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EU green public procurement criteria for computers, monitors, tablets and smartphones

EU GPP criteria for computers, monitors, tablets and smartphones

1 INTRODUCTION

EU green public procurement (GPP) criteria are designed to make it easier for public authorities to purchase goods, services and works. The criteria are formulated in such a way that they can, if deemed appropriate by the individual authority, be (partially or fully) integrated into the authority's tender documents with minimal editing. Before publishing a call for tender, public authorities are advised to check what goods, services and works are available they plan to purchase on the market where they are operating.

When a contracting authority uses the criteria suggested in this document, it must do so in compliance with EU public procurement laws (see, for instance, Articles 42, 43, 67(2) or 68 of Directive 2014/24 and similar provisions in other EU public procurement laws). Practical information can be found in the 2016 handbook on 'Buying green!' (http://ec.europa.eu/environment/gpp/buying_handbook_en.htm).

This document lists the EU GPP criteria for computers, monitors, tablets and smartphones. An accompanying technical report provides the full rationale for selecting these criteria and gives references for further information.

The criteria are split into selection criteria, technical specifications, award criteria and contract performance clauses. There are two types of criteria:

- ***Core criteria*** *– which are designed to allow for easy application of GPP, focusing on a product's environmental performance and aimed at keeping administrative costs for companies to a minimum*.
- ***Comprehensive criteria*** *– which take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental goals and innovation*.

The formulation 'same for core and comprehensive criteria' is inserted if the criteria are identical for both types.

1.1 Definition and scope

The product group includes:

- **Stationary devices**
  - **Stationary computers**
    - Desktop computers
    - Integrated desktop computers
    - Desktop Thin Clients
    - Desktop workstations (or Workstations)
  - **Computer displays (Monitors)**

- **Portable devices**
  - **Portable computers**
    - Notebook computers
    - Two-in-one notebooks
    - Mobile Thin Clients
    - Mobile workstations
  - **Tablets**
  - **Smartphones**

1.2 General note on verification

A number of criteria can be verified by providing test reports. For each criterion, the relevant test methods are indicated, based on internationally recognised measurement methods and standards. This helps to ensure that the performance claims provided by tenderers are verifiable, repeatable, auditable and, above all, comparable.

It is up to the public authority to decide at which stage such test results should be provided. In general, it does not seem necessary to require all tenderers to provide test results from the outset. To reduce the burden on tenderers and public authorities, a self-declaration could be considered sufficient when submitting bids. Afterwards, there are different options for if and when these tests could be required:

a) At the tendering stage:

For *one-off supply contracts*, the bidder with the most economically advantageous tender could be required to provide this proof. If the proof is deemed to be sufficient, the contract can be awarded. If the proof is deemed to be insufficient or non-compliant then:

i) where the means of verification concerns a technical specification, the proof would be requested from the next highest scoring bidder who would then be considered for the contract;

ii) where the means of verification concerns an award criterion, the additional points awarded would be removed and the tender ranking would be recalculated.

A test report only ensures that a sample product has been tested for certain requirements, not the items actually delivered under the contract. For framework contracts, the situation may be different. This scenario is covered further in the next point on contract execution and in the additional explanations below.

b) During execution of the contract:

Test results could be requested for one or several items delivered under the contract, either in general or if there are doubts about false declarations. This is particularly important for framework contracts which do not stipulate an initial order.

It is recommended to explicitly set contract performance clauses. These clauses should stipulate that the contracting authority is entitled to carry out random verification tests at any time during the term of the contract. If the results of such tests show that the products delivered do not meet the criteria, the contracting authority will be entitled to apply penalties and has the possibility to terminate the contract. Some public authorities specify that if, following the tests, the product meets their requirements, the testing costs have to be borne by the public authority; however, if the requirements are not met, the costs have to be borne by the supplier.

For *framework agreements*, the point at which proof has to be provided will depend on the specific set-up of the contract:

i) For framework agreements with a single operator, where the individual items to be delivered are identified when the framework agreement is awarded, and where it is just a question of how many units will be needed, the same considerations apply as for the one-off supply contracts described above;

ii) For framework agreements that pre-select several potential suppliers with ensuing competitions among those pre-selected, tenderers will only need to show at this initial pre-selection stage that they can deliver items meeting the minimum performance requirements of the framework agreement. For ensuing call-down contracts (or orders) that are awarded following a competition among the pre-selected suppliers, the same considerations apply in principle as under a) and b) above, if the competition includes additional requirements. If the competition is decided only on the basis of price, then a check at the contract execution stage should be considered.

Bidders can also provide verification based on products holding a relevant Type I Ecolabel (according to ISO 14024) fulfilling the specified requirements. Such products should be deemed to comply with the relevant criteria, and verification would be requested following the same approach as has been set out for test results.

Under Article 44 (2) of Directive 2014/24/EU, contracting authorities must accept other appropriate means of proof. This could include a technical dossier prepared by the manufacturer, where the economic operator concerned had no access to test reports or no possibility of obtaining them within the relevant time limits. This is acceptable on the condition that the lack of access was not attributable to the economic operator concerned and that this economic operator proves that the works, supplies or services they provided meet the requirements or criteria set out in the technical specifications, the award criteria or the contract performance conditions. Even if there is a reference to a certificate/test report drawn up by a conformity assessment body responsible for performing the tests, the contracting authorities must also accept certificates/test reports issued by other equivalent assessment bodies.

2 KEY ENVIRONMENTAL IMPACTS

These criteria for computers, monitors, tablets and smartphones focus on the most significant environmental impacts during their life cycle, which have been divided into four distinct categories:

- Product lifetime extension;
- Energy consumption;
- Hazardous substances;
- End-of-life management.

This set of criteria also includes a further category of criteria that apply to separate procurements for refurbished/remanufactured devices and related services.

When setting environmental criteria for these devices, evidence from life cycle assessments suggest that a distinction should be based on the following factors:

- *The energy intensity of their use, meaning:*
  - desktop computers and displays whose electricity consumption has significant environmental impacts, as well as impacts related to the manufacturing of their sub-assemblies;
  - portable devices, such as notebooks, tablets and smartphones which use proportionally less electricity and consist of more advanced miniaturised components; the most significant environmental impacts relate to the manufacturing of their sub-assemblies, such as motherboards, hard drives, batteries and display units.
- *Their ability to be portable, meaning:*
  - stationary devices, such as desktop computers and monitors;
  - portable devices, such as notebooks, tablets and smartphones, which are exposed to conditions and stresses in the workplace or in the outside environment that will influence their lifespan.

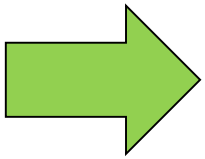
While criteria addressing energy use are familiar to procurers, the potential to directly influence environmental impacts during production is less familiar. By improving product design (e.g. design for durability, repair and upgrading), indirectly extending the lifetime of products by facilitating re-use, the impacts associated with primary production and resource extraction can be avoided and the overall impact during the manufacturing phase can be reduced.

As a result of Life Cycle Assessment (LCA) evidence and market analysis, the criteria pay specific attention to extending a product's lifetime through improved durability, upgradeability and reparability. The criteria draw on evidence about the reasons for early failure or replacement of products, together with manufacturers' specifications for common improvements.

The potential to extend the life of a product beyond its first use has also been addressed by:

- procuring refurbished/remanufactured devices;
- increasing the potential for equipment to be repaired/re-used and therefore given a second life after its service life with a public authority.

Extracting and recovering larger plastic parts, metals and critical raw materials at the end of their life can also increase the EU's resource efficiency and reduce the impact of making new IT products. The criteria therefore reflect the best means of encouraging selective dismantling and disassembly of equipment.

Key environmental aspects		**GPP approach**
• Use of finite resources and critical raw materials to produce IT products. • Air, soil and water pollution, bioaccumulation and effects on aquatic organisms due to raw material extraction and processing, and hazardous substances used in products. • Energy consumption and resulting greenhouse gas emissions from production and use. • Generation of potentially hazardous waste electronic equipment upon final disposal.		• Extended services and warranty. • Design for durability, upgradeability and reparability. • Extending a product's life at the end of its service life (reusability). • Purchase of energy-efficient models. • Purchase of products with a restricted amount of hazardous constituents and reduced potential for hazardous emissions upon disposal. • Design for dismantling and end-of-life management to maximise the recovery of resources. • Purchase of refurbished/remanufactured equipment.

The order of these impacts does not necessarily reflect their magnitude.

Detailed information about the key environmental impacts and the GPP approach can be found in the technical report.

3 CRITERIA STRUCTURE AND APPLICABILITY

The criteria have been divided into four main sections: 1) product lifetime extension, 2) energy consumption 3) hazardous substances, 4) end-of-life management. There is an additional section for horizontal criteria: (5) criteria applicable to refurbished/remanufactured equipment. The following table shows which criteria apply to which product group.

Type of Criterion	No	Criterion	Stationary Computers	Monitors	Mobile Computers	Tablets/ Smartphones
CRITERIA AREA 1 – Product lifetime extension						
1.1 – Reparability, reusability and upgradeability						
SUBJECT MATTER: Service agreement associated with the supply of ICT equipment						
TECHNICAL SPECIFICATIONS	TS1	Provision of an extended service agreement	X	X	X	X
	TS2	Continued availability of spare parts	X	X	X	X
CONTRACT PERFORMANCE CLAUSE	CPC1	Service agreement	X	X	X	X
SUBJECT MATTER: Supply of ICT equipment						
TECHNICAL SPECIFICATIONS	TS3	Manufacturer's warranty	X	X	X	X
	TS4	Design for reparability	X	X	X	X
	TS5	Functionality for secure data deletion	X	N.A.	X	X
1.2 – Rechargeable battery life and endurance						
TECHNICAL SPECIFICATIONS	TS6	Rechargeable battery endurance	N.A.	N.A.	X	X
	TS7	Minimum requirements for electrical performance	N.A.	N.A.	X	X
	TS8	Information on battery state of health	N.A.	N.A.	X	X
	TS9	Battery protection software	N.A.	N.A.	X	N.A.
	TS10	Intelligent charging	N.A.	N.A.	N.A.	X

Type of Criterion	No	Criterion	Stationary Computers	Monitors	Mobile Computers	Tablets/ Smartphones
AWARD CRITERIA	AC1	Further rechargeable battery endurance	N.A.	N.A.	X	X
1.3 – Mobile equipment durability testing						
TECHNICAL SPECIFICATIONS	TS11	Drop testing	N.A.	N.A.	X	X
	TS12	Temperature stress	N.A.	N.A.	X	X
	TS13	Ingress protection level – semi-rugged and rugged devices	N.A.	N.A.	X	X
AWARD CRITERIA	AC2	Mobile equipment durability testing	N.A.	N.A.	X	X
	AC3	Ingress protection level – semi-rugged and rugged devices	N.A.	N.A.	X	X
1.4 – Interoperability and reusability of components						
TECHNICAL SPECIFICATIONS	TS14	Standardised port	X	N.A.	X	X
	TS15	Standardised external power supply	N.A.	N.A.	X	X
	TS16	External power supply: detachable cables	X	N.A.	X	X
	TS17	Backward compatibility: adapters	X	N.A.	X	N.A.
AWARD CRITERIA	AC4	ICT equipment without accessories	N.A.	N.A.	X	X
CRITERIA AREA 2 – Energy consumption						
TECHNICAL SPECIFICATIONS	TS18	Minimum energy performance of computers	X	N.A.	X	N.A.
	TS19	Minimum energy performance of monitors (core and comprehensive)	N.A.	X	N.A.	N.A.
	TS20	Thin Client devices in a server-based network	X	N.A.	N.A.	N.A.
AWARD CRITERIA	AC5	Improvement in energy consumption	X	N.A.	N.A.	N.A.

Type of Criterion	No	Criterion	Stationary Computers	Monitors	Mobile Computers	Tablets/ Smartphones
		above the specified threshold for computers				
	AC6	Improvement in energy consumption above the specified threshold for monitors	N.A.	X	N.A.	N.A.
CRITERIA AREA 3 – Hazardous substances						
SELECTION CRITERIA	SC1	Restricted substance controls	X	X	X	X
TECHNICAL SPECIFICATIONS	TS21	Restriction of chlorinate and brominate substances in plastic parts	X	X	X	X
AWARD CRITERIA	AC7	Restriction of Substances of Very High Concern	X	X	X	X
	AC8	Avoidance of regrettable substitution	X	X	X	X
CRITERIA AREA 4 – End-of-life management						
4.1 – Design for recycling						
TECHNICAL SPECIFICATIONS	TS22	Marking of plastic casings, enclosures and bezels	X	X	N.A.	N.A.
AWARD CRITERIA	AC9	Recyclability of plastic casings, enclosures and bezels – separable inserts and fasteners	X	X	N.A.	N.A.
	AC10	Recyclability of plastic casings, enclosures and bezels – paints and coatings	X	X	N.A.	N.A.
4.3 – End-of-life management						
SUBJECT MATTER: Procurement of end-of-life management services for all ICT devices						
TECHNICAL	TS23	Secure computer collection, sanitisation,	X	X	X	X

Type of Criterion	No	Criterion	Stationary Computers	Monitors	Mobile Computers	Tablets/ Smartphones
SPECIFICATIONS		re-use and recycling				
CONTRACT PERFORMANCE CLAUSE	CPC2	Reporting on the end destination of ICT equipment	X	X	X	X
CRITERIA AREA 5 – Refurbished/remanufactured products (separate procurement route)						
SUBJECT MATTER: Supply of refurbished/remanufactured ICT equipment						
SELECTION CRITERIA	SC2	Quality of refurbishment/remanufacture process	X	X	X	X
TECHNICAL SPECIFICATIONS	TS24	Provision of an extended service agreement	X	X	X	X
	TS25	Refurbished/remanufactured product warranty	X	X	X	X
	TS26	Information on rechargeable battery endurance	N.A.	N.A.	X	X
	TS27	Minimum requirements for electrical performance	N.A.	N.A.	X	X
AWARD CRITERIA	AC11	Further rechargeable battery endurance	N.A.	N.A.	X	X
	AC12	Standardised external power supply	N.A.	N.A.	X	X
	AC13	External power supply: detachable cables	N.A.	N.A.	X	X
SUBJECT MATTER: Service agreement associated with the supply of refurbished/remanufactured ICT equipment						
TECHNICAL SPECIFICATIONS	TS28	Provision of an extended service agreement	X	X	X	X
CONTRACT PERFORMANCE CLAUSE	CPC3	Service agreement	X	X	X	X

4 EU GPP CRITERIA AREA 1: PRODUCT LIFETIME EXTENSION

4.1 Reparability, reusability and upgradeability

4.1.1 Service agreement associated with the supply of ICT equipment

Subject matter
Service agreement associated with the supply of ICT equipment

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS1 Provision of an extended service agreement	
Applicable to all categories of devices except refurbished/remanufactured devices. *For refurbished/remanufactured devices, see criterion TS28.* The tenderer must provide X years *[minimum 2, to be defined]* of services as detailed in the Service Level Requirements document (see the explanatory note below). **Verification:** The tenderer must provide a written declaration that the products supplied will be warranted in conformity with the contract specifications and the related service level agreement.	*Applicable to all categories of devices except refurbished/remanufactured devices.* *For refurbished/remanufactured devices, see criterion TS28.* The tenderer must provide X years *[minimum 3, to be defined]* of services as detailed in the Service Level Requirements document (see the explanatory note below). **Verification:** The tenderer must provide a written declaration that the products supplied will be warranted in conformity with the contract specifications and the related service level agreement.
Explanatory note: Examples of service level requirements A Service Level Requirements document describes how the service should be delivered to the customer. Examples of possible service level requirements to be included are listed below: • Access to the manufacturer's warranty: register the manufacturer's warranty; manage any documentation or proof required to invoke the	

manufacturer's warranty; invoke the manufacturer's warranty on behalf of a public administration (during the manufacturer's warranty); follow up with the manufacturer to ensure that the terms of the manufacturer's warranty are met.

- Pick-up and return: pick up the product(s) from a specified location on the public administration's premises and return it/them to a specific location on the public administration's premises *(alternative options for convenient return of products can also be specified)*.
- Management of failures: provide an efficient single point of contact for technical issues and escalations of problems, a person responsible for following the progress of the case, reports on progress, transparent access to a warranty database (whoever manages this warranty data) to verify warranty status, and incident status for open incidents.
- Access to diagnostic and repair tools: access to all technical tools necessary to perform hardware diagnostics and corrections; access to any technical training required to become a certified repair technician; possibility, through non-exclusivity, to become a certified technical partner (perform warranty repairs).
- Battery coverage: the service explicitly covers battery defects for applicable products with rechargeable batteries, such as failure to charge or a faulty battery connection. A progressive drop in battery capacity due to usage must not be considered a defect unless it is covered by the battery replacement policy in the bullet below.
- Battery replacement policy: the service covers the replacement of batteries that do not fulfil minimum performance conditions related to endurance in terms of number of cycles.
- Provision of failure statistics: provision of high-level, aggregated, anonymous and non-traceable statistics on incident types (nature and quantity), problems and diagnostics concerning the products within the scope of the contract.
- Incident management/problem management/preventive maintenance: this service includes all the operations necessary to maintain the ICT products in perfect working order, or to restore a defective product or one of its components to perfect working order, including incident management, problem management and preventive maintenance. Preventive maintenance during the warranty period includes ensuring OS (operating system) and security updates for the duration of the contract.
- Upgrading: a scan for upgrading possibilities and needs can take place after a certain period (e.g. 3 years) and cover performance aspects like CPU/Memory/Disk.
- Repair/replacement activities: repair or replace any products which become damaged or defective in the course of normal use during the extended warranty period with products which have identical or better performance characteristics. Breakdowns related to firmware are also covered. If part of an item is replaced, the replacement part must be covered by the same level and duration of extended warranty as the part that has been replaced. The extended warranty applies to both hardware and software, unless explicitly agreed otherwise.

• Commitment to repair/upgrade as first remedy: in the event of failures and, whenever technically feasible, the service provider commits to provide the option of repairing/upgrading the equipment instead of substituting it.	
TS2 Continued availability of spare parts	
Applicable to all categories of devices except refurbished/remanufactured devices. *This criterion is not relevant if the availability of spare parts is already ensured under TS1.* The tenderer must guarantee the availability of spare parts (critical components), including as a minimum[1] those identified in criterion TS4, for X years [*minimum 2, to be defined]* from the date of purchase. The spare parts/replacement components can be: • a like-for-like used part; • a new or used OEM (original equipment manufacturer) part that conforms to specifications; • an after sales (third-party) part that conforms to specifications. All critical components identified must be: • available to be purchased; • or replaced by a service network for repair and maintenance. The tenderer must provide a price list for original or compatible spare parts and indicative labour costs for their replacement, including rechargeable batteries (if applicable). **Verification:** The tenderer must provide a declaration that the requested spare parts will	*Applicable to all categories of devices except refurbished/remanufactured devices.* *This criterion is not relevant if the availability of spare parts is already ensured under TS1.* The tenderer must guarantee the availability of spare parts (critical components), including as a minimum[1] those identified in criterion TS4, for X years [*minimum 3, to be defined]* from the date of purchase. The spare parts/replacement components can be: • a like-for-like used part; • a new or used OEM part that conforms to specifications; • an after sales (third-party) part that conforms to specifications. All critical components identified must be: • available to be purchased; • or replaced by a service network for repair and maintenance. The tenderer must provide a price list for original or compatible spare parts and indicative labour costs for their replacement, including rechargeable batteries (if applicable). **Verification:** The tenderer must provide a declaration that the requested spare parts will be available for X years [*minimum 3, to be defined]* for each model

1 Additional critical components could be identified by the contracting authority at the tendering stage.

be available for X years [*minimum 2, to be defined]* for each model provided. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	provided. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
CONTRACT PERFORMANCE CLAUSE	
Core criteria	**Comprehensive criteria**
CPC1 Service agreement	
To be used in conjunction with criterion TS1 on provision of an extended service agreement. The tenderer must provide periodic *[monthly/annual]* reporting on their compliance with all the metrics, Key Performance Indicators (KPIs) and other indicators defined by the service level agreement.	
Explanatory note: Examples of Key Performance Indicators • Aggregate KPI 1 – Incident solved: number of incidents resolved within the incident resolution time during a month / total number of incidents opened during the given month or opened during a previous month and still pending. Monthly target: ≥90%. • Aggregate KPI 2 – Commitment to repair as first remedy: number of incidents resolved within a product repair or upgrade / number of incidents resolved within a product replacement.	

4.1.2 Supply of ICT equipment

Subject matter
Supply of ICT equipment

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS3 Manufacturer's warranty	
Applicable to all categories of devices except refurbished/remanufactured	*Applicable to all categories of devices except refurbished/remanufactured*

devices. For *refurbished/remanufactured devices, see criterion TS24.* The tenderer must provide products covered by X years [*minimum 2, to be defined]* of the manufacturer's warranty. **Verification:** The tenderer must provide written evidence of the manufacturer's warranty. Equipment holding a Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	*devices.* *For refurbished/remanufactured devices, see criterion TS24.* The tenderer must provide products covered by X years [*minimum 3, to be defined]* of the manufacturer's warranty. **Verification:** The tenderer must provide written evidence of the manufacturer's warranty. Equipment holding a Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
TS4 Design for reparability	
Applicable to all categories of devices except refurbished/remanufactured devices. The tenderer must ensure that joining or sealing techniques for the products supplied do not prevent the repair and replacement of the parts (critical components) listed below: • Notebooks: Battery, Display panel/Display assembly, Storage (SSD, HDD, RAM), External/internal PSU, Keyboard, System/motherboard • Desktops: CPU, GPU (PCIe), External/internal PSU, Storage (SSD, HDD, ODD, RAM), System/motherboard • All-in-one PCs: External/internal PSU, Storage (SSD, HDD, ODD, RAM), System/motherboard • Tablets: Battery, Display panel/Display assembly, External/internal PSU • Smartphones: Battery, Display panel/Display assembly, Charger • Computer displays: Connectivity cables, Power cables, External PSU Note 1: On-board soldered CPUs are excluded from the critical component list.	*Applicable to all categories of devices except refurbished/remanufactured devices*. The tenderer must ensure that the following parts (critical components) are easily accessible, repairable and replaceable by the use of commercially available tools (class A, B or C, as defined according to EN 45554:2020 – see the explanatory note below): • Notebooks: Battery, Display panel/Display assembly, Storage (SSD, HDD, RAM), External/internal PSU, Keyboard, System/motherboard • Desktops: CPU, GPU (PCIe), External/internal PSU, Storage (SSD, HDD, ODD, RAM), System/motherboard • All-in-one PCs: External/internal PSU, Storage (SSD, HDD, ODD, RAM), System/motherboard • Tablets: Battery, Display panel/Display assembly, External/internal PSU • Smartphones: Battery, Display panel/Display assembly, Charger • Computer displays: Screen assembly and LED backlight, power and control circuit boards

Note 2: A list of mandatory replaceable components for computer displays is set out in Annex II (D. Material efficiency requirements. Point 5. A) of Regulation (EU) 2019/2021. Instructions on how to replace the parts must be provided with a service/repair manual. The manual must include security measures to ensure safe repair, an exploded diagram of the device illustrating the parts that can be accessed and replaced (which could also be provided in the form of a tutorial video), and the tools required. The service/repair manual must be available online, free of charge. **Verification:** The tenderer must provide: • A statement that the applicable parts are replaceable by the end-user and/or a technician. • The service/repair manual with instructions on how to replace the parts through a direct link to the document on the manufacturer's website. • Repair information according to EN 45559:2019 – Methods for providing information relating to material efficiency aspects of energy-related products[2]. Equipment holding a Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	Note 1: On-board soldered CPUs are excluded from the critical component list. Note 2: A list of mandatory replaceable components for computer displays is set out in Annex II (D. Material efficiency requirements. Point 5. A) of Regulation (EU) 2019/2021. Instructions on how to replace the parts must be provided with a service/repair manual. The manual must include security measures to ensure safe repair, an exploded diagram of the device illustrating the parts that can be accessed and replaced (which could also be provided in the form of a tutorial video), and the tools required. The service/repair manual must be available online, free of charge. **Verification:** The tenderer must provide: • A statement that the applicable parts are replaceable by the end-user and/or a technician. • The service/repair manual with instructions on how to replace the parts through a direct link to the document on the manufacturer's website. • Repair information must be provided according to EN 45559:2019 – Methods for providing information relating to material efficiency aspects of energy-related products[2]. Equipment holding a Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

2 According to EN 45559:2019, for end-users, the information to be provided shall be simple, clear and intuitive, easily accessed, visible and readable, and shall be provided in the official languages where the product is sold. Where possible, symbols may replace or support the use of long or complex texts. The communication method should be assessed (if possible) prior to applying it to end-users, and the findings of any existing studies in this area taken into account.

Explanatory note: Classification of tools according to EN45554:2020

According to EN 45554:2020, a part is replaceable by Class A tools if the disassembly is feasible with:

- The use of no tools;
- A tool, or a set of tools, or a set of tools supplied with the product or with the spare part;
- Basic tools as listed in Table A.3 of the standard: Screwdriver for slotted heads, cross recess or for hexalobular recess heads (ISO2380, ISO8764, ISO10664); Hexagon socket key (ISO2936); Combination wrench (ISO7738); Combination pliers (ISO5746); Half round nose pliers (ISO5745); Diagonal cutters (ISO5749); Multigrip pliers (multiple slip joint pliers) (ISO8976); Locking pliers; Combination pliers for wire stripping and terminal crimping; Prying lever; Tweezers; Hammer, steel head (ISO15601); Utility knife (cutter) with snap-off blades; Multimeter; Voltage tester; Soldering iron; Hot glue gun; Magnifying glass.

A part is replaceable by a Class B tool if the disassembly is feasible with the use of a tool, or with a product-specific tool that is listed as part of a method to assess whether a product can be repaired, upgraded and re-used (in the absence of a method defining product-specific tools, this category is void).

A part is replaceable by a Class C tool if the disassembly is not feasible by the use of basic or product-specific tools as defined above, but can be carried out without the use of any proprietary tools.

TS5 Functionality for secure data deletion

(same for core and comprehensive criteria)

Applicable to all categories of devices except computer displays and refurbished/remanufactured devices.

Functionality for secure data deletion must be made available for the deletion of user data contained in all data storage devices of the product (see the explanatory note below). Instructions on how to use this functionality, the techniques used and the secure data deletion standard(s) it supports must be provided in the user manual and/or by a web link to the manufacturer's webpage.

Verification:

The tenderer must provide specifications for the data erasure functionality provided with the product. A relevant reference for compliance can be the NIST 800-88 Revision 1 guidelines, for the level of 'Clear', or equivalent.

Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

Explanatory note: Technical solutions for secure data deletion

Functionality for secure data deletion could be implemented by means of technical solutions such as, but not limited to:

- functionality implemented in firmware, typically in the Basic Input/Output System (BIOS);
- functionality implemented in the software included in a self-contained bootable environment, provided in a bootable compact disc;
- a digital versatile disc or universal serial bus memory storage device included with the product, or in software installable in the supported operating systems provided with the product.

4.2 Rechargeable battery life and endurance

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS6 Rechargeable battery endurance	
Applicable to portable devices (portable computers, tablets and smartphones). *For refurbished/remanufactured devices, see criteria TS24 and TS25.* The tested State of Health of the battery after 300 cycles must be ≥80%. Tests must be carried out according to the standard IEC EN 61960-3:2017. See the explanatory note below for the definitions. **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies according to the IEC EN 61960-3:2017 standard or equivalent. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	*Applicable to portable devices (portable computers, tablets and smartphones).* *For refurbished/remanufactured devices, see criteria TS25 and TS26.* The tested State of Health of the battery must be: • ≥90% after 300 cycles[3], or • ≥80% after 500 cycles. Tests must be carried out according to the standard IEC EN 61960-3:2017 or equivalent. See the explanatory note below for the definitions. **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies according to the IEC EN 61960-3:2017 standard. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

3 Please note that the testing threshold of 300 cycles does not represent the expected endurance, but is a proxy for much longer endurance (e.g. >500 cycles).

Explanatory note: Definition of State of Health (SoH)

State of Health: Current full charge capacity (in mAh) expressed as a percentage of the design capacity (rated capacity).

TS7 Minimum requirements for electrical performance	
	Applicable to portable devices (portable computers, tablets and smartphones). *For refurbished/remanufactured devices, see criterion TS27.* The battery must be compliant with the electrical test acceptance criteria according to the standard IEC EN 61960-3:2017 (see details in Annex I of this document). **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies according to EC EN 61960-3:2017.

TS8 Information on battery state of health

(same for core and comprehensive criteria)

Applicable to portable devices (portable computers, tablets and smartphones).

For refurbished/remanufactured devices, see criterion TS26.

The tenderer must provide the equipment with pre-installed software to determine and monitor the status of the battery/accumulator and allow for the reading of the battery or accumulator's 'state of health' and 'state of charge', as well as the number of 'full charge cycles' already performed from the battery/accumulator and to display these data for the user. See the explanatory note below for the definitions.

The software must also provide tips for users to maximise battery lifespan.

Verification:

The tenderer must provide the specifications and version of the software.

Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

Explanatory note: Definition of charge cycle, State of Charge (SoC) and State of Health (SoH)

- Charge Cycle: One charge cycle is completed when the battery is fully charged from 0% up to 100% and then discharged back down to 0%. This

could be performed by partially charging-discharging the battery multiple times on different SoC levels as long as the total amount of charge-discharge percentage is approximately equal to the nominal capacity.

- State of Charge: The remaining battery capacity expressed as a percentage of full charge capacity (SBS-IF, 1998).
- State of Health: Current full charge capacity (in mAh) expressed as a percentage of the design capacity (rated capacity).

TS9 Battery protection software

(same for core and comprehensive criteria)

Applicable to portable computers.

The tenderer must provide the equipment with pre-installed software to enable a limit on the battery State of Charge (SoC) when the computer is used systematically in grid operation (e.g. to a value ≤80% SoC).

Verification:

The tenderer must provide a written declaration that the products supplied have pre-installed software with the requested features. The specifications and version of the software must also be provided.

Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

TS10 Intelligent charging

	Applicable to tablets and smartphones. The tenderer must provide the equipment with a pre-installed battery management system that includes intelligent charging software able to identify the user's regular charging habits/pattern, stop the charging process before it reaches 100% (e.g. at 80%), and fully charge the device only when needed by the user. **Verification:** The tenderer must provide a written declaration that the products supplied have pre-installed software with the requested features. The specifications and version of the software must also be provided. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC1 Further rechargeable battery endurance	
	Applicable to portable devices (portable computers, tablets and smartphones). *For refurbished/remanufactured devices, see criterion AC11.* Additional points will be awarded if the battery endurance is greater than 500 cycles (with ≥80% capacity retention of the initial rated capacity) proportionally to the additional number of cycles ensured. **Verification:** Tests must be carried out according to the standard IEC EN 61960-3:2017. Tenderers must provide test results obtained by accredited ISO17025 test bodies.

4.3 Mobile equipment durability testing

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS11 Drop testing	
(same for core and comprehensive criteria) *Applicable to portable devices (portable computers, tablets and smartphones).* The equipment must be tested according to the following standards: • IEC 60068 Part 2-31: Ec (Freefall, procedure 1), or • MIL-STD-810H - Method 516.8 – Shock (Procedure IV) with a drop height of 45 cm. *Note: Tests carried out according to the corresponding method in the previous version of the Military Standard 'MIL-STD-810G' can be accepted until*	

the end of 2021 (see Annex II for details). Functional performance requirements in Annex II of this document must be met by the equipment after exposure to the drop test. Alternatively, the device must be provided with cover and protection cases tested for, or designed according to, a robustness standard such as US MIL-STD-810 or equivalent test procedures. **Verification:** The tenderer must provide test reports showing that the model has been tested and has met the functional performance requirements for durability. Testing must be carried out by a test facility accredited according to ISO 17025. Existing tests for the product, carried out to the same or a stricter specification, will be accepted without the need to retest. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	
TS12 Temperature stress	
	Applicable to portable devices (portable computers, tablets and smartphones). The equipment must be tested according to the following standards: • IEC 60068 Part 2-1: A Cold Part 2-2: B Dry Heat, or • MIL-STD-810H Method 501.7 - High temperature - Basic Hot (A2) and Method 502.7 - Low temperature - Basic Cold (C1), with the modified storage/operational temperatures described in Annex II. Functional performance requirements in Annex II of this document must be met by the equipment after exposure to the temperature stress tests. *Note: Tests carried out according to the corresponding method in the previous version of the Military Standard 'MIL-STD-810G' can be accepted until the end of 2021 (see Annex II for details).* **Verification:** The tenderer must provide test reports showing that the model has been tested and has met the functional performance requirements for

	temperature stress. Testing must be carried out by a test facility accredited according to ISO 17025. Existing tests for the product, carried out to the same or a stricter specification, will be accepted without the need to retest. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
TS13 Ingress protection level – semi-rugged and rugged devices	
	Applicable to portable devices (portable computers, tablets and smartphones). *To be included where the expected use is for outdoor working activities or other harsh usage environments and conditions.* The equipment delivered as part of the contract must have passed durability tests carried out according to: • IEC/EN 60529:2013, Degrees of Protection Provided by Enclosures (IP Code), or • MIL-STD-810H 510.7 – Procedure I - Sand and Dust – Blowing Dust and MIL-STD-810H 506.6 – Procedure I Rain. Functional performance requirements in Annex II of this document must be met by the equipment after exposure to the temperature stress tests. The degree of protection provided by enclosures must be classified as level IP54 or higher. *Note: Tests carried out according to the corresponding method in the previous version of the Military Standard 'MIL-STD-810G' can be accepted until the end of 2021 (see Annex II for details).* **Verification:** The tenderer must provide test reports showing that the model has been tested and has met the functional performance requirements for the ingress protection level. Testing must be carried out by a test facility accredited

	according to ISO 17025. Existing tests for the product, carried out to the same or a stricter specification, will be accepted without the need to retest. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

Explanatory note: Degree of protection for IEC/EN 60529:2013

- Degree of protection against solid foreign objects indicated by the first characteristic numeral:
  - IP5x - Ingress of dust is not totally prevented, but dust must not penetrate in such a quantity as to interfere with satisfactory operation of the apparatus or to impair safety;
  - IP6x - No ingress of dust; complete protection against contact.
- Degree of protection against water indicated by the second characteristic numeral:
  - IPx4 - Water splashed against the enclosure from any direction must have no harmful effects;
  - IPx5 - Water is projected in jets against the enclosure from any direction with no harmful effects;
  - IPx6 - Water is projected in powerful jets against the enclosure from any direction with no harmful effects;
  - IPx7 - Ingress of water in quantities causing harmful effects must not be possible when the enclosure is temporarily immersed in water under standardised conditions of pressure and time;
  - IPx8 - Ingress of water in quantities causing harmful effects must not be possible when the enclosure is continuously immersed in water under conditions which must be agreed between the manufacturer and user but which are more severe than for numeral 7.

AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC2 Mobile equipment durability testing	
(same for core and comprehensive criteria) *Applicable to portable devices (portable computers, tablets and smartphones).*	

The applicable tests must be specified in the tender to reflect the conditions of use defined for the product.

Points will be awarded for offers including products that have passed durability tests carried out according to IEC 60068, US MIL-810 or equivalent.

A maximum of x points [to be specified] may be awarded for:

- Accidental drop (x points)
- Resistance to shock (x points)
- Resistance to vibration (x points)
- Screen resilience (x points)
- Temperature stress (x points)

Functional performance requirements and test specifications are provided in Annex II of the criteria document.

Verification:

The tenderer must provide test reports showing that the model has been tested and has met the functional performance requirements for durability.

Testing must be carried out by a test facility accredited according to ISO 17025.

Existing tests for the product, carried out to the same or a stricter specification, will be accepted without the need to retest.

Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

AC3 Ingress protection level – semi-rugged and rugged devices

Applicable to mobile devices (portable computers, tablets and smartphones).

To be included where the expected use is for outdoor working activities or other harsh usage environments and conditions.

Points will be awarded if the products demonstrate that they have reached the following IP Protection Level according to IEC/EN 60529:2013:

- IP65 – 025 X points
- IP66 – 0.5 X points
- IP67 – 0.75 X points
- IP68 – X points

Verification:

The tenderer must provide test reports showing that the model has been tested and has met the functional performance requirements for the ingress protection level.

Testing must be carried out by a test facility accredited according to ISO 17025.

Existing tests for the product, carried out to the same or a stricter specification, will be accepted without the need to retest.

Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

4.4 Interoperability and reusability of components

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS14 Standardised port	
(same for core and comprehensive criteria) *Applicable to all devices except computer displays and refurbished/remanufactured devices.* The equipment delivered as part of the contract must carry at least one standardised USB Type-C™ receptacle (port) for data exchange that is backward compatible with USB 2.0 according to the standard IEC 62680-1-3:2018. If the product does not have a built-in USB Type-C receptacle, then an adapter must be available to be ordered at no additional cost. **Verification:** The tenderer must provide a product manual for each model provided, which must include an exploded diagram of the device illustrating the types of connectors used. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	
Explanatory note: Standardised USB Type-C™ The USB Type-C™ receptacle is defined according to the standard IEC 62680-1-3:2018 - Universal serial bus interfaces for data and power - Part 1-3: Common components - USB Type-C™ Cable and Connector Specification.	

TS15 Standardised external power supply	
	Applicable to all portable devices with a power supply up to 100 W. *For refurbished/remanufactured devices, see criterion AC12.* *This is not applicable to products with Qi (wireless) charging capability (e.g. for strong resistance to immersion in water or to dust, such as industrial computers).* The equipment delivered as part of the contract must carry a USB Type-C™ standardised receptacle (port) for USB Power Delivery (PD) according to the standard EN/IEC 63002:2017. If the product does not have a built-in USB PD receptacle, then an adapter must be available to be ordered at no additional cost. **Verification:** The tenderer must provide a product manual for each model provided, which must include an exploded diagram of the device illustrating the types of receptacles used for power delivery.
Explanatory note: Standardised external power supply Interoperability guidelines for external power supplies are defined according to IEC 63002:2016 - Identification and communication interoperability method for external power supplies used with portable computing devices.	
TS16 External power supply: detachable cables	
	Applicable to all portable devices with a power supply up to 100 W except for refurbished/remanufactured devices. *For refurbished/remanufactured devices, see criterion AC13.* The External Power Supply (EPS) configuration must consist of a USB EPS with a detachable input cable (or one that is integrated in the EPS housing) and a detachable output cable to the ICT device **Verification:**

	The tenderer must provide product documentation for each model provided, which must include an exploded diagram of the device illustrating the main characteristics of the USB EPS.
TS17 Backward compatibility: adapters	
	Applicable to stationary and portable computers. The following adapters [to be selected from the list below] must be available to be procured separately: • USB-C to USB Type-A • USB-C to VGA • USB-C to HDMI • USB-C to RJ45 (Ethernet Port) **Verification:** The tenderer must provide a product specification and a price list for the adapters required.
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC4 ICT Equipment without accessories	
	Applicable to portable computers, tablets and smartphones. Additional points will be awarded if the following accessories are available to be procured separately: • External Power Supply (EPS) • Headphones **Verification:** The tenderer must provide a quotation for the model with and without these accessories and a separate quotation for each one of the accessories.

	The quotation should also outline the process for ordering the accessories.

5 EU GPP CRITERIA AREA 2: ENERGY CONSUMPTION

Subject matter
Supply of ICT equipment

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS18 Minimum energy performance for computers	
(same for core and comprehensive criteria) *Applicable to stationary and mobile computers.* The calculated Typical Energy Consumption (E_{TEC}) for each piece of equipment delivered as part of the contract must be less than or equal to the Maximum E_{TEC} requirement, as described in Annex III of this document. **Verification:** Tenderers must report the Typical Energy Consumption (E_{TEC}) value, based on testing and calculations according to the IEC standard 62623:2012. Products holding a relevant Type I Ecolabel or a label from another labelling scheme fulfilling the specified requirements will be deemed to comply. Alternative test results obtained by accredited ISO17025 test bodies according to the IEC 62623:2012 standard are accepted as proof of compliance.	

<table>
<tr><th colspan="2">TS19 Minimum energy performance for monitors</th></tr>
<tr><td>Applicable to computer displays.

The Energy Efficiency Index for each model delivered as part of the contract must be in the range of Energy Classes A-D as set out in Annex I of Commission Delegated Regulation (EU) No 2019/2013[4].

Verification:

For each model delivered, the tenderer must provide the valid Energy Label issued according to the EU's Energy Labelling framework Regulation (2017/1369).

Products labelled as Class A, B, C or D will be deemed to comply.</td><td>Applicable to computer displays from 31 March 2021.

The Energy Efficiency Index for each model delivered as part of the contract must be in the range of the following classes [A; D] (to be defined by the contracting authority according to the methodology described in the explanatory note below).

Verification:

For each model delivered, tenderers must provide the valid Energy Label issued according to the EU's Energy Labelling framework Regulation (2017/1369).

Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.</td></tr>
<tr><td colspan="2">Explanatory note: Definition of the requested energy classes

The contracting authority should refer to the top two EU energy classes available at the time of the tender, which include at least 25 registered monitor models under the European Product Database for Energy Labelling (EPREL).

As of 31 March 2021, computer monitor suppliers will register their devices in the EPREL Database, before selling them on the European market. Contracting authorities (and consumers) will be able to search the product database for energy labels and product information sheets, including the energy class.

The availability of devices with the requested performance and characteristics can be verified directly through the EPREL Database. Screen diagonal in cm and screen resolution in pixel are examples of the information included in the product information sheet.</td></tr>
<tr><th colspan="2">TS20 Thin Client devices in a server-based environment</th></tr>
<tr><td></td><td>Applicable to Thin Client computers.

This technical specification can be generally taken into consideration in a server-based working environment.</td></tr>
</table>

4 Commission Delegated Regulation (EU) 2019/2013 of 11 March 2019 supplements Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays and repeals Commission Delegated Regulation (EU) No 1062/2010 (Text with EEA relevance.)

	The equipment delivered as part of the contract must be classified as 'Thin Client'. The Typical Energy Consumption (E_{TEC}) for each piece of equipment delivered must be lower than the E_{TEC_MAX} for Thin Clients as calculated in Annex II. **Verification:** Tenderers must report the Typical Energy Consumption (E_{TEC}) value in kWh, based on testing and calculations according to the IEC Standard 62623:2012 and demonstrate compliance with the E_{TEC_MAX} threshold calculated in Annex II for Thin Clients. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC5 Improvement in energy consumption above the specified threshold for computers	
(same for core and comprehensive criteria) *It is recommended to use this criterion in conjunction with criterion TS18 for desktop computers if the products are for graphic-intensive use.* Points will be awarded if the product is more energy-efficient than the E_{TEC_MAX} value required under criterion TS18. A maximum of x points [*to be specified*] may be awarded. Points must be awarded in proportion to the improvement in energy efficiency as follows: • Over 60% lower: x points • 40-59% lower: 0.75x points • 25-39% lower: 0.50x points • 15-24% lower: 0.25x points **Verification:** Tenderers must report the Typical Energy Consumption (E_{TEC}) value, based on testing and calculations according to the IEC Standard 62623:2012. Typical Energy Consumption reported by a valid Energy Star Certificate can be used as proof of compliance.	

AC6 Improvement in energy consumption above the specified threshold for monitors

Applicable to computer displays.

To be used in conjunction with criterion TS19.

Points will be awarded if the product is in an energy class higher than D.

A maximum of x points [*to be specified*] may be awarded. Points must be awarded in proportion to the improvement in energy efficiency class as follows:

Energy efficiency class	Energy Efficiency Index (EEI)	Points
A	EEI < 0.30	x points
B	0.30 ≤ EEI < 0.40	0.66x points
C	0.40 ≤ EEI < 0.50	0.33x points

Verification:

For each model delivered, the tenderer must provide the valid Energy Label issued according to the EU's Energy Labelling framework Regulation (2017/1369).

Applicable to computer displays.

To be used in conjunction with criterion TS19.

Points will be awarded if the equipment delivered as part of the contract is in the highest Energy Label class for registered models of monitors under the product database (EPREL Database) at the time of the tender *[class X, to be defined by the contracting authority]*.

Verification:

For each model delivered, tenderers must provide the valid Energy Label issued according to the EU's Energy Labelling framework Regulation (2017/1369).

6 EU GPP CRITERIA AREA 3: HAZARDOUS SUBSTANCES

Subject matter
Supply of ICT equipment

SELECTION CRITERIA	
Core criteria	**Comprehensive criteria**
SC1 Restricted substance controls	
	Applicable to all relevant product categories except for refurbished/ remanufactured devices. The tenderer must demonstrate use of a framework for Restricted Substance Controls (RSC) along the supply chain for the products to be supplied. Product evaluations according to the RSC should, as a minimum, cover the following areas: • product planning/design; • supplier conformity; • analytical testing. The RSC must at least outline the substances restricted under RoHS and, where relevant, under REACH (Annex XVII) and substances on the REACH Candidate List (see the explanatory note below). Implementation should follow the guidelines in IEC 62476 or equivalent and use the IEC 62474 material declaration database as the basis for identifying, tracking and declaring specific information about the composition of the products to be supplied. Alternatively, IPC1752 can be used to collect declarations from the supply chain. Supplier declarations of conformity with the RSCs must be collected

	and kept up to date for relevant materials, parts and sub-assemblies of the products to be supplied. These may be supported, where appropriate, by supplier audits and analytical testing. The RSC procedures must ensure that product and supplier compliance is re-evaluated when: • restricted substance requirements change; • supplied materials, parts and sub-assemblies change; • manufacturing and assembly operations change. **Verification:** The tenderer must provide documentation describing the system and its procedures and giving proof of its implementation.

Explanatory note: List of substances regulated under RoHS and REACH

The current list of restricted substances under RoHS is defined in the Annex II of the Commission Delegated Directive COMMISSION (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances.

The Annex XVII of the Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH Regulation) contains a list of substances that shall not be manufactured, placed on the market or used unless it complies with the conditions of that restriction. The list of restricted substances is published and periodically updated on the ECHA website: https://echa.europa.eu/substances-restricted-under-reach

The Candidate List of substances of very high concern for Authorisation is published in accordance with Article 59(10) of the REACH Regulation and periodically updated on the ECHA website (https://echa.europa.eu/candidate-list-table).

For substances identified as SVHCs included in the Candidate List, a particular duty to communicate the content of the substances in products applies under Article 33 of the REACH Regulation. This communication should happen along the supply chain without being requested. The same information must also be submitted to ECHA by all suppliers along the supply chain under Article 9(1)(i) of the Waste Framework Directive (https://echa.europa.eu/scip). That information will be publicly available in the Substances of Concern in Products (SCIP) database."

<table>
<tr><th colspan="2">TECHNICAL SPECIFICATIONS</th></tr>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">TS21 Restriction of chlorinate and brominate substances in plastic parts</td></tr>
<tr><td colspan="2">Applicable to all relevant product categories except refurbished/remanufactured devices.

Equipment delivered as part of the contract must contain low halogenated substances in plastic parts that weigh more than 25 grams (5 grams for smartphones). Each plastic part of the device must contain less than 1000 ppm (0.1% weight by weight) of bromine and less than 1000 ppm (0.1% weight by weight) of chlorine.

Applicable exemptions are: printed circuit boards, electronic components, cables and wiring insulation, fans.

Verification:

The tenderer must provide documentation which proves that the requirement has been met by either:
• Test data showing that the part contains less than 1000 ppm chlorine and less than 1000 ppm bromine (test methods used can be IEC 62321-3-1 or IEC 62321-3-2), or
• Documentation based on IEC 62474 or similar (e.g. documents produced according to the Substance Control system, such as analytical testing and suppliers’ conformity assessments).

Where exemptions are used, a declaration by the manufacturer must be provided.

Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.</td></tr>
<tr><td colspan="2">AC7 Restriction of Substances of Very High Concern (SVHC)</td></tr>
<tr><td></td><td>Applicable to all relevant product categories except for refurbished/ remanufactured devices.

Points must be awarded when no substances on the REACH Candidate List are intentionally added above 0.1% (weight by weight) in each of the following sub-assemblies:
• Populated motherboard (including CPU, RAM, graphics units);
• Display unit (including backlighting);</td></tr>
</table>

	• Casings and bezels; • External keyboard, mouse and/or trackpad; • External AC and DC power cords (including adapters and power packs). Compliance must be ensured with the latest version of the REACH Candidate List available at the moment of tendering (see the explanatory note below). **Verification:** The tenderer must provide a declaration of compliance with this criterion. Documentation based on IEC 62474 or similar (e.g. documents produced according to the Substance Control system, such as analytical testing and suppliers' conformity assessments) can be used. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
Explanatory note: Candidate List of substances of very high concern for Authorisation The Candidate List of substances of very high concern for Authorisation is published in accordance with Article 59(10) of the REACH Regulation and periodically updated on the ECHA website (https://echa.europa.eu/candidate-list-table). For substances identified as SVHCs included in the Candidate List, a particular duty to communicate the content of the substances in products applies under Article 33 of the REACH Regulation. This communication should happen along the supply chain without being requested.	
AC8 Avoidance of regrettable substitution	
	This criterion is applicable to relevant products containing plasticisers and flame retardants, except for refurbished/remanufactured devices. Points are awarded if the substitution of plasticisers restricted under RoHS (restriction of hazardous substances) and halogenated flame retardants is based on methods and tools for comparative hazard assessment indicated by the European Chemicals Agency or the OECD

	Substitution and Alternatives Assessment Toolbox. This hazard assessment must apply (as a minimum) to the flame retardants and plasticisers used in plastic parts that weigh more than 25 grams. **Verification:** The alternative plasticisers and flame retardants have to be indicated by name and CAS number. The tenderer must provide evidence that the selected alternative(s) have been assessed by methods or tools for comparative hazard assessment indicated by the European Chemicals Agency (https://echa.europa.eu/assess-compare-and-select-substitution) or the OECD Substitution and Alternatives Assessment Toolbox (http://www.oecdsaatoolbox.org/). Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.

7 EU GPP CRITERIA AREA 4: END-OF-LIFE MANAGEMENT

7.1 Design for recycling

Subject matter
Supply of ICT equipment

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS22 Marking of plastic casings, enclosures and bezels	
	Applicable to stationary computers and computer displays. External plastic casings, enclosures and bezels with a weight greater than 25 grams must be marked in accordance with ISO 11469 and ISO 1043 Section 1 and 4. Plastic parts are exempted from marking in the circumstances described by the explanatory note below. **Verification:** The tenderer must identify the plastic parts by their weight, their polymer composition and their ISO 11469 and ISO 1043 markings. The dimension and position of the marking must be illustrated visually. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
Explanatory note: Plastic marking exemptions Plastic components are exempt from marking requirements in the following circumstances: (i) if the marking is not possible because of the shape or size; (ii) if the marking would impact on the performance or functionality of the plastic component; and	

(iii) if the marking is technically not possible because of the moulding method. For the following plastic components, no marking is required: (i) packaging, tape, labels and stretch wraps; (ii) wiring, cables and connectors, rubber parts and wherever there is not enough appropriate surface area 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.	
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC9 Recyclability of plastic casings, enclosures and bezels - separable inserts and fasteners	
	Applicable to stationary computers and computer displays. Additional points will be awarded if all discrete plastic parts >25 grams do not contain a metal insert or fastener that is moulded-in, inserted by heat or ultrasonically, or glued-in, unless the metal component is either separable by breaking it off from the plastic part or is separable by using commonly available tools. Fan impellers are excluded from this requirement. **Verification:** The tenderer must provide either: 1) documentation showing that the product does not contain a metal insert or fastener that is moulded-in, inserted by heat or ultrasonically, or glued-in; 2) where metal inserts or fasteners are moulded, inserted by heat or ultrasonically, or glued into plastic parts, documentation showing how it is separable by way of breaking it off from the plastic part or by using commonly available tools.

	or 3) a basis for exemption(s) from safety, legal or technical requirements for a metal insert/fastener, if claimed. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
AC10 Recyclability of plastic casings, enclosures and bezels - paints and coatings	
	Applicable to stationary computers and computer displays. Additional points will be awarded if the presence of paints and coatings in the plastic components of the devices does not have a significant impact on the resilience of plastic recyclate produced from these components upon recycling and when tested according to ISO 180 or equivalent (see the explanatory note below). Discrete plastic parts >25 grams must not have an adhesive, coating, paint or finish that is incompatible with recycling. The following are excluded from this requirement: • printed circuit board assemblies and fan impellers; • wires and cables, connectors, electronic components, optical components, acoustic components, ESD components and EMI components; • metal inserts/fasteners required for safety, legal or technical requirements. **Verification:** The compatibility of a surface coating(s) (adhesives, coatings, paints, or finishes) with recycling must be demonstrated through either: 1) test results showing that the surface coating(s) does not lead to more than a 25% reduction in the notched Izod or Charpy impact at room temperature, as measured using ASTM D256, ASTM E23, ISO 180, or

	ISO 179-1; one test result can be representative for multiple parts in the event that the same material is used in the parts and that the worst-case application is tested; or 2) a statement from a minimum of three plastics recyclers individually, or at least one plastics recycler processing plastics from electronics and working under an independent entity (e.g. not contracted/associated with the manufacturer or contracted with a trade organisation), confirming these surface coatings do not negatively impact the recyclability of the plastic; or 3) test results from an independent laboratory. Equipment holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
Explanatory note: Impact on the resilience of plastic recyclate For the purposes of this criterion, a significant impact is defined as a >25% reduction in the notched Izod impact of a recycled resin as measured using ISO 180:2019 Plastics - Determination of Izod impact strength.	

7.2 End-of-life management

Subject matter
Procurement of end-of-life management services for all ICT devices

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS23 Secure computer collection, sanitisation, re-use and recycling	
(same for core and comprehensive criteria) *Procurement of end-of-life management services for all ICT devices.* Tenderers must provide a service for the re-use and recycling of the whole product or of components requiring selective treatment in accordance with Annex VII of the WEEE Directive for equipment that has reached the end of its service life. The service must comprise the following activities: • collection (take back system); • confidential handling and secure data erasure (unless carried out in-house); • functional testing, servicing, repair and upgrading to prepare products for re-use; • the remarketing of products for re-use; • dismantling for component re-use, recycling and/or disposal. In providing the service, they must report on the proportion of equipment prepared or remarketed for re-use and the proportion of equipment prepared for recycling. Preparation for re-use, recycling and disposal operations must be carried out in full compliance with the requirements in Article 8 and Annexes VII and VIII of the (recast) WEEE Directive 2012/19/EU and with reference to the list of components for selective treatment [see the explanatory note below]. **Verification:**	

The tenderer must provide details of the arrangements for collection, data security, preparation for re-use, remarketing for re-use and recycling/disposal. This must include, during the contract, valid proof of compliance by the WEEE handling facilities to be used.

Explanatory note: Component requiring selective WEEE treatment

The following are components requiring selective treatment in accordance with Annex VII of the WEEE Directive:

1) mercury containing components;
2) batteries;
3) printed circuit boards greater than 10 cm^2;
4) plastic containing brominated flame retardants;
5) chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC);
6) external electric cables;
7) polychlorinated biphenyls (PCB) containing capacitors;
8) components containing refractory ceramic fibres;
9) electrolyte capacitors containing substances of concern;
10) equipment containing gases that are ozone depleting or have a global warming potential (GWP) above 15;
11) ozone-depleting gases, which must be treated in accordance with Regulation (EC) No 1005/2009.

CONTRACT PERFORMANCE CLAUSE	
Core criteria	**Comprehensive criteria**
CPC2 Reporting on the end destination of ICT equipment	
(same for core and comprehensive criteria) *To be used in conjunction with criterion TS23.* The contractor must provide a report on the status of the equipment in the inventory once all items have been processed for re-use, recycling or disposal. The report must identify the proportion of items re-used or recycled, and whether they remained in the EU or were exported. For equipment and components recycled in the EU, the following means of proof for the handling facilities must be accepted: • a permit issued by the national competent authority in accordance with Article 23 of Directive 2008/98/EC, or • third-party certification of compliance with the technical requirements of EN 50625-1 or an equivalent compliance scheme. Where equipment and components are exported for re-use or recycling, contractors must provide the following shipment and treatment information: • shipping information for equipment intended for re-use, in accordance with Annex VI of WEEE Directive 2012/19/EU. WEEE that is exported to be treated outside the EU requires third-party certification of compliance with the minimum WEEE requirements laid down in the criterion, or with the technical requirements of EN 50625-1 or an equivalent compliance scheme.	

8 EU GPP CRITERIA AREA 5: REFURBISHED/REMANUFACTURED EQUIPMENT

8.1 Supply of refurbished/remanufactured ICT equipment

Subject matter
Supply of refurbished/remanufactured ICT equipment

SELECTION CRITERIA	
Core criteria	**Comprehensive criteria**
SC2 Quality of refurbishment/remanufacture process	
(same for core and comprehensive criteria) *Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products.* The tenderer must implement quality assurance/quality control procedures to ensure minimum quality of the equipment delivered as part of the contract (see the explanatory note below). Quality assurance and control procedures must cover, as a minimum, the following steps: • Inspection • Reprocessing (e.g. repair, replace or upgrade) if needed • Cleaning • Testing • Storage • Packaging and Transport **Verification:** The tenderer must provide details of the quality assurance/quality control procedures established to ensure the quality of the equipment delivered as part of the contract.	

Third-party certified management systems for refurbishment/remanufacturing according to the following standards (or equivalent) can be accepted as proof of compliance:

- Quality and environmental management systems according to ISO 9001 and ISO 14001/EMAS, including quality assurance/quality control procedures for the steps mentioned above.
- BS 8887- 220:2010 - Design for manufacture, assembly, disassembly and end- of- life processing (MADE). The process of remanufacture. Specification (applicable to remanufacture processes).
- BS8887-240:2011 - Design for manufacture, assembly, disassembly and end-of-life processing (MADE). Reconditioning (applicable to refurbished/reconditioned equipment).
- EN50614:2020 in case the equipment was previously discarded as WEEE, which has been prepared for re-use for the same purpose for which it was conceived.

Explanatory note: Quality assurance levels

The procurer should establish minimum quality requirements as per the examples below:

- Aesthetic grade: no sign of aesthetic damage should be visible to more than 20 cm.
- Original factory settings: the products must be restored to their original factory settings and must be fully unlocked for use.
- Products must be upgradeable to the latest firmware supported by the OEM (where applicable and technically feasible).

An instruction manual must be provided. In the absence of physical instruction manuals, a link or reference to the manufacturer's instruction manual should be included, when possible.

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS24 Refurbished/remanufactured product warranty	
Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products. The tenderer must provide products covered by X years [at least 1 year] warranty.	*Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products* The tenderer must provide products covered by X years [at least 2 years] warranty.

Verification: The tenderer must provide written evidence of the warranty.	**Verification:** The tenderer must provide written evidence of the warranty.
TS25 Rechargeable battery endurance	
Applicable to refurbished mobile equipment (laptops, tablets and smartphones) equipped with a <u>new</u> battery. The battery endurance must be greater than 300 battery cycles (with SoH ≥80%). Tests must be carried out according to standard IEC EN 61960-3:2017 or equivalent. **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies according to the IEC EN 61960-3:2017 standard. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.	*Applicable to refurbished mobile equipment (laptops, tablets and smartphones) equipped with a <u>new</u> battery.* • The battery endurance must be: greater than 500 cycles (with SoH ≥80%), or • The battery endurance must be: greater than 300 cycles (with SoH ≥90%). Tests must be carried out according to standard IEC EN 61960-3:2017 or equivalent. **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies according to the IEC EN 61960-3:2017 standard. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
TS26 Information on rechargeable battery endurance	
Applicable to refurbished mobile equipment (laptops, tablets and smartphones) equipped with a second-hand battery. The tenderer must indicate minimum levels of the second-hand battery's State of Health (SoH) in the tender (e.g. SoH > 80%). **Verification:** Tenderers must provide information on the battery SoH for the mobile equipment shipped as part of the contract.	
TS27 Minimum requirements for electrical performance	
	Applicable to refurbished mobile equipment (laptops, tablets and smartphones) equipped with a new battery. The battery must comply with the electrical test criteria according to

	the standard IEC EN 61960-3:2017. **Verification:** Tenderers must provide test results obtained by accredited ISO17025 test bodies. Products holding a relevant Type I Ecolabel fulfilling the specified requirements will be deemed to comply.
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
AC11 Further rechargeable battery endurance	
	Applicable to refurbished mobile equipment (laptops, tablets and smartphones) equipped with a new battery. Additional points will be awarded if the battery endurance is greater than 500 cycles (with ≥80% capacity retention of the initial rated capacity) proportionally to the additional number of cycles ensured. **Verification:** Tests must be carried out according to the standard IEC EN 61960-3:2017. Tenderers must provide test results obtained by accredited ISO17025 test bodies.
AC12 Standardised external power supply	
	Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products. *Applicable to portable computing devices with power supplies up to 100 W.* This is not applicable to products with only Qi charging capability (e.g. for strong resistance to immersion in water or to dust, such as

	industrial computers). Additional points will be awarded if the equipment delivered as part of the contract carries a USB Type C standardised receptacle for power delivery (PD) according to the standard EN/IEC 63002:2017. If the product does not have a built-in USB PD receptacle, then an adapter must be available to be ordered at no additional cost. **Verification:** The tenderer must provide a product manual for each model provided, which must include an exploded diagram of the device illustrating the types of receptacle used for power delivery.
Explanatory note: Standardised external power supply Interoperability guidelines for external power supplies are defined according to IEC 63002:2016 - Identification and communication interoperability method for external power supplies used with portable computing devices.	
AC13 External power supply: detachable cables	
	Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products. Additional points will be awarded if the External Power Supply (EPS) configuration consists of an EPS with a detachable input cable (or one that is integrated in the EPS housing) and a detachable output cable to the ICT device. **Verification:** The tenderer must provide a product manual for each model provided, which must include an exploded diagram of the device illustrating the types of EPS used.

8.2 Service agreement associated with the supply of refurbished/remanufactured ICT equipment

Subject matter
Service agreement associated with the supply of refurbished/remanufactured ICT equipment

TECHNICAL SPECIFICATIONS	
Core criteria	**Comprehensive criteria**
TS28 Provision of an extended service agreement	
	Applicable to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products. The tenderer must provide a minimum of X years [to be defined] services as detailed in the Service Level Requirements document (see the explanatory note below). **Verification:** The tenderer must provide a written declaration that the products supplied will be warranted in conformity with the contract specifications and the related service level agreement.

Explanatory note: Examples of service level requirements

A Service Level Requirements document describes how the service should be delivered to the customer. Examples of possible service level requirements are listed below:

- Access to the refurbisher/remanufacturer's warranty: register the warranty; manage any documentation or proof required to invoke the warranty; invoke the warranty on behalf of the public administration (during the warranty); follow up with the refurbisher to ensure that the terms of the refurbisher's warranty are met.
- Pick-up and return: pick up the product(s) from a specified location on the public administration's premises and return it/them to a specific location on the public administration's premises. Alternative options for convenient return of products can also be requested.

- Management of failures: provide an efficient single point of contact for technical issues and escalations of problems, a person responsible for following the progress of the case, reports on progress, transparent access to a warranty database (whoever manages this warranty data) to verify warranty status, and incident status for open incidents.
- Access to diagnostic and repair tools: access to all technical tools necessary to perform hardware diagnostics and corrections; access to any technical training required to become a certified repair technician; possibility, through non-exclusivity, to become a certified technical partner (perform warranty repairs).
- Battery coverage: the service explicitly covers battery defects for applicable products with rechargeable batteries, such as failure to charge or a faulty battery connection. A progressive drop in battery capacity due to usage must not be considered a defect unless it is covered by the battery replacement policy in the bullet below.
- Battery replacement policy: the service covers the replacement of batteries that do not fulfil the minimum performance conditions related to endurance in terms of number of cycles (see criteria TS25 and TS26 on rechargeable battery endurance).
- Provision of failure statistics: provision of high-level, aggregated, anonymous and non-traceable statistics on incident types (nature and quantity), problems and diagnostics concerning the products within the scope of the contract.
- Incident management/problem management/preventive maintenance: this service includes all the operations necessary to maintain the ICT products in perfect working order, or to restore a defective product or one of its components to perfect working order, including incident management, problem management and preventive maintenance. Preventive maintenance during the warranty period includes ensuring OS and security updates for the duration of the contract.
- Upgrading: a scan for upgrading possibilities can take place after a certain period (e.g. 3 years) and cover performance aspects like CPU/Memory/Disk.
- Repair/replacement activities: repair or replace any products which become damaged or defective in the course of normal use during the extended warranty period with products which have identical or better performance characteristics. Breakdowns related to firmware are also covered. If part of an item is replaced, the replacement part must be covered by the same level and duration of extended warranty as the part that has been replaced. The extended warranty applies to both hardware and software, unless explicitly agreed otherwise.
- Commitment to repair/upgrade as first remedy: in the event of failures and, whenever technically feasible, the service provider commits to provide the option of repairing/upgrading the equipment instead of substituting it.

CONTRACT PERFORMANCE CLAUSES	
Core criteria	**Comprehensive criteria**
CPC3 Service agreement	
	Applies to the procurement of refurbished/remanufactured products. To be included in a separate procurement route from the one used for brand new products. *To be used in conjunction with criterion TS28 on provision of an extended service agreement.* The tenderer must provide periodic [frequency to be agreed between the procurer and supplier] reporting on their compliance with all the metrics, Key Performance Indicators and other indicators defined by the service level agreement.
Explanatory note: Examples of Key Performance Indicators Aggregate KPI 1 – Incident solved: number of incidents resolved within the incident resolution time during a month / total number of incidents opened during the given month or opened during a previous month and still pending. Monthly target: ≥90%. Aggregate KPI 2 – Commitment to repair as first remedy: number of incidents resolved within a product repair or upgrade / number of incidents resolved within a product replacement.	

9 LIFE CYCLE COSTING

Life Cycle Costing (LCC) is a technique that can be used to estimate the total cost of ownership for IT equipment (and possibly some of the environmental externalities). It is a method for making effective, long-term investment decisions since some cost aspects may not be immediately apparent to the decision maker, e.g., a higher initial investment may be required to achieve lower life cycle costs, more durable portable equipment and lower repair and upgrading costs. When externalities are taken into consideration, LCC is particularly relevant to achieving improved environmental performance.

Costs typically considered in a LCC calculation are:

- Acquisition costs
- Delivery and installation costs
- Maintenance/service costs
- Operation costs (energy consumption)
- Fees, taxes and other costs
- Externalities (CO_2 emissions linked to energy consumption)

Whenever energy consumption, resulting from usage, is included in the LCC and thus considered as part of the costs award criterion, this should not be duplicated elsewhere in the award criteria. However, it is perfectly possible to combine LCC with technical specifications which set minimum requirements for energy efficiency, for example those which are included in these EU GPP criteria (TS18, TS19 and TS20).

It is also possible to combine LCC with award criteria based on other aspects of environmental performance, such as durability, recyclability and end-of-life considerations.

Strategies for the extension of a product's lifetime, such as reparability and upgradeability (including the availability and cost effectiveness of spare parts), reliable design solutions, endurance and replacement (of batteries, for instance), are all features that are relevant from a LCC perspective. However, it is probably difficult to address these aspects by a LCC calculation in the award phase, since it is not possible to consider those costs/benefits as a given and quantify them financially. Rather, the EU GPP criteria propose to address these aspects via the technical specifications and award criteria included in this document.

More information on LCC and calculation support tools are available at: https://ec.europa.eu/environment/gpp/lcc.htm

ANNEX I: Battery testing according to EC EN 61960-3:2017

Parameter	Description	Acceptance Criteria Battery
Discharge performance at 20 °C (Rated Capacity)	This test verifies the rated capacity of the battery.	100% of the rated capacity (C5 Ah)[5]
Discharge performance at –20 °C (Rated Capacity)	This test determines the capacity of the battery at low temperatures.	30% of the rated capacity (C5 Ah)
High rate discharge performance at 20 C	This test determines the capacity of the battery when discharged at high rate. This test is not required if the battery is not designed to be used at this rate (1 ItA).	60% of the rated capacity (C5 Ah)
Charge (capacity) retention and recovery	This test determines, firstly, the capacity which a battery retains after storage for an extended period of time (28 days) and, secondly, the capacity that can be recovered by a subsequent recharge.	60% of the rated capacity (C5 Ah)
Charge (capacity) retention after long-term storage	This test determines the capacity of a battery after extended storage (90 days) at 50% state of charge, followed by a subsequent charge.	85% of the rated capacity (C5 Ah)
Endurance in cycles	This test determines the number of charge/discharge cycles which a battery can endure before its capacity has been significantly depleted.	60% of the rated capacity (C5 Ah) after 300 cycles
Electrostatic discharge	This test is to evaluate the ability of a battery to withstand electrostatic discharge.	Operational

5 Amount of electricity declared by the manufacturer that a cell can deliver in a 5-hour period.

ANNEX II: Durability tests for mobile equipment

Test	Test method	Minimum thresholds		Functional performance requirements
Accidental drop	IEC 60068 Part 2-31: Ec (Freefall, procedure 1) or MIL-STD-810G w/CHANGE 1 Drop test: Method 516.7 - Shock (procedure IV) or MIL-STD-810H Method 516.8 – Shock (Procedure IV)	CORE CRITERIA The notebook or tablet must be dropped from: a minimum of 45 cm (modified drop test height) of height onto a non-yielding surface. A minimum of one drop must be made on each bottom side and each bottom corner.	AWARD CRITERIA The notebook or tablet must be dropped from: a minimum of 76 cm (30 inches[6]) of height onto a non-yielding surface. A minimum of one drop must be made on each bottom side and each bottom corner.	After exposure to any of the specified stress tests, the product should be able to: 1. Boot up and operate normally • Booting up or resuming should not exceed 50% more time as a result of the test. • No noticeable operational faults when using standard software applications. • No major damage to the product that does not allow for standard usage. 2. Not create hazards to the end-user • No case or display cracking or other sharp points created from failures that could injure a user. • No electrical component failures or access that could result in a user safety issue.
Temperature stress	IEC 60068 Part 2-1: A Cold Part 2-2: B Dry Heat or MIL-STD-810G w/CHANGE 1 High temperature: Method 501.6 - Basic Hot (A2) Low temperature: Method	The mobile equipment must be subjected to test cycles of a minimum of 48 hours exposure for storage temperature at: • High temperature storage ≥ 60 ° C • Low temperature storage ≤ -30 ° C The mobile equipment must be subjected to test cycles of a minimum of 4 hours for operational temperature at: • Operational temperature ≥ 40 ° C • Operational temperature ≤ -20 ° C		

6 US Department of Defence standard MIL-STD-810G Method 516.6 Specification VI 'Transit drop test'.

Test	Test method	Minimum thresholds		Functional performance requirements
	502.6 - Basic Cold (C1) or MIL-STD-810H Method 501.7 - High temperature - Basic Hot (A2) Method 502.7 - Low temperature - Basic Cold (C1)			
Screen resilience	The test equipment and set-up used must be confirmed by the tenderer. Applicable test standards include: ISO 1518-1:2019 Paints and varnishes - Determination of scratch resistance - Part 1: Constant-loading method ISO 1518-:2019 Paints and varnishes - Determination of scratch resistance - Part 2: Variable-loading method ASTM C1895 - 19 using a hardness test pencil equipped with a spiral spring and a carbide ball tip of 1 mm diameter (in accordance with ISO		With the product placed on a flat surface, two loading tests must be carried out: • A minimum load of 50kg must be evenly applied to the screen lid (for notebooks) or screen (for tablets). • A minimum load of 25kg must be applied to a point at the centre of screen with a diameter of approximately 3cm.	

Test	Test method	Minimum thresholds		Functional performance requirements
	1518)			
Resistance to shock	IEC 60068 Part 2-27: Test Ea and guidance: Shock Part 2-47: Test - Mounting of specimens for vibration, impact and similar dynamic tests		A minimum of a 40G peak half-sine wave pulse must be applied three times for a duration of a minimum of 6 ms to the top, bottom, right, left, front and rear side of the product.	
Resistance to vibration	IEC 60068 Part 2-6: Test Fc: Vibration (sinusoidal) Part 2-47: Test - Mounting of specimens for vibration, impact and similar dynamic tests		Minimum specification: Randomised sinusoidal vibrations in the frequency range 5Hz up to a minimum of 250Hz must be applied for a minimum of one sweep cycle to the end of each axis of the top, bottom, right, left, front and back of the product.	
Dust ingress protection	IEC 60529, Degree of protection provided by enclosures or MIL-STD-810G Method 510.5, Procedure I Sand and dust - Blowing dust or MIL-STD-810H 510.7 – Procedure I - Sand and Dust – Blowing Dust		IP-6x - No ingress of dust; complete protection against contact.	

Test	Test method	Minimum thresholds		Functional performance requirements
Water ingress protection	IEC 60529, Degree of protection provided by enclosures or MIL-STD-810G, Method 506.5 Procedure I Rain and blowing rain or MIL-STD-810H 506.6 – Procedure I Rain		IP-x5 - Water is projected in jets against the enclosure from any direction with no harmful effects.	

ANNEX III: Minimum energy performance for computers (based on Energy Star for Computers, Specifications 7.1)

Calculated Typical Energy Consumption (E_{TEC}) for Desktop, Integrated Desktop, and Notebook Computers per shall be less than or equal to the maximum TEC (E_{TEC_MAX}) as calculated below:

(E_{TEC_MAX}) per Equation below:

$$E_{TEC\_MAX} = (1+ALLOWANCE_{PSU}) \times (TEC_{BASE} + TEC_{MEMORY} + TEC_{GRAPHICS} + TEC_{STORAGE} + TEC_{INT\_DISPLAY} + TEC_{SWITCHABLE} + TEC_{EEE} + TEC_{MOBILEWORKSTATIONS})$$

Where:

- $ALLOWANCE_{PSU}$ is an allowance provided to power supplies that meet the optional more stringent efficiency levels specified in Table 1; power supplies that do not meet the requirements receive an allowance of 0;
- TEC_{BASE} is the base allowance specified in Table 2; and,
- $TEC_{GRAPHICS}$ is the discrete graphics allowance as specified in Table 2, with the exception of systems with integrated graphics, which do not receive an allowance, or Desktops and Integrated Desktops with switchable graphics enabled by default, which receive an allowance through $TEC_{SWITCHABLE}$; and
- TEC_{MEMORY}, $TEC_{STORAGE}$, $TEC_{INT\_DISPLAY}$, $TEC_{SWITCHABLE}$, TEC_{EEE} and $TEC_{MOBILEWORKSTATIONS}$ are adder allowances as specified in Table 3.

Table 1: Power Supply Efficiency Allowance

Power Supply Type	Computer Type	Minimum Efficiency at Specified Proportion of Rated Output Current				Minimum Average Efficiency	$Allowance_{PSU}$
		10%	20%	50%	100%		

IPS	Desktop	0.86	0.90	0.92	0.89	-	0.015
		0.90	0.92	0.94	0.90	-	0.03
	Integrated Desktop	0.86	0.90	0.92	0.89	-	0.015
		0.90	0.92	0.94	0.90	-	0.04

Table 2: Base TEC (TEC_{BASE}) Allowances for Desktop or Integrated Desktops and Notebooks

Category Name	**Graphic Capability**	**Desktop or Integrated Desktop**	
		Performance Score, P	**Base Allowance**
0	Any Graphics dGfx≤G7	P≤3	69.0
I1	Integrated or Switchable Graphics	3<P≤6	112.0
I2		6<P≤7	120.0
I3		P>7	135.0
D1	Discrete Graphics dGfx≤G7	3<P≤9	115.0
D2		P>9	135.0

Category Name	**Notebooks**	
	Performance Score, PV	**Base Allowance**
0	P≤2	6.5
I1	2<P≤5.2	22.0

I2	5.2<P≤8	8.0
I3	P>8	14.0

Table 3: Functional Adder Allowances for Desktop, Integrated Desktop, Thin Client and Notebook Computers

Function			**Desktop**	**Integrated Desktop**	**Notebook**
TEC_{MEMORY} (kWh) vi			0.8		2.4 + (0.294 x GB)
$TEC_{GRAPHICS}$ (kWh) vii	Graphics Category Viii	G1 (FB_BW ≤ 16)	36		29.3 x tanh (0.0038 x FB_BW – 0.137) + 13.4
		G2 (16< FB_BW ≤ 32)	51		
		G3 (32 < FB_BW ≤ 64)	64		
		G4 (64 < FB_BW ≤ 96)	83		
		G5 (96 < FB_BW ≤ 128)	105		
		G6 (FB_BW > 128; Frame Buffer Data Width < 192 bits)	115		
		G7 (FB_BW > 128;	130		

		Frame Buffer Data Width ≥ 192 bits			
$TEC_{SWITCHABLE}$ (kWh)			0.5 x G1		N/A
TEC_{EEE} (kWh) x			8.76 x 0.2 x (0.15 + 0.35)		8.76 x 0.2 x (0.10 + 0.30)
$TEC_{STORAGE}$ (kWh) xi			26		2.6
$TEC_{INT\_DISPLAY}$ (kWh) xii			N/A	8.76 x 0.35 x (1+EP) x (4xr +0.05 x A)	8.76 x 0.30 x (1+EP) x (2 x r +0.02 x A)
$TEC_{MOBILEWORKSTATION}$ (kWh) xii			N/A		4.0

Equation 1: Calculation of Allowance for Enhanced Performance Integrated Displays

$$EP = \begin{cases} 0, \text{ No Enhanced Power Displays} \\ 0.3 \text{ Enhanced Performance Display } d < 27 \\ 0.75 \text{ Enhanced Performance Display } d \geq 27 \end{cases}$$

Where

vi TEC_{MEMORY} Adder: Applies per GB installed in the system.

vii $TEC_{GRAPHICS}$ Adder: Applies to only the first dGfx installed in the system, but not Switchable Graphics.

viii FB_BW: Is the display frame buffer bandwidth in gigabytes per second (GB/s). This is a manufacturer declared parameter and should be calculated as follows: (Data Rate [Mhz] × Frame Buffer Data Width [bits]) / (8 × 1000).

ix $TEC_{SWITCHABLE}$ Incentive: Applies to automated switching that is enabled by default in Desktops and Integrated Desktops.

x TEC_{EEE}: Applies per IEEE 802.3az-compliant (Energy Efficient Ethernet) Gigabit Ethernet port.

xi $TEC_{STORAGE}$ Adder: Applies once if system has more than one Additional Internal Storage element.

xii $TEC_{INT\_DISPLAY}$ Adder: EP is the Enhanced Performance Display allowance calculated per Table 3; r is the Screen resolution in megapixels; and A is viewable screen area in square inches.

Calculation of E_{TEC_MAX} for Thin Clients

- $E_{TEC\_MAX} = TEC_{BASE} + TEC_{GRAPHICS} + TEC_{WOL} + TEC_{INT\_DISPLAY} + TEC_{EEE}$
- Where:
- TEC_{BASE} is the Base Allowance specified in Table 4;
- $TEC_{GRAPHICS}$ is the Discrete Graphics allowance specified in Table 4, if applicable;
- TEC_{WOL} is the Wake-on-LAN allowance specified in Table 4, if applicable;
- $TEC_{INT\_DISPLAY}$ is the Integrated Display allowance for Integrated Desktops specified in Table 3, if applicable; and
- TEC_{EEE} is the Energy Efficiency Ethernet incentive for Desktops specified in Table 3, if applicable, per IEEE 802.3az-compliant (Energy Efficient Ethernet) Gigabit Ethernet port.

Table 4: Adder allowances for Thin Clients

Adder	Allowance (kWh)
TEC_{BASE}	31
$TEC_{GRAPHICS}$	36
TEC_{WOL}	2

LIST OF ACRONYMS

AC	Award criterion	PC	Personal Computer
CPC	Contract performance clause	PCB	Printed Circuit Board
CPU	Central Processing Unit	PD	Power Delivery
EMI	Electromagnetic Interference	PPM	Parts per million
EoL	End of Life	PMMA	Poly(methyl methacrylate)
EPS	External Power Supply	PSU	Power Supply Unit
ESD	Electrostatic-sensitive Device	RAM	Random-access Memory
GHG	Greenhouse Gas	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
GPP	Green Public Procurement	RoHS	Restriction of Hazardous Substances
GWP	Global Warming Potential	SC	Selection criterion
HDD	Hard Disk Drive	SCIP	Substances of Concern in Products
HDMI	High-Definition Multimedia Interface	SoC	State of Charge
ICT	Information and Communications Technology	SoH	State of Health
ISO	International Organisation for Standardisation	SSD	Solid-state Drive
LCA	Life Cycle Assessment	SVHC	Substance of Very High Concern
LCC	Life Cycle Costing	TS	Technical specification
ODD	Optical Disc Drive	USB	Universal Serial Bus
OEM	Original Equipment Manufacturer	VGA	Video Graphics Array