans for the relevant time horizon.
82. The public consultation must last at least 30 days. After the end of the public consultation, the Member State has to launch the competitive selection procedure or to start the implementation of the project concerned ⁽⁶⁷⁾ for direct investment models within 1 year. If the Member State does not launch the competitive selection procedure or the implementation of the State-funded project within that period, it must carry out a new public consultation before it can launch the competitive selection procedure or implement the State-funded project.
83. The consultation of the NRA on the results of the public consultation is recommended ⁽⁶⁸⁾.

5.2.2.4.3 Best practices: assessment of private investment plans in the public consultation

84. There is a risk that a mere 'expression of interest' in future private investment plans in the target area by a stakeholder in a public consultation could delay the deployment of broadband networks if that private investment does not subsequently take place while State intervention has been stalled.
85. To reduce the risk that State intervention is prevented on the basis of future investment plans that will not materialise, Member States may decide to ask the relevant stakeholders to provide evidence to demonstrate the credibility of their investment plans, within a time frame that is appropriate and proportionate to the level of information requested ⁽⁶⁹⁾. This evidence may include, for instance, a detailed deployment plan with milestones (for example, for every 6-month period), demonstrating that the investment will be completed within the relevant time horizon and will ensure similar performances as the planned State-funded network.
86. To assess the credibility of the declared performance and coverage, Member States may use the same criteria used to assess the performance of the existing networks, where reasonable and appropriate.

⁽⁶⁶⁾ The results of a public consultation are only valid for the relevant time horizon indicated in the public consultation. The implementation of the measure beyond that time requires at least new mapping and public consultation.

⁽⁶⁷⁾ This includes individual aid grants under a State aid scheme.

⁽⁶⁸⁾ A similar mechanism is set out in Article 22 of Directive (EU) 2018/1972.

⁽⁶⁹⁾ Member States may include this request directly in the public consultation for efficiency. Alternatively, as part of the assessment of the results of the public consultation, Member States may request further information when certain plans provided by stakeholders may qualify as a mere 'expression of interest'.

87. When assessing the credibility of future investment plans, Member States may take notably the following criteria into account:
- (a) whether the stakeholder has submitted a project-related business plan, factoring in suitable criteria concerning, for example, time frame, budget, the location of premises targeted, quality of service to be provided, type of network and technology to deploy and take-up rate;
 - (b) whether the relevant stakeholder has submitted a credible high-level project plan that properly takes into account major project milestones, such as administrative procedures and permits (including rights of way, environmental permits, safety and security provisions), civil engineering works, the completion of the network, the start of operations and provision of services to end users;
 - (c) the suitability of the size of the company in the light of the size of the investment;
 - (d) the track record of the stakeholder in comparable projects;
 - (e) if necessary and appropriate, the geographical coordinates of key parts of the planned network (base stations, points of presence, etc.).
88. If a Member State considers that the private investment plans are credible, it may decide to invite the stakeholders concerned to sign commitment agreements, which could include obligations to report progress on their stated milestones.
89. It is the responsibility of the stakeholders concerned to provide meaningful information in accordance with the relevant Union ⁽⁷⁰⁾ or national rules.
90. The Member State should consult the NRA on the Member State's assessment of the credibility of the future investment plans ⁽⁷¹⁾.
91. The Member State should communicate the results of its assessment and the reasons on which it bases its conclusions to all stakeholders who submitted information about their private investment plans.
- 5.2.2.4.4 Best practices: *ex post* monitoring of the implementation of private investment plans
92. If the Member State considers that the private investment plans submitted are credible and consequently the corresponding area has been carved out from the scope of the State intervention, the Member State may decide to require the stakeholders who have submitted those plans to report regularly on the compliance with the milestones for the deployment of the network and for the provision of services.
93. If the Member State identifies deviations from the plan submitted which suggest that the project will not materialise or has sufficient reasons to doubt that the investment will be completed as declared, the Member State may decide to require the stakeholders concerned to provide further information demonstrating the continued credibility of the declared investment.
94. If the Member State has significant doubts as to whether the investment will be completed as declared, it may decide at any time during the relevant time horizon to include the areas concerned by the investment in a new public consultation, with a view to verifying their potential eligibility for State intervention.
- 5.2.3 *Appropriateness of the aid as a policy instrument*
95. The Member State must demonstrate that the aid is appropriate to address the identified market failure and to achieve the objectives pursued by the aid. State aid is not appropriate if the same outcome is achievable through other less distortive measures.

⁽⁷⁰⁾ For example in accordance with Article 29 of Directive (EU) 2018/1972.

⁽⁷¹⁾ A similar mechanism is set out in Article 22 of Directive (EU) 2018/1972.

96. State aid is not the only policy instrument available to Member States to boost investment in the deployment of broadband networks. Member States can use other less distortive means, such as administrative and regulatory measures or market-based instruments.
97. In order for the aid to be appropriate, the State-funded fixed and mobile networks must provide significantly enhanced characteristics in comparison to existing networks. State-funded fixed and mobile networks should therefore ensure a step change. A step change is ensured if, as a result of the State intervention, the following conditions are fulfilled: (a) the deployment of the State-funded fixed or mobile network represents a significant new investment ⁽⁷²⁾; and (b) the State-funded network brings significant new capabilities to the market in terms of availability, capacity, speeds ⁽⁷³⁾ and competition of broadband services.
98. The performance of the State-funded network must be compared to the highest performance of the existing network(s). Credible investment plans must be taken into account for the assessment of the step change only if they would, on their own, provide similar performances to that of the planned State-funded network in the target areas within the relevant time horizon.

5.2.3.1 Step change – Fixed access networks

99. As regards State aid to fixed access networks, the presence of a step change is assessed based on a distinction between the types of target areas, depending on the presence of fixed ultrafast networks.

5.2.3.1.1 White and grey areas

100. White areas are areas where no fixed ultrafast network is present or credibly planned in the relevant time horizon.
101. Grey areas are areas where only one fixed ultrafast network is present or credibly planned in the relevant time horizon.
102. In white and grey areas, to achieve a step change, State intervention must both:
- (a) at least triple the download speed compared to the existing network;
 - (b) represent a significant new infrastructure investment bringing significant new capabilities to the market ⁽⁷⁴⁾.

5.2.3.1.2 Mixed areas (white and grey)

103. In principle, the planned intervention should be designed so that the entire target area is either white or grey.

⁽⁷²⁾ For instance, in the case of fixed networks, marginal investments related merely to the upgrade of the active components of the network should not be considered eligible for State aid. Similarly, although certain copper enhancing technologies (such as vectoring) could increase the capabilities of the existing networks, they may not require significant investments in new networks, hence should not be eligible for State aid. For mobile networks, in certain circumstances Member States may demonstrate that investments in active equipment may play an important role and that public support may be justified if the investment does not consist of merely incremental upgrades but constitutes an integral part of a significant new investment in the network, provided that all compatibility conditions are complied with. See for instance Commission Decision C(2021) 9538 of 10 January 2022, case SA.57216 Mobile coverage in rural areas in Galicia (OJ C 46, 28.1.2022, p. 1).

⁽⁷³⁾ The subsidised network must provide services at the speed needed to fulfil the step change requirement. However, in addition to the speed needed to fulfil the step change requirement operators of a subsidised network may also offer services of a lower quality.

⁽⁷⁴⁾ This is for example the case when the new network significantly extends the fibre from the core of the network toward the edge of the network, for instance: (i) the deployment of fibre to the base stations to support the deployment of fixed wireless access networks; (ii) the deployment of fibre to the cabinets where the cabinets were not previously connected to a fibre network; (iii) the increase (deepening) of the fibre in cable networks.

104. However, for reasons of efficiency, when it is not justified to dissociate white and grey areas, Member States may select target areas that are partly white and partly grey. In such areas, where some end users are already served by one fixed ultrafast network (or will be in the relevant time horizon), the Member State must ensure that the State intervention does not lead to an undue distortion of competition as regards the existing network.
105. An appropriate solution may consist of allowing a limited overbuilding of the existing fixed ultrafast network that connects end users in the grey area that is part of the mixed area. In such situations, the entire target area may be treated as white for the purposes of assessing the State intervention, provided that the Member State demonstrates that the following conditions are fulfilled:
- (a) the overbuilding does not create undue distortions of competition, based on the results of a public consultation;
 - (b) the overbuilding is limited to maximum 10 % of all premises in the target area;
 - (c) the step change requirements set out in Section 5.2.3.1.1 for white areas are fulfilled and the State-funded network provides substantially better services than the ones available in the grey part of the mixed area. The step change requirements set out in Section 5.2.3.1.1 for grey areas do not have to be fulfilled.
106. The Commission will assess the appropriateness of interventions in mixed areas on a case-by-case basis.

5.2.3.1.3 Black areas

107. Black areas are areas where at least two fixed ultrafast networks are present or credibly planned in the relevant time horizon.
108. Provided that the State intervention complies with the conditions set out in Section 5.2.2.1, the State-funded network must satisfy all the following conditions:
- (a) at least triple the download speed compared to the existing network;
 - (b) provide a download speed of at least 1 Gbps and an upload speed of at least 150 Mbps;
 - (c) represent a significant new infrastructure investment bringing significant new capabilities to the market ⁽⁷⁵⁾.

5.2.3.2 Step change – Mobile access networks

109. A State-funded mobile network must ensure a step change in terms of mobile services' availability, capacity, speeds and competition that may foster the adoption of new innovative services ⁽⁷⁶⁾.
110. As indicated in Section 2.3.2, the transition to each new IMT standard is generally incremental. Between two full consecutive IMT standards, there are incremental hybrid systems, which are usually more performant than their predecessors. For instance, the 4G LTE cellular communication system surpassed 4G in several aspects and 5G standalone is more performant than 5G non-standalone. Similarly, each new IMT standard has provided new capabilities ⁽⁷⁷⁾. While all IMT standards provide mobile voice services, only the newest IMT standards can provide performant mobile broadband services, including lower latency and higher transmission capacities.

⁽⁷⁵⁾ See footnote 68.

⁽⁷⁶⁾ This may include providing new services that would not have been possible absent the State intervention, such as connected and automated mobility.

⁽⁷⁷⁾ See also footnote 27.

111. As providing new capabilities requires more capacity, new IMT standards require new frequencies. As frequencies are a scarce resource, their assignment in the Union for the provision of mobile services is carried out on the basis of an auction or other competitive selection procedure and is subject to fees. When a new IMT standard is implemented as a result of the spectrum assignment process, it can be expected that mobile networks using this technology will provide significant new capabilities compared to the existing mobile networks. Mobile service providers are only willing to accept significant upfront costs for obtaining new rights of use of spectrum supporting a new IMT standard if they expect that the new IMT standard will offer superior capabilities, which would give them a return on their investment over time. On that basis, the Commission has accepted that the additional features of 4G networks over previous generations amount to a step change ⁽⁷⁸⁾. Similarly, 5G networks, and in particular 5G standalone networks, generally have additional functional capabilities such as ultra-low latency, high reliability and the possibility to reserve part of the network for a particular use and guarantee a certain quality of service. Those features will allow 5G networks, and in particular 5G standalone networks, to support new services (for instance health-monitoring and emergency services, real-time control of factory machines, smart grids for renewable energy management, connected and automated mobility, precise fault detection and quick intervention), thereby ensuring a step change compared to previous mobile generations. Next-generation mobile technologies (such as 6G) are expected to provide more enhanced capabilities in the future.

5.2.3.3 Step change – Backhaul networks

112. A State-funded backhaul network must ensure a step change in comparison to the existing network(s). A step change is ensured if, as a result of the State intervention, the funded backhaul network represents a significant investment in backhaul infrastructure and adequately supports the increasing needs of fixed or mobile access networks. This can be the case where the State-funded backhaul network, in contrast to the existing one(s), is based on fibre or on other technologies that can provide the same level of performance as fibre. Where existing networks are based on fibre or on similarly performant technologies, a step change can be achieved, for instance, by an appropriate dimensioning of the backhaul capacity, which depends on the specific evolving situation in the target areas.
113. If a State intervention covers both backhaul and access (fixed or mobile) networks, the backhaul network must be dimensioned in a way that it can support the needs of the access networks.
114. The Member State should select the most suitable technologies, in accordance with the technological neutrality principle, taking into account the characteristics and needs of the target areas, in particular when fibre-based or similarly performant networks are not technically or economically viable.

5.2.4 Proportionality of the aid

115. Member States must demonstrate that the aid is proportionate to the problem being tackled. They must essentially show that the same change in behaviour would not be obtained with less aid and fewer distortions. Aid is considered proportionate if the amount is limited to the minimum necessary and the potential distortions of competition are minimised, in accordance with the principles set out in this Section.

5.2.4.1 Competitive selection procedure

116. State aid is considered proportionate if its amount is limited to the minimum needed for the supported economic activity to occur.

⁽⁷⁸⁾ See, for instance, Commission Decision C(2020) 8939 final of 16 December 2020, case SA.54684 – Germany – High-capacity mobile infrastructure roll-out in Brandenburg (OJ C 60, 19.2.2021, p. 2).

117. Without prejudice to the applicable public procurement rules, the aid must be granted on the basis of an open, transparent and non-discriminatory competitive selection procedure, in line with the principles of public procurement ⁽⁷⁹⁾. The aid must also respect the principle of technological neutrality, as set out in Section 5.2.4.2.
118. State aid is deemed proportionate and limited to the minimum amount necessary if it is granted through a competitive selection procedure attracting a sufficient number of participants. If the number of participants or the number of eligible bids is not sufficient, the Member State must entrust an independent auditor with the assessment of the winning bid (including cost calculations).
119. Different procedures may be suitable depending on the circumstances. For instance, as regards interventions with a high technical complexity, Member States may choose to engage in a competitive dialogue procedure with potential bidders, aiming to ensure the most appropriate design of the intervention.
120. The Member State must ensure that the most economically advantageous offer ⁽⁸⁰⁾ is selected. For that purpose, the Member State must set objective, transparent and non-discriminatory qualitative award criteria and specify the relative weighting of each criterion in advance.
121. Qualitative award criteria may include, among others, the performance of the network (including its security), the geographical coverage, how future-proof the technological approach is, the impact of the proposed solution on competition (including wholesale access terms, conditions and pricing) ⁽⁸¹⁾, and the total cost of ownership ⁽⁸²⁾.
122. Member States may consider granting additional priority points for criteria pertaining to the climate and environmental performance of the network ⁽⁸³⁾, respectively as regards its climate neutrality characteristics, including its carbon footprint, and the impact of the network on the principle components of natural capital, that is to say air, water, land and biodiversity. Member States may also include obligations for the selected bidder to implement proportionate mitigating measures in case the network may negatively impact the environment.
123. Where the aid is granted without a competitive selection procedure, to a public authority that deploys and manages a broadband network at wholesale level ⁽⁸⁴⁾ directly, or through an in-house entity (direct investment model), the Member State must similarly justify its choice of network and technological solution ⁽⁸⁵⁾.

⁽⁷⁹⁾ Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (OJ L 94, 28.3.2014, p. 65), and Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts (OJ L 94, 28.3.2014, p. 1).

⁽⁸⁰⁾ In line with the public procurement principles.

⁽⁸¹⁾ For instance, network topologies allowing full and effective unbundling should in principle receive more priority points.

⁽⁸²⁾ The total cost of ownership (TCO) is considered, for example, by companies when they are looking to invest in assets. TCO includes the initial investment as well as all direct and indirect costs over the long term. While the amount of initial investment can be easily determined, companies most often seek to analyse all potential costs which they will incur to manage and maintain the asset during its lifespan, which can significantly influence the decision to invest.

⁽⁸³⁾ For instance, of the energy consumption or the life-cycle of the investment and thus use of the Do No Significant Harm criteria as introduced in Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (OJ L 198, 22.6.2020, p. 13).

⁽⁸⁴⁾ The aid beneficiary may be allowed to provide retail services as a 'retailer of last resort' where the market does not ensure the provision of such services. See Commission Decision C(2019) 8069 final of 15 November 2019, case SA.54472 (2019/N) – Ireland – National Broadband Plan (OJ C 7, 10.1.2020, p. 1).

⁽⁸⁵⁾ See Commission Decision C(2018) 6613 final of 12 October 2018, case SA.49614 (2018/N) – Lithuania – Development of Next Generation Access Infrastructure – RAIN 3 (OJ C 424, 23.11.2018, p. 8); Commission Decision C(2016) 3931 final of 30 June 2016, case SA.41647 – Italy – Strategia Banda Ultralarga (OJ C 258, 15.7.2016, p. 4); Commission Decision C(2019) 6098 final of 20 August 2019, case SA.52224 – Austria – Broadband project in Carinthia (OJ C 381, 8.11.2019, p. 7).

124. Any concession or other entrustment by such a public authority or in-house entity to a third party to design, build or operate the network must be allocated through an open, transparent and non-discriminatory competitive selection procedure. The procedure must be in line with the principles of public procurement, be based on the most economically advantageous offer and respect the principle of technological neutrality, without prejudice to the applicable public procurement rules.

5.2.4.2 Technological neutrality

125. The technological neutrality principle requires that State intervention must not favour or exclude any particular technology, both in the selection of beneficiaries and in the provision of wholesale access. As different technological solutions exist, the tender should not favour or exclude any particular technology or network platform. Bidders should be entitled to propose the provision of the required services using or combining whatever technology they deem most suitable. This is without prejudice to the possibility for Member States to determine the desired performance, including the energy efficiency of the networks, before the procedure and to grant priority points to the most suitable technological solution or mix of technology solutions based on objective, transparent and non-discriminatory criteria, in accordance with Section 5.2.4.1. A State-funded network must enable access under fair and non-discriminatory conditions to all access seekers irrespective of the technology used.

5.2.4.3 Use of existing infrastructure

126. The use of existing infrastructure is one of the main factors that can contribute to reducing the cost of deployment of a new broadband network and limiting the impact on the environment.
127. Member States should encourage undertakings willing to participate in a competitive selection procedure to use any available existing infrastructure. Member States should also encourage these undertakings to provide detailed information on the existing infrastructures that they own or control ⁽⁸⁶⁾ in the planned intervention area. That information should be provided in due time to be taken into account when preparing the bids. When proportionate, taking into account among other factors the size of the intervention area, readiness of the information and available time, Member States should make the provision of that information a condition for participation in the selection procedure ⁽⁸⁷⁾. The information may include, in particular: (a) location and route of the infrastructure; (b) the type and current use of the infrastructure; (c) a contact point and (d) where available ⁽⁸⁸⁾, the terms and conditions for its use.
128. Member States must make accessible all information at their disposal ⁽⁸⁹⁾ on existing infrastructure that could be used for rolling out broadband networks in the intervention area. Member states are encouraged to rely on the Single Information Point set up pursuant to Article 4(2) of Directive 2014/61/EU.

⁽⁸⁶⁾ Infrastructure to which they have the right to grant access to third parties.

⁽⁸⁷⁾ See Commission Decision in case SA. 40720 (2016/N) National Broadband Scheme for the UK for 2016-2020 (OJ C 323, 2.9.2016, p. 2), recitals 115 and 116, where the UK authorities required all bidders to sign up to a Code of Conduct. The Code of Conduct included standards for: (i) the level of detail of information that should be provided; (ii) the timeframes in which the information is to be provided; (iii) the acceptable terms of a non-disclosure agreement; and (iv) the obligations to make available the infrastructure for use in other bids. Bidders not meeting the terms of the Code of Conduct would be excluded from the procurement.

⁽⁸⁸⁾ This may notably be the case when such term and conditions already exist as a result of regulatory obligations imposed by national regulatory authorities or other competent authorities under Directive (EU) 2018/1972, when access is foreseen in a previous State Aid Decision or when a commercial wholesale offer is available.

⁽⁸⁹⁾ Access to this information may be limited according to the applicable rules. For instance, access to information concerning physical infrastructure under Directive 2014/61/EU may be limited for reasons of security and integrity of networks, national security, public health or safety, confidentiality or business secrets.

5.2.4.4 Wholesale access

129. Effective wholesale access for third parties to the funded networks is an indispensable condition of any State aid measure. In particular, wholesale access enables third-party undertakings to compete with the selected bidder, thereby strengthening choice and competition in the areas covered by the measure. Wholesale access also avoids the creation of regional service monopolies. By enabling competition to develop in the target area, it also ensures the development of the market in that area in the longer term. That access is not contingent on any prior market analysis within the meaning of Chapter III of Directive (EU) 2018/1972. Nevertheless, the type of wholesale access obligations imposed on a State-funded network should take into account the portfolio of access obligations laid down under the sectoral rules. However, as aid beneficiaries are not just using their own resources but public funds to deploy the network, they should provide a wider range of wholesale access products than those imposed by NRAs on the undertakings having significant market power. Such wholesale access should be granted as early as possible before starting to provide the relevant services and, where the network operator also intends to provide retail services, at least 6 months before the launch of those retail services.
130. The State-funded network must offer effective access under fair and non-discriminatory conditions to undertakings. This may imply the upgrade and increased capacity of existing infrastructure, where necessary, and the deployment of sufficient new infrastructure (for instance, ducts large enough to cater for a sufficient number of networks, and different network topologies) ⁽⁹⁰⁾.
131. Member States must indicate the terms, conditions and prices for the wholesale access products in the documents of the competitive selection procedure and must publish that information on a comprehensive website, at national or regional level. The general public should be allowed to access the website without any restrictions, including prior users' registration.
132. In order to render the wholesale access effective and to enable the access seeker to provide its services, wholesale access must also be granted to parts of the network that have not been State funded or that may not have been deployed by the aid beneficiary ⁽⁹¹⁾.

5.2.4.4.1 Wholesale access terms and conditions

133. Effective wholesale access must be granted for at least 10 years for all active products except virtual unbundled local access (VULA).
134. Access based on VULA must be granted for a period of time equal to the lifespan of the infrastructure for which VULA is a substitute ⁽⁹²⁾.

⁽⁹⁰⁾ This may include, depending on the type of intervention: adequately sized ducts, sufficient number of dark fibres, type and upgrade of poles, masts, towers, type and size of street cabinets to provide effective unbundling etc. See Commission Decision C(2016) 3208 final of 26 May 2016, case SA 40720 (2016/N) – United Kingdom - Broadband Delivery UK (OJ C 323, 2.9.2016, p. 2) and Commission Decision C(2019) 8069 final of 15 November 2019, case SA.54472 (2019/N) – Ireland – National Broadband Plan (OJ C 7, 10.1.2020, p. 1).

⁽⁹¹⁾ For example effective access implies that adequate wholesale access to active equipment is granted even if only infrastructure is financed.

⁽⁹²⁾ As in this particular case, VULA is a substitute for the physical unbundling of a new infrastructure, the same rules as for new infrastructure apply.

135. Access to new infrastructure (such as ducts, poles, cabinets or dark fibre) must be granted for the lifespan of the network element concerned ⁽⁹³⁾. If State aid is granted for new infrastructure, the infrastructure must be large enough to meet access seekers' current and evolving demand ⁽⁹⁴⁾. This is complementary and without prejudice to regulatory obligations that may be imposed by the NRA.
136. Member States must consult NRAs on wholesale access products, conditions and pricing. NRAs are encouraged to provide guidance, as set out in Section 5.2.4.6.
137. The same access conditions must apply to the entire State-funded network, including the parts of the network where existing infrastructure has been used. The access obligations must be enforced irrespective of any change in ownership, management or operation of the State-funded network.
138. If they use their own resources, the aid beneficiary or access seekers connecting to the State-funded network may decide to extend their networks into adjacent areas outside the target area. Access seekers may carry out such extensions on the basis of the wholesale access obligations. If they are not linked to the aid beneficiary, there is no limitation for such extensions into adjacent areas. An access seeker is deemed to be not linked to the aid beneficiary if they are not part of the same group and do not have participation in their respective undertakings. Extensions by the aid beneficiaries can be allowed subject to the following cumulative safeguards:
- (a) when carrying out the public consultation (see Section 5.2.2.4.2), the Member State must indicate that private extensions are permitted at a later stage and provide meaningful information regarding the potential coverage of such extensions;
 - (b) extensions into adjacent areas may only be carried out 2 years after the State-funded network enters into operation, where one of the following situation occurs:
 - (i) in the public consultation, stakeholders demonstrate that the planned extension would risk entering an adjacent area which is already served by at least two independent networks providing speeds comparable to those of the State-funded network;
 - (ii) there is at least one network in the adjacent area providing speeds comparable to those of the State-funded network which entered into operation less than 5 years before the State-funded network enters into operation ⁽⁹⁵⁾.
139. If the results of the public consultation show evidence of risks of other significant distortions of competition, extensions by the aid beneficiary must be prohibited.

5.2.4.4.2 Wholesale access products

5.2.4.4.2.1 Fixed access networks deployed in white areas

140. The State-funded network must provide at least bitstream access, access to dark fibre and access to infrastructure, including street cabinets, poles, masts, towers, and ducts.

⁽⁹³⁾ See Commission Decision C(2019) 8069 final of 15 November 2019, case SA.54472 (2019/N) – Ireland – National Broadband Plan (OJ C 7, 10.1.2020, p.1). Whenever the aid recipient decides to upgrade or replace the infrastructure before the end of lifespan of the aided infrastructure, the aid recipient will have to continue to give access to the new infrastructure for the whole period foreseen for the original infrastructure.

⁽⁹⁴⁾ For instance and depending on the specificity of the network, where new ducts are built to host fibre, they should cater for at least three independent fibre cables each hosting several fibres and therefore able to serve several undertakings. Where existing infrastructure has capacity constraints and cannot provide access to at least three independent fibre cables, based on the principle first-come-first-served, the operator of the State-funded network should make available at least 50 % of the capacity (in particular dark fibres) to access seekers.

⁽⁹⁵⁾ These rules also apply in the case of connections to State-funded backhaul networks or in the case of State-funded mobile network which is subsequently used for the provision of fixed wireless access services in areas which are already covered by a fixed network.

141. In addition, Member States must ensure the State-funded network provides at least either physical unbundling or VULA. To be considered suitable as a wholesale access product, any VULA product must be approved in advance by the NRA or other competent authority.

5.2.4.4.2 Fixed access networks deployed in grey and black areas

142. The State-funded network must provide at least (a) the wholesale access products referred to in paragraph 140; and (b) physical unbundling.

143. Member States may consider it appropriate not to impose the provision of physical unbundling and require the provision of VULA instead. In that case, Member States must indicate their intention to grant a derogation from the obligation to provide physical unbundling and provide the reasons for this choice in the public consultation. Member States must demonstrate that replacing the provision of physical unbundling with the provision of VULA does not risk unduly distorting competition taking into account the result of the public consultation and the characteristics of the market and the area concerned ⁽⁹⁶⁾. On that basis, the Commission will assess whether providing VULA, instead of physical unbundling, ensures that the aid is proportionate.

5.2.4.4.3 Mobile access networks

144. The State-funded network must provide a reasonable set of wholesale access products, considering the characteristics of the market, for ensuring effective access to the subsidised network. This includes at least roaming, and access to poles, masts, towers and ducts. As soon as they become available, the State-funded network will have to provide the access products necessary to exploit the more advanced features ⁽⁹⁷⁾ of mobile networks, such as 5G and future generations of mobile networks ⁽⁹⁸⁾.

5.2.4.4.4 Backhaul networks

145. The State-funded network must ensure at least one active service and access to poles, masts, towers, ducts and dark fibre.

146. Member States must foresee the deployment of sufficient capacity for new infrastructure (for instance, ducts large enough to cater for deployment of fibre to accommodate the expected needs of all access seekers) if necessary to ensure effective access under fair and non-discriminatory conditions.

5.2.4.4.3 Wholesale access on the basis of reasonable demand

147. By way of exception to the conditions set in Section 5.2.4.4.2, Member States may limit the provision of certain wholesale access products to cases of reasonable demand from an access seeker, where the provision of such products would disproportionately increase investment costs without delivering significant benefits in terms of increased competition.

148. In order for the Commission to approve such an exception, the Member State must provide justification on the basis of the characteristics of that specific intervention. The justification should be based on well-reasoned and objective criteria, such as the low-population density of the areas concerned, the size of the target area or the

⁽⁹⁶⁾ Such characteristics may pertain to the applicable *ex ante* regulation in the electronic communications markets, the business model of the operators present on the market (wholesale-only or vertically integrated providers of broadband services), the size of the State aid intervention project, the use of physical unbundling in the Member State concerned, etc.

⁽⁹⁷⁾ Such as Multi-Operator-Access-Network (MORAN), Multi-Operator Core Network (MOCN), network slicing.

⁽⁹⁸⁾ When granting the aid, Member States must ensure that masts and towers are able to ensure that such access can be granted considering the current and evolving market structure.

size of the aid beneficiaries ⁽⁹⁹⁾. The Member State must demonstrate, for each access product that will not be provided, that the provision of that product would result in a disproportionate cost increase of the intervention, on the basis of detailed and objective cost calculations.

149. The access seeker's demand is considered reasonable if (a) the access seeker provides a business plan that justifies the development of the product on the State-funded network; and (b) no comparable access product is already offered in the same geographic area by another undertaking at equivalent prices to those in more densely populated areas ⁽¹⁰⁰⁾.

150. If an access request is reasonable, the additional cost of meeting the access request must be borne by the aid beneficiary.

5.2.4.4.4 Wholesale access pricing

151. When setting prices for the wholesale access products, Member States must ensure that the wholesale access price for each product is based on one of the following benchmarks and pricing principles:

- (a) the average published wholesale prices that prevail in other comparable and more competitive areas of the Member State;
- (b) the regulated prices already set or approved by the NRA for the markets and services concerned;
- (c) costs orientation or a methodology mandated in accordance with the sectoral regulatory framework.

152. The NRA must be consulted on wholesale access products and the terms and conditions for wholesale access, including prices and related disputes, as set out in Section 5.2.4.6.

5.2.4.4.5 Clawback

153. The aid amount for State interventions supporting the deployment of fixed and mobile network is often set on an *ex ante* basis in order to cover the expected funding gap over the lifespan of the aided infrastructure.

154. In that case, as future costs and revenues are generally uncertain, Member States should closely monitor implementation of each State-funded project ⁽¹⁰¹⁾ for the entire lifespan of the aided infrastructure and provide for a clawback mechanism. This mechanism makes it possible to properly consider information that the aid beneficiary was not able to factor into the original business plan when applying for State aid. Factors that may

⁽⁹⁹⁾ For instance, see Commission Decision C(2011) 7285 final of 19 October 2011, case N 330/2010 — France — Programme national «Très Haut Débit» - Volet B (OJ C 364, 14.12.2011, p.2) and Commission Decision C(2012) 8223 final of 20 November 2012, case SA.33671 (2012/N) — United Kingdom — National Broadband scheme for the UK - Broadband Delivery UK (OJ C 16, 19.1.2013, p. 2).

⁽¹⁰⁰⁾ Other conditions may be accepted by the Commission as part of the proportionality analysis in the light of the characteristics of the case and the overall balancing exercise. See for example, Commission Decision C(2011) 7285 final of 19 October 2011, case N 330/2010 — France — Programme national «Très Haut Débit» - Volet B (OJ C 364, 14.12.2011, p.2) and Commission Decision C(2012) 8223 final of 20 November 2012, case SA.33671 (2012/N) — United Kingdom — National Broadband scheme for the UK - Broadband Delivery UK (OJ C 16, 19.1.2013, p. 2). If the conditions are fulfilled, access should be granted within a period which is customary for the particular market. In the case of conflict, the aid granting authority should ask the NRA or another competent national body for an advice.

⁽¹⁰¹⁾ This includes individual grants of aid under a State aid scheme.

have an impact on the profitability of the project and that may be difficult, or even impossible, to establish *ex ante* with adequate accuracy are, for example: (a) the actual deployment costs of the network; (b) the actual revenue from the core services; (c) the actual take-up; and (d) the actual revenue from 'non-core' services ⁽¹⁰²⁾.

155. Member States must implement a clawback mechanism for the lifespan of the aided infrastructure if the aid amount of the project is above EUR 10 million. The Member States must set out the rules of that mechanism transparently and clearly in the competitive selection procedure's documentation.
156. A clawback is not necessary where the project is carried out by means of the direct investment model in which a publicly owned, wholesale-only network, is built and operated by a public authority with the sole purpose of granting fair and non-discriminatory access to all undertakings ⁽¹⁰³⁾.
157. As various factors may have a positive or a negative impact on the business plan of the aid beneficiary, the clawback mechanism should be designed in a way to consider and balance two objectives: (a) it should allow the Member State to recover amounts that exceed a reasonable profit ⁽¹⁰⁴⁾; (b) it should not endanger the incentives for undertakings to participate in a competitive selection procedure ⁽¹⁰⁵⁾ and to strive for cost efficiencies (efficiency gains) when rolling out the network. To achieve a good balance between the two objectives, Member States should introduce criteria to incentivise efficiency gains ⁽¹⁰⁶⁾.
158. The incentive amount must be set to a maximum of 30 % of the reasonable profit. Member States should not claw back any extra profit equal to or below that threshold (that is to say, the reasonable profit increased by the incentive amount ⁽¹⁰⁷⁾). Any profit in excess of the threshold must be shared between the aid beneficiary and the Member State, on the basis of the aid intensity resulting from the outcome of the competitive selection procedure ⁽¹⁰⁸⁾.
159. Clawback mechanisms must also take into account profits made from other transactions concerning the State-funded network. For instance, where a company is set up specifically to build or operate the State-funded network, if an existing shareholder of that company sells all or part of its shares in the company

⁽¹⁰²⁾ For instance, a clawback mechanism may help recover profits that are higher than reasonably anticipated, for instance due to: (i) higher than forecast take-up of broadband products resulting in additional profits and a smaller investment gap; and (ii) higher than forecast revenues from non-broadband products resulting in additional profits and a smaller investment gap (for instance revenue from new wholesale access products). See Commission Decision C(2016) 3208 final of 26 May 2016, case SA 40720 (2016/N) – United Kingdom - Broadband Delivery UK (OJ C 323, 2.9.2016, p. 2).

⁽¹⁰³⁾ A clawback mechanism may be necessary in other cases, such as certain public ownership models. See for instance Commission Decision C(2016) 3208 final of 26 May 2016, case SA 40720 (2016/N) – United Kingdom – Broadband Delivery UK (OJ C 323, 2.9.2016, p. 2).

⁽¹⁰⁴⁾ Reasonable profit should be taken to mean the rate of return on capital that would be required by a typical company, taking into account the level of risk specific to the broadband sector and the type of services provided. The required rate of return on capital is typically determined by the weighted average cost of capital ('WACC').

⁽¹⁰⁵⁾ The participation in the competitive selection procedure depends on expected profit and losses. Losses can arise for instance if the bidder has been too optimistic with regard to expected future revenues arising from the provision of broadband services or if unexpected costs materialise. As the aid granting authority does not reimburse any unexpected losses, a tight clawback mechanism on future profits may increase the overall risk for the investor and discourage participation in the competitive selection procedure.

⁽¹⁰⁶⁾ Efficiency gains must not reduce the quality of the service provided.

⁽¹⁰⁷⁾ If the reasonable profit is 10 %, the maximum incentive amount would be 3 %.

⁽¹⁰⁸⁾ For instance, if the reasonable profit is 10 % and the maximum incentive amount of 3 % is applied, the Member States should not recover any profit not exceeding 13 %. If the actual profit is 20 % and the aid intensity is 70 %, the difference in profit from 13 % to 20 % will be shared as follows: 70 % to the Member State and 30 % to the broadband investor.

within 7 years from the completion of the network or within 10 years from the award of the aid, the Member State must recover any amount by which the sales proceeds exceed the price at which the current shareholder would achieve a reasonable profit ⁽¹⁰⁹⁾.

5.2.4.5 Accounting separation

160. To ensure that aid remains proportional and does not lead to overcompensating or cross-subsidising non-aided activities, the aid beneficiary must ensure accounting separation so that the costs for the deployment and the operation and the revenues from the exploitation of the network deployed with State funding are clearly identified.

5.2.4.6 Role of NRAs, National Competition Authorities, national competence centres and Broadband Competence Offices

161. The role of NRAs in designing the most appropriate State interventions in support of broadband networks is particularly important. The NRAs have gained technical knowledge and expertise due to the crucial role assigned to them by sectoral regulation and are best placed to support public authorities with regard to the design of State interventions.

162. Member States are encouraged to systematically involve NRAs in the design, implementation and monitoring of State interventions, and in particular but not limited to, in (a) the identification of target areas (mapping and public consultation), (b) the assessment of the fulfilment of the step change requirements, and (c) the conflict resolution mechanisms, including in the event of disputes in relation to any of those aspects.

163. In view of the particular expertise of NRAs of the national markets, Member States must consult NRAs, which are best placed, with regard to: (a) the wholesale access products, conditions and pricing (Section 5.2.4.4); and (b) the existing infrastructures that are subject to *ex ante* regulation (Section 5.2.4.3). Where the NRA has been vested with the necessary competences for involvement in State interventions for the deployment of broadband networks, the Member State should send the NRA a detailed description of aid measures, at least 2 months prior to a State aid notification to allow the NRA to have a reasonable period of time to provide its opinion.

164. In keeping with best practices, without prejudice to the competences of the NRAs under the regulatory framework, NRAs may issue guidelines for local authorities on, among others, carrying out market analysis and definitions of wholesale access products and pricing. Such guidelines should take into account the regulatory framework and recommendations issued by the Commission ⁽¹¹⁰⁾.

165. In addition to the involvement of NRAs, Member States may also consult National Competition Authorities, for instance to receive advice on how to establish a level playing field for undertakings and to avoid that a disproportionately high share of State funds is earmarked to one undertaking, thereby strengthening a (possibly already dominant) market position ⁽¹¹¹⁾.

⁽¹⁰⁹⁾ For instance, in a case where a shareholder owns 40 % of the shares of the beneficiary company and the net present value (NPV) of the company using the reasonable profit as discount rate is X, if the shareholder sells its shares for a total amount of Y, the Member State must recover $Y - 40 \% * X$ from that shareholder.

⁽¹¹⁰⁾ This would increase transparency, ease the administrative burden on local authorities and could mean that NRAs would not have to analyse each State aid case individually.

⁽¹¹¹⁾ See, for instance, opinion No 12-A-02 of 17 January 2012 from the French Competition Authority relating to a request for an opinion from the Senate's Committee on the Economy, Sustainable Development and Regional Planning concerning the framework for involvement of local authorities in the deployment of very high-speed networks [Avis No 12-A-02 du 17 janvier 2012 de l'Autorité de la concurrence relatif à une demande d'avis de la commission de l'économie, du développement durable et de l'aménagement du territoire du Sénat concernant le cadre d'intervention des collectivités territoriales en matière de déploiement des réseaux à très haut débit].

166. Member States may set up national competence centres such as Broadband Competence Offices that may help public authorities design State intervention supporting the deployment of broadband networks ⁽¹¹²⁾.

5.2.5 *Transparency, reporting, monitoring of the aid*

167. Member States must comply with the requirements laid down in Section 7 on transparency, reporting and monitoring.

5.3 **Negative effects on competition and trade**

168. Aid for the deployment of fixed and mobile networks may have negative effects in terms of market distortions and impact on trade between Member States.

169. The Commission assesses the significance of the distortion of competition and the effect on trade in terms of impact on competitors and possible crowding out of private investments. The public support may also encourage local service providers to take up services offered by the State-funded network rather than those provided on market terms. Additionally, where the aid beneficiary is likely to be an undertaking that is already dominant on a market or may become dominant due to the public investment, the aid could weaken the competitive constraints that competitors can exert. Even where distortions may be considered limited at an individual level, on a cumulative basis, aid schemes might still lead to high levels of distortion.

5.4 **Weighing the positive effects of aid against the negative effects on competition and trade**

170. The Commission will balance the positive effects of the planned aid on the supported economic activities with the actual and potential negative effects on competition and trading conditions. For State aid to be compatible with the internal market, the positive effects must outweigh its negative effects.

171. First, the Commission will assess the positive effects of the aid on the supported economic activities, including its contribution to digital policy objectives. The Member State must demonstrate, based on a counterfactual analysis, that the measure has positive effects compared to what would have happened without the aid. As indicated in Section 5.2.1, positive effects may include achieving the objectives of the State intervention, such as the roll-out of a new network on the market delivering additional capacity and speed as well as lower prices and better choice for end users, and higher quality and innovation. This would also result in more access for end users to online resources and it is likely to stimulate an increase in demand. As a result, this may also contribute to the completion of the Digital Single Market and bring benefits to the Union economy as a whole.

172. In addition, the Commission may also take into account, where relevant, whether the aid brings about other positive effects, for instance improvements in the energy efficiency of network operations, or Union policies such as the European Green Deal.

173. Second, Member States must demonstrate that the negative effects are limited to the minimum necessary. When designing the measure taking into account the necessity, appropriateness and proportionality of the aid (Sections 5.2.2, 5.2.3. and 5.2.4), the Member States should take into account, for example, the size of projects, the individual and cumulative aid amounts, the characteristics of the beneficiaries (for instance whether they

⁽¹¹²⁾ See, for instance, Commission Decision K(2008) 6705 of 5 November 2008, case N 237/08 – Germany – Broadband support in Niedersachsen (OJ C 18, 24.1.2009, p. 1); Commission Decision C(2012) 8223 final of 20 November 2012, case SA.33671 (2012/N) – United Kingdom – National Broadband scheme for the UK - Broadband Delivery UK (OJ C 16, 19.1.2013, p. 2) and Commission Decision C(2016) 3208 final of 26 May 2016, case SA.40720 (2016/N) – United Kingdom - Broadband Delivery UK (OJ C 323, 2.9.2016, p. 2).

have significant market power) and the characteristics of the targeted areas (for instance the number of performant existing or credibly planned networks in a given area). In order to enable the Commission to assess the likely negative effects, Member States are encouraged to submit any impact assessment at their disposal as well as *ex post* evaluations carried out for similar predecessor schemes.

6. Compatibility assessment of take-up measures

174. The availability of a broadband network is a prerequisite for the possibility to subscribe to broadband services. However, this could, in some cases, be insufficient to ensure that end users' needs (referred to notably in paragraphs 53 and 61) will be satisfied and the benefits for society as a whole will materialise.
175. The reason for that may be the end users' relatively low propensity to subscribe to broadband services. Such low propensity may be due to various reasons, including: (a) the economic impact of the cost of subscribing to broadband services for end users in general or for certain categories of end users in precarious situations; and (b) the lack of awareness of the benefits that the subscription to broadband services will bring.
176. Demand-side measures, such as vouchers, are designed to reduce the costs for end users and may be useful to remedy a specific market failure in terms of take-up of available broadband services. Widespread and affordable access to connectivity generates positive externalities because of its ability to accelerate growth and innovation in all sectors of the economy. Where it is not possible to ensure affordable access to satisfactory broadband services due to, for instance, high retail prices, State aid may remedy such a market failure. In such cases, granting State aid may produce positive effects.
177. Vouchers do not amount to aid to end users, including individual consumers, if those end users do not carry out an economic activity falling within the scope of Article 107(1) of the Treaty. However, vouchers may amount to aid with regard to end users if the latter carry out an economic activity within the scope of Article 107(1) of the Treaty. Nevertheless, in most cases that aid could fall under the scope of the De Minimis Regulation ⁽¹¹³⁾, considering the limited value of vouchers.
178. The case-law of the Court of Justice of the European Union confirms that where an advantage is granted to end users such as individual consumers that do not carry out an economic activity, it may still amount to an advantage to certain undertakings and may thus constitute State aid under Article 107(1) of the Treaty ⁽¹¹⁴⁾.
179. Vouchers may thus constitute aid to undertakings in the electronic communications sector that will be able to improve or increase their offer of services using the existing broadband networks and thus strengthen their market position to the detriment of other undertakings in the broadband sector. Those undertakings are subject to State aid control, if the advantage they receive exceeds de minimis levels.
180. Voucher measures cannot be provided for areas where there is no network providing the eligible services.

⁽¹¹³⁾ Commission Regulation (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to de minimis aid (OJ L 352, 24.12.2013, p. 1).

⁽¹¹⁴⁾ Judgment of 4 March 2009, *Italy v Commission*, T-424/05, ECLI:EU:C:2009:49, paragraph 108; judgment of 28 July 2011, *Mediaset v Commission*, C-403/10 P, ECLI:EU:C:2011:533, paragraph 81.

6.1 Social vouchers

181. Social vouchers aim to support certain individual consumers to procure or retain broadband services. They can be found compatible with the internal market on the basis of Article 107(2), point (a), of the Treaty, as *'aid having a social character, granted to individual consumers, provided that such aid is granted without discrimination related to the origin of the products concerned'*.
182. To be compatible under Article 107(2), point (a), of the Treaty, social vouchers must be reserved for particular categories of individual consumers whose financial circumstances justify the granting of aid for social reasons (for example, low-income families, students, pupils, etc.)⁽¹¹⁵⁾. To that end, Member States must identify on the basis of objective criteria the categories of consumers that the social voucher schemes intend to target⁽¹¹⁶⁾.
183. Eligible costs may be the monthly fee, the standard⁽¹¹⁷⁾ set-up costs and the necessary terminal equipment for the consumer to access the broadband services. The costs for in-house wiring and some limited deployment in the consumers' private property or in public property in close proximity to the consumers' private property may also be eligible to the extent they are necessary and ancillary to the provision of the service.
184. Social vouchers may be used to subscribe to new broadband services or to retain existing subscriptions ('eligible services').
185. The requirement to avoid any discrimination based on the origin of the products (see paragraph 181) is fulfilled by complying with the technological neutrality principle. Consumers must be able to use social vouchers to procure eligible broadband services from any provider capable of providing them, irrespective of the technology used for providing the service. The social vouchers schemes must ensure equal treatment of all possible service providers and must offer consumers the widest possible choice of suppliers. For that purpose, the Member State must set up an online registry of all eligible service providers or implement an equivalent alternative method to ensure the openness, transparency and non-discriminatory nature of the State intervention. Consumers must have the possibility to consult such information about all undertakings that are able to provide the eligible services. All undertakings capable of providing the eligible broadband services based on objective and transparent criteria (for example, ability to comply with the minimum requirements for the provision of such services), must have the possibility, upon request, to be included in the online registry or in any alternative location chosen by the Member State. The registry (or the alternative location chosen) may also provide additional information to assist consumers, such as the type of services provided by the different undertakings.
186. Member States must carry out a public consultation on the main characteristics of the scheme. The public consultation must last at least 30 days.
187. Member States may implement additional safeguards to avoid possible misuse of social vouchers by consumers, service providers or other beneficiaries involved. For example, in certain circumstances, where only the subscription to new eligible services is subsidised, additional safeguards may be necessary to ensure that social vouchers will not be used to procure broadband services where another member of the same household already has a subscription to an eligible service.

⁽¹¹⁵⁾ See Commission Decisions: C(2020) 8441 final of 4 December 2020, case SA.57357 (2020/N) – Greece – Broadband voucher scheme for students (OJ C 41, 5.2.2021, p. 4); C(2020) 5269 final of 4 August 2020, case SA.57495 (2020/N) – Italy – Broadband vouchers for certain categories of families (OJ C 326, 2.10.2020, p. 9).

⁽¹¹⁶⁾ National rules may provide for various implementation means. For instance, the social voucher schemes may provide for planned payments directly to the consumers or directly to the service provider chosen by the consumers.

⁽¹¹⁷⁾ Standard costs are those that apply to all consumers irrespective of their specific situation.

188. In addition, Member States must comply with the requirements laid down in Section 7 on transparency, reporting and monitoring.

6.2 Connectivity vouchers

189. Connectivity vouchers may be designed for broader categories of end users (for example, connectivity vouchers for consumers or certain undertakings, such as small and medium-sized enterprises) to incentivise the take-up of broadband services that contribute to the development of an economic activity. Such measures can be declared compatible with the internal market on the basis of Article 107(3), point (c), of the Treaty.

190. The Commission will consider such measures to be compatible if they contribute to the development of an economic activity (first condition) without unduly affecting trading conditions to an extent contrary to the common interest (second condition).

6.2.1 *First condition: facilitation of the development of an economic activity*

191. The Commission considers that connectivity voucher schemes that effectively contribute to the take-up of certain broadband services can facilitate the development of a range of economic activities by increasing connectivity and access to broadband services where there is a market failure in the take-up of the relevant services ⁽¹¹⁸⁾.

192. Member States must demonstrate that the connectivity voucher schemes have an incentive effect.

193. Connectivity vouchers should only cover up to 50% of the eligible costs ⁽¹¹⁹⁾. Eligible costs may be the monthly fee, the standard set-up costs and the necessary terminal equipment for the end users to access the broadband services. The costs for in-house wiring and some limited deployment in the end users' private properties or in public property in close proximity to the end users' private properties may also be eligible to the extent they are necessary and ancillary to the provision of the service.

6.2.2 *Second condition: the aid must not unduly affect trading conditions to an extent contrary to the common interest*

194. State aid should be targeted to situations where aid can bring about a material improvement that the market alone cannot deliver, that is to say, where the aid is necessary to address a market failure in the take-up of the relevant broadband services. For instance, if connectivity voucher schemes are not targeted at addressing end-users' needs in terms of take-up (for instance if vouchers are misused for supporting deployment instead of incentivising demand) or do not respect technological neutrality, such schemes would not be an appropriate policy instrument. In such cases, aid in the form of vouchers would unduly affect trading conditions to an extent contrary to the common interest and therefore it is unlikely to be declared compatible with the internal market.

195. Connectivity vouchers cannot be used for maintaining existing services. Vouchers may be used to procure a new service or upgrade the existing one. When the connectivity vouchers can be used to upgrade an existing subscription, Member States must demonstrate that the voucher scheme does not unduly distort competition at retail and wholesale level, for instance that it will not create disproportionate windfalls profits for some operators while being unduly detrimental to other operators.

⁽¹¹⁸⁾ Different means of implementation may be provided for under national rules. For instance, a connectivity voucher scheme may provide for payments directly to the end users or directly to the service provider chosen by the end users.

⁽¹¹⁹⁾ See Commission Decision C(2021) 9549 final of 15 December 2021, case SA.57496 (2021/N) – Italy – Broadband vouchers for SMEs (OJ C 33, 21.1.2022, p.1).

196. Connectivity vouchers must be technologically neutral. End users must be able to use connectivity vouchers to procure eligible broadband services from any provider capable of providing them, irrespective of the technology used for providing the services. The connectivity vouchers schemes must ensure equal treatment of all possible service providers and must offer end users the widest possible choice of suppliers. For that purpose, the Member State must set up an online registry of all eligible service providers or implement an equivalent alternative method to ensure the openness, transparency and non-discriminatory nature of the State intervention. End users must have the possibility to consult such information about all undertakings that are able to provide eligible services. All undertakings capable of providing eligible services, on the basis of objective and transparent criteria (for example, ability to comply with the minimum requirements for the provision of such services), must have the possibility, upon request, to be included in the online registry or in any alternative location chosen by the Member State. The registry (or the alternative location chosen) may also provide additional information to assist end users, such as the type of services provided by the different undertakings.
197. In order to minimise market distortions, Member States must carry out a market assessment to identify the eligible providers present in the area and collect information to calculate their market share. The market assessment must determine whether the connectivity voucher scheme could give a disproportionate advantage to some providers to the detriment of others possibly reinforcing (local) market dominance. The market assessment must also determine the actual need to implement a connectivity voucher scheme by comparing the situation in the intervention area(s) with the situation in other areas of the Member State or the Union. Trends in take-up by end users may also be looked at to assess and decide on the voucher scheme.
198. Member States must carry out a public consultation on the main characteristics of the scheme. The public consultation must last at least 30 days.
199. To be eligible, when a provider of broadband services is vertically integrated and has a retail market share above 25 %, it must offer, on the corresponding wholesale access market, wholesale access products on the basis of which any access seeker will be able to provide the eligible services under open, transparent and non-discriminatory conditions. The wholesale access price must be set in accordance with the principles in Section 5.2.4.4.4.
200. To limit negative effects on competition, the duration of a connectivity voucher scheme must in principle not exceed 3 years ⁽¹²⁰⁾. The validity of the vouchers for individual end users must not exceed 2 years.
201. In addition, Member States must comply with the requirements laid down in Section 7 on transparency, reporting and monitoring.

7. Transparency, reporting, monitoring

7.1 Transparency

202. Member States must publish the following information in the Commission's transparency award module ⁽¹²¹⁾ or on a comprehensive State aid website at national or regional level:
- (a) the full text of the decision approving the aid scheme or the individual aid, and its implementing provisions, or a link to it;
 - (b) information on each individual aid award exceeding EUR 100 000, in accordance with Annex II.

⁽¹²⁰⁾ In exceptional circumstances, subject to the Commission's assessment, a connectivity voucher measure may be prolonged if duly justified, provided that it does not unduly affect trading conditions to an extent contrary to the common interest.

⁽¹²¹⁾ 'State Aid Transparency Public Search', available at: <https://webgate.ec.europa.eu/competition/transparency/public?lang=en>.

203. The information referred to in paragraph 202(b), must be published within 6 months from the date of award of the aid, or, for aid in the form of tax advantages, within 1 year from the date that the tax declaration is due ⁽¹²²⁾.
204. Member States must organise their comprehensive State aid websites, as referred to in paragraph 202, in such a way as to allow easy access to the information. For aid that is unlawful but subsequently found to be compatible, Member States must publish the information within 6 months from the date of the Commission's decision declaring the aid compatible.
205. To enable the enforcement of State aid rules under the Treaty, the information must be available for at least 10 years from the date on which the aid was granted. The information must be published in a non-proprietary spreadsheet data format, which allows data to be effectively searched, extracted, downloaded and easily published on the internet, for instance in CSV or XML format. The general public must be allowed to access the website without any restrictions, including prior users' registration.
206. The Commission will publish on its website the link to the national or regional State aid website referred to in paragraph 202.

7.2 Reporting

207. Pursuant to Council Regulation (EU) 2015/1589 ⁽¹²³⁾ and Commission Regulation (EC) No 794/2004 ⁽¹²⁴⁾, Member States are required to submit annual reports to the Commission in respect of each aid measure approved under these Guidelines.
208. In addition to the annual reports referred to in paragraph 207, Member States must submit a report to the Commission every 2 years containing key information on the aid measures approved under these Guidelines, in accordance with Annex III.

7.3 Monitoring

209. Member States must maintain detailed records regarding all aid measures. Those records must contain all information necessary to establish that all the compatibility conditions set out in these Guidelines are fulfilled. Member States must maintain those records for 10 years from the date of award of the aid and must provide them to the Commission upon request.

8. Ex post evaluation plan

210. To further ensure that distortions of competition and trade are limited, the Commission may require schemes to be subject to an *ex post* evaluation in order to verify (a) whether the assumptions and conditions which led to the compatibility decision have been realised; (b) the effectiveness of the aid measure in the light of its pre-defined objectives; (c) the impact of the aid measure on markets and competition and that no undue distortive effects arise throughout the duration of the aid scheme that are contrary to the interests of the Union ⁽¹²⁵⁾.
211. *Ex post* evaluation will be required for schemes with large aid budgets, or containing novel characteristics, or when significant market, technology or regulatory changes are foreseen. In any event, *ex post* evaluation will be required for schemes with a State aid budget or accounted expenditure over EUR 150 million in any given year or EUR 750 million over their total duration. The total duration of the schemes includes the combined

⁽¹²²⁾ If there is no formal requirement for an annual declaration, 31 December of the year for which the aid was granted will be considered as the granting date for encoding purposes.

⁽¹²³⁾ Council Regulation (EU) 2015/1589 of 13 July 2015 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 248, 24.9.2015, p. 9).

⁽¹²⁴⁾ Commission Regulation (EC) No 794/2004 of 21 April 2004 implementing Council Regulation (EU) 2015/1589 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 140, 30.4.2004, p. 1).

⁽¹²⁵⁾ See for instance Commission Decision C(2012) 8223 final of 20 November 2012, case SA.33671 (2012/N) – United Kingdom – National Broadband scheme for the UK – Broadband Delivery UK (OJ C 16, 19.1.2013, p. 2).

duration of the scheme and any predecessor scheme covering a similar objective and geographical area, starting from publication of these Guidelines. Given the objectives of the evaluation, and in order not to impose a disproportionate burden on Member States and on smaller aid projects, ex post evaluations are only required for aid schemes the total duration of which exceeds 3 years, starting from publication of these Guidelines.

212. The *ex post* evaluation requirement may be waived with respect to aid schemes that are the immediate successors of schemes covering a similar objective and geographical area that have been subject to an evaluation, delivered a final evaluation report in compliance with the evaluation plan approved by the Commission and have not generated any negative findings. Any scheme where the final evaluation report is not in compliance with the approved evaluation plan must be suspended with immediate effect.
213. The aim of the evaluation is to verify whether the underlying assumptions and conditions for the compatibility of the scheme have been achieved, in particular the necessity and effectiveness of the aid measure in the light of its general and specific objectives. It should also assess the impact of the scheme on competition and trade.
214. As regards aid schemes subject to the evaluation requirement referred to in paragraph 211, Member States must notify a draft evaluation plan, which will form an integral part of the Commission's assessment of the scheme. The plan must be notified:
- (a) together with the aid scheme, if the State aid budget of the scheme exceeds EUR 150 million in any given year or EUR 750 million over its total duration;
 - (b) within 30 working days following any significant change that increases the budget of the scheme to over EUR 150 million in any given year or EUR 750 million over the total duration of the scheme;
 - (c) for schemes not falling under point (a) or (b), within 30 working days following the recording in official accounts of expenditure under the scheme in excess of EUR 150 million in any year.
215. The draft evaluation plan must be in accordance with the common methodological principles provided by the Commission ⁽¹²⁶⁾. Member States must publish the evaluation plan approved by the Commission.
216. The *ex post* evaluation must be carried out by an expert independent from the aid granting authority on the basis of the evaluation plan. Each evaluation must include at least one interim and one final evaluation report. Member States must publish both reports.
217. The final evaluation report must be submitted to the Commission in due time to allow it to assess any prolongation of the aid scheme and at the latest 9 months before its expiry. That period may be reduced for schemes triggering the evaluation requirement in their last 2 years of implementation. The precise scope and arrangements for each evaluation will be set out in the decision approving the aid scheme. The notification of any subsequent aid measure with a similar objective must describe how the results of the evaluation have been taken into account.

9. Final provisions

218. The Commission will apply the principles set out in these Guidelines from the day following that of their publication in the *Official Journal of the European Union*.

⁽¹²⁶⁾ Commission staff working document, Common methodology for State aid evaluation, 28.5.2014, SWD(2014) 179 final, or any of its successors.

219. The Commission will apply the principles set out in these Guidelines to notified aid on which it is called upon to take a decision after the date of publication of these Guidelines in the *Official Journal of the European Union*, even where the aid was notified before that date.
220. In accordance with the Commission notice on the determination of the applicable rules for the assessment of unlawful State aid ⁽¹²⁷⁾, the Commission will apply the rules in force when the aid was granted to unlawful aid. The Commission will apply the principles set out in these Guidelines accordingly if unlawful aid is granted after their date of publication.
221. The Commission proposes to Member States, on the basis of Article 108(1) of the Treaty, the following appropriate measures:
- (a) Member States must amend, where necessary, their existing aid schemes in order to bring them in line with Section 7.1 of these Guidelines within 12 months after their publication in the *Official Journal of the European Union*.
 - (b) Member States should give their explicit unconditional agreement to the appropriate measures (including amendments) proposed in point (a) within 2 months from the date of publication of these Guidelines in the *Official Journal of the European Union*. In the absence of any reply within the 2 months, the Commission will assume that the Member State in question does not agree with the proposed measures.
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⁽¹²⁷⁾ OJ C 119, 22.5.2002, p. 22.

ANNEX I

Mapping of fixed and mobile access networks – best practices referred to in section 5.2.2.4.1 of these guidelines**1. Scope**

This Annex outlines best practices on how to carry out the mapping exercise to support State aid interventions for the deployment of fixed access and mobile access networks.

This Annex aims to help Member States design a transparent methodology to gather and assess information on the availability and performance of networks.

This Annex builds on and complements, for the purposes of State aid, the methodology developed in accordance with Article 22 of Directive (EU) 2018/1972 of the European Parliament and of the Council ⁽¹⁾ and the implementing guidelines of the Body of European Regulators for Electronic Communications (BEREC) on geographical surveys of network deployments ⁽²⁾.

This Annex sets out, for fixed access networks and for mobile and fixed wireless access networks, best practices on:

- (a) the criteria for mapping the performance of the networks;
- (b) the information that the competent public authorities may collect to verify the accuracy of the information provided;
- (c) the additional information about infrastructure that the competent public authorities may request operators to provide in specific situations, when it is duly justified in order to carry out an in-depth assessment ⁽³⁾.

2. Mapping of fixed access networks**2.1. Criteria for mapping the performance of fixed access networks**

Pursuant to paragraph 73(a) of these Guidelines, Member States must assess the performance of networks expressed at least in terms of download and upload speeds that are or will be available to end users under peak-time conditions.

Peak-time conditions as defined in paragraph 19(k) of these Guidelines should be understood as the conditions that exist whenever a minimum of 10 % of the users ⁽⁴⁾ are transmitting concurrently at the nominal peak rate ⁽⁵⁾ provided by the operator to each of them, both downstream and upstream, which correspond to the usual oversubscription ratio definition ⁽⁶⁾.

2.2. Information for verification purposes

To limit risks of opportunistic behaviours by stakeholders and ensure that the information provided is sufficient, consistent, and can be relied on, with a view to avoiding delay to the delivery of services in the target area, the competent public authorities carrying out the mapping exercise may decide to require stakeholders to submit further information regarding their networks for verification purposes.

⁽¹⁾ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (OJ L 321, 17.12.2018, p. 36).

⁽²⁾ BoR (20) 42 and related BoR (21)82.

⁽³⁾ This may be subject to confidential treatment in accordance with national law, as relevant.

⁽⁴⁾ This includes both connected and potential users.

⁽⁵⁾ This is the peak rate included in the end users' contracts.

⁽⁶⁾ The same network infrastructure can provide different performance levels to the end users depending on how many users are being multiplexed in bottleneck links and what their nominal speeds are. Performance depends on the number of users concurrently active (which is higher during peak-time conditions). Such 'statistical multiplexing gain' (minimum 10 % meaning 1:10 activity level) requires also that accurate- enough user traffic distribution models are employed by operators.

The competent public authorities may ask stakeholders to provide the full description of the methodology used to calculate their achievable performance, including, but not limited to:

- (a) the access network technology used (FTTH, FTTB, ADSL, VDSL, VDSL + vectoring, DOCSIS.x, etc.), with full specification of the corresponding standard;
- (b) the topology of the network (for instance P2P or a P2MP), including a simplified graph that reflects the physical layout of the cables/fibres (for instance, a tree topology in a GPON);
- (c) the bottleneck links in the topology of the network, defined as the network segments with larger statistical multiplexing gain, including clear information concerning either (i) the oversubscription ratio used for dimensioning such a link (for instance in the backhaul network) or (ii) the capacity planning exercise performed for such bottleneck links. In any case, the public authority may request a statistical characterization of the achievable speed for an end user (for instance the average or typical speed or probability of achieving the nominal speed to be provided to the end user at any point in time, with indication of the user model assumptions).

2.3. Information for in-depth verification purposes

The competent public authorities may decide to require stakeholders to submit further information on network components and their locations for in-depth verification purposes, for instance to review the methodology used to calculate the performance submitted.

The competent public authorities may thus ask stakeholders to submit further information on the access part of the fixed network, including but not limited to:

- (a) the location of the cabinets and the wiring distance from the cabinet to the household;
- (b) clear information on link-budget calculations (for instance on how the received signal power level is mapped to bit-rates, link-budget margins used etc.). The competent public authorities may ask operators to provide all applicable link-budgets used to design and dimension the network services, with their key parameters, including the description of the methodology followed by the operator to develop the link-budget and the rationale.

3. Mapping of mobile and fixed wireless access networks

3.1. Criteria for mapping the performance of mobile and fixed wireless access networks

For the purpose of this mapping method, the Member State should request stakeholders to calculate their network performance taking into account the following principles:

- (a) use the best industry practices ⁽⁷⁾ considering all the major effects on the wireless signal propagation ⁽⁸⁾;
- (b) base the calculation on a 95 % cell edge probability ⁽⁹⁾ of reaching the declared performance and in any case no less than 95 % probability of reaching the declared performance in each of the grid points considering possible variations of propagation conditions due to random effects and possible variations among the points within the area considered (at address level or on the basis of maximum 100 meter×100 meter grids);

⁽⁷⁾ Best industry practices mean modelling parameters, tools, planning, and error boundaries that are common in planning of wireless communications systems and business, and which can be deemed to be faithful and correct enough by experts in the field if they were to verify the methodology.

⁽⁸⁾ Such as terrain, building, and clutter when predicting the received signal power.

⁽⁹⁾ The 'cell edge probability' means the likelihood that the minimum performance will be met at the ultimate edge of the coverage area (maximum claimed coverage distance in the area considered). The calculation needs to be based on realistic propagation simulations, link-budget calculations, and sufficient margins.

- (c) assume peak-time conditions as follows:
 - (i) for mobile networks, a nominal cell load ⁽¹⁰⁾ not lower than 50 %, or higher in the case of peak-time traffic conditions being significantly higher;
 - (ii) for fixed wireless access networks, the expected realistic peak-time traffic conditions should be used to derive the appropriate cell load for calculations ⁽¹¹⁾;
- (d) provide the performance per end user and based on outdoor antennas. If a receiving antenna is shared among multiple end users, the overall performance should be considered equally shared among end users ⁽¹²⁾;
- (e) provide the performance per technology and per operating frequency in case of coverage with multiple technologies ⁽¹³⁾ and multiple frequencies ⁽¹⁴⁾, considering the bandwidth actually available per frequency. In case of use of unlicensed frequencies, this should be clearly stated.

When providing information to the requesting body, operators should consider in particular:

- (a) the type ⁽¹⁵⁾ of backhaul and its capacity for each base station ⁽¹⁶⁾;
- (b) for fixed wireless access networks, the number of served and of passed premises present in each calculated grid.

3.2. Information for verification purposes

To limit risks of opportunistic behaviours by stakeholders and ensure that the information provided is sufficient, consistent, and can be relied on, with a view to avoiding delay to the delivery of services in the target area, the competent public authorities carrying out the mapping exercise may decide to require stakeholders to submit further information for verification purposes.

The competent public authorities may thus ask stakeholders to provide the full description of the methodology used to calculate their coverage maps, including, but not limited to:

- (a) propagation models and key parameters for propagation simulation;
- (b) general information on network components and in particular on antennas (for instance transmission power, MIMO, antenna site locations);
- (c) key information on link-budget calculation (for instance, how the received signal power level is mapped to bit-rates, link-budget margins used etc.). Stakeholders should provide all applicable link-budgets used to design and dimension the network services, with their key parameters, including also the description of how the stakeholder developed the link-budget and the rationale;
- (d) the location of cell sites;
- (e) characteristics of the backhaul.

⁽¹⁰⁾ The 'cell load' (cell loading) means the average percentage of the resources of a base station that are used by end-users with respect to a certain service.

⁽¹¹⁾ If peak-traffic estimation is not used, the nominal 90 % cell load for fixed wireless access should be used. The higher cell load for fixed wireless access (compared to mobile networks) reflects the expected different usage pattern resulting in higher competition for the use of the shared resources of the serving base station.

⁽¹²⁾ In fixed wireless access, this may be the case for shared rooftop antennas for a multi-dwelling building.

⁽¹³⁾ Technologies include: 3G UMTS and HSPA technologies; 4G LTE or LTE-Advanced technologies; 5G either the 3GPP Release 15 New Radio (NR) non-standalone (with 4G core network) or NR standalone (with a native 5G core network) and further developments (such as 3GPP Release 16). It is recommended that the public authority collects information on the used 3GPP based technologies (at least the 3GPP release levels).

⁽¹⁴⁾ This is to separate sub-6 GHz and mm-wave frequency bands as they are often used for different categories of services.

⁽¹⁵⁾ Fibre optic, carrier grade copper Ethernet, wireless, etc.

⁽¹⁶⁾ In the case of optical fibre connection, this can be normally assumed to be sufficient.

3.3. Information for in-depth verification purposes

The competent public authorities may decide to require stakeholders to submit further information on network components and their locations for in-depth verification purposes, for instance to review the methodology used to calculate the performance submitted. The competent public authorities may thus ask stakeholders to submit further information on their networks, including but not limited to:

- (a) number of transmitters at each site;
 - (b) the ground elevation of such transmitters;
 - (c) number of sectors at each cell site;
 - (d) used technology at transmitters including MIMO-order, available channel bandwidth;
 - (e) the effective isotropic transmission power employed by each transmitter.
-

ANNEX II

Information to be published by Member States pursuant to paragraph 202(b) of these guidelines

The information on individual awards referred to in paragraph 202(b) of these Guidelines must include the following ⁽¹⁾:

- (a) identity of the individual aid beneficiary:
 - (i) name;
 - (ii) aid beneficiary's identifier;
- (b) type of aid beneficiary at the time of application:
 - (i) SME;
 - (ii) large enterprise;
- (c) region in which the aid beneficiary is located, at NUTS level II or below;
- (d) the main sector or activity of the aid beneficiary for the given aid, identified by the NACE group (three-digit numerical code) ⁽²⁾;
- (e) aid element expressed in full in the national currency. For schemes in the form of tax advantage, the information on individual aid amounts ⁽³⁾ can be provided in the following ranges (in EUR million):
 - [0,1-0,5];
 - [0,5-1];
 - [1-2];
 - [2-5];
 - [5-10];
 - [10-30];
 - [30-60];
 - [60-100];
 - [100-250]
 - [250 and over];
- (f) where different from the aid element, the nominal aid amount, expressed in full in the national currency ⁽⁴⁾;
- (g) aid instrument ⁽⁵⁾:
 - (i) grant/interest rate subsidy/debt write-off;
 - (ii) loan/repayable advances/reimbursable grant;

⁽¹⁾ With the exception of business secrets and other confidential information in duly justified cases and subject to the Commission's agreement [Commission communication on professional secrecy in State aid decisions, C(2003) 4582 (OJ C 297, 9.12.2003, p. 6)].

⁽²⁾ Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains (OJ L 393, 30.12.2006, p. 1).

⁽³⁾ The amount to be published is the maximum allowed tax benefit and not the amount deducted each year (for instance in the context of a tax credit, the maximum allowed tax credit shall be published rather than the actual amount which might depend on the taxable revenues and vary each year).

⁽⁴⁾ Gross grant equivalent, or where applicable, the amount of the investment. For operating aid, the annual aid amount per aid beneficiary can be provided. For fiscal schemes, this amount can be provided by the ranges set out point e of this Annex. The amount to be published is the maximum allowed tax benefit and not the amount deducted each year (for instance in the context of a tax credit, the maximum allowed tax credit shall be published rather than the actual amount, which might depend on the taxable revenue and vary each year).

⁽⁵⁾ If the aid is granted through multiple aid instruments, the aid amount shall be specified by instrument.

- (iii) guarantee;
 - (iv) tax advantage or tax exemption;
 - (v) risk finance;
 - (vi) other (please specify);
 - (vii) date of award and date of publication;
 - (viii) objective of the aid;
 - (h) identity of the granting authority or authorities;
 - (i) where applicable, name of the entrusted entity, and the names of the selected financial intermediaries;
 - (j) reference of the aid measure, as stated in the decision approved under these Guidelines.
-

ANNEX III

Information to be provided by Member States pursuant to paragraph 208 of these guidelines

The report referred to in paragraph 208 of these Guidelines must include, for the relevant reporting period, and for each individual project implemented in application of an aid measure approved under these Guidelines, the following information:

- (a) name of the aid beneficiary or beneficiaries;
- (b) the total cost (or estimated total cost) of the project and average cost per premises passed;
- (c) aid amount awarded and aid expenditure;
- (d) aid intensity;
- (e) sources of public financing;
- (f) the coverage rates and numbers prior to and after the State intervention;
- (g) for projects supporting the deployment of broadband networks:
 - (i) date when the network was put in use;
 - (ii) technology deployed on the publicly funded network;
 - (iii) upload and download speeds of services provided;
 - (iv) wholesale access products offered, including conditions for access and prices/pricing methodology;
 - (v) wholesale access products requested on reasonable demand, if applicable, and treatment of such requests;
 - (vi) number of access seekers and service providers using wholesale access products;
 - (vii) retail prices before and after implementation of the measure;
 - (viii) number of premises passed by the publicly funded infrastructure;
 - (ix) take-up rates;
- (h) for project supporting take-up of broadband services, such as voucher schemes:
 - (i) duration of the aid measure;
 - (ii) voucher value(s);
 - (iii) type of eligible subscriptions/services, including in the form of customer devices, as well as in-building wiring and/or drop down cable within a private domain;
 - (iv) take-up rates before and after implementation of the measure and the number of end-users having benefited from the aid measure (by category, for instance individual end-users or SMEs and by type of subscriptions/service supported);
 - (v) number of eligible broadband service providers;

- (vi) number of broadband service providers that have actually benefited from the aid measure;
 - (vii) evolution of the market position of operators by type of subscriptions/services supported, taking into account the relevant infrastructure and technologies (FTTH, FTTC, DOCSIS, FWA, etc.);
 - (viii) wholesale and retail prices before and after implementation of the measure.
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ANNEX IV

Typical interventions for broadband support

In its case practice, the Commission has observed certain funding mechanisms used by several Member States to foster broadband deployment, which typically amount to State aid within the meaning of Article 107(1) of the Treaty. The following description of typical interventions models is illustrative and not exhaustive, as public authorities might develop different ways of supporting broadband deployment or deviate from the models described in the following paragraphs.

1. Gap funding model: In the gap funding ⁽¹⁾ model, Member States ⁽²⁾ support the deployment of fixed or mobile networks by awarding direct monetary grants or subsidies to broadband investors ⁽³⁾ to design, build, manage and commercially exploit a network, taking into account the relevant receipts and a reasonable profit. In the gap funding model, reasonable profit is determined as the rate of return on capital that would be required by an investor, taking into account the level of risk specific to the broadband sector and the type of services provided. The required rate of return on capital is typically determined by the weighted average cost of capital (WACC). In determining what constitutes a reasonable profit, Member States usually introduce incentive criteria relating, in particular, to the quality of service provided and gains in productive efficiency. Any rewards linked to productive efficiency gains are set at a level such as to allow balanced sharing of those gains between the broadband investor and the Member State or the end users. Under the gap funding model, the infrastructure built is usually fully owned by the aid recipient that bears the risks associated with building new infrastructure and attracting sufficient customers.
2. Support in kind model: Member States support fixed or mobile broadband deployment by putting at the disposal of broadband network operators existing or newly built infrastructures. This support takes many forms, with the most recurring being Member States providing broadband passive infrastructure by carrying out civil engineering works (for instance by digging up a road), by placing ducts or dark fibre or giving access to existing infrastructure (for instance ducts, poles or towers).
3. Direct investment model: Member States build a fixed or mobile network and operate it directly through a branch of the public administration or via an in-house operator ⁽⁴⁾. The State-funded network is often operated as a wholesale-only network available to retail broadband services providers on a non-discriminatory basis.
4. Concessionaire model: Member States finance the roll-out of a fixed or mobile broadband network, that remains in public ownership, whereas its operation is offered through a competitive selection procedure to an electronic communication provider to manage and commercially exploit it. The network may be run by a broadband network operator to provide only wholesale services or, alternatively, to provide both wholesale and retail services.

⁽¹⁾ 'Gap funding' generally refers to the difference between investment costs and expected profits.

⁽²⁾ This includes any public authority.

⁽³⁾ The term 'investors' denotes undertakings or broadband network operators that invest in the construction and deployment of broadband infrastructures.

⁽⁴⁾ Commission Decision C(2011) 7285 final of 19 October 2011, case N 330/2010 — France – Programme national «Très Haut Débit» - Volet B (OJ C 364, 14.12.2011, p. 2), which covered various intervention modalities, inter alia one in which the collectivités territoriales can operate own broadband networks as a 'régie' operation.

CORRIGENDA

Corrigendum to Commission Regulation (EC) No 1480/2004 of 10 August 2004 laying down specific rules concerning goods arriving from the areas not under the effective control of the Government of Cyprus in the areas in which the Government exercises effective control

(Official Journal of the European Union L 272 of 20 August 2004)

On page 7, in Annex I, title 'Certification of the Turkish Cypriot Chamber of Commerce':

for: 'Council Regulation (EEC) No 2913/93',

read: 'Council Regulation (EEC) No 2913/92'.

On page 8, in Annex II, title 'Declaration by the producer':

for: 'Council Regulation (EEC) No 2913/93',

read: 'Council Regulation (EEC) No 2913/92'.

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