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COMMISSION REGULATION (EU) …/…

of XXX

laying down ecodesign requirements for servers and data storage products pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 617/2013

(Text with EEA relevance)

[…]

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(Text with EEA relevance)

Article 1
Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market and putting into service of servers and online data storage products.

2. This Regulation shall not apply to the following products:

   (a) servers intended for embedded applications;

   (b) servers classified as small scale servers in terms of Regulation (EU) No 617/2013;

   (c) servers with more than four processor sockets;

   (d) network servers;

   (e) small data storage products;

   (f) large data storage products.

Article 2
Definitions

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

(1) ‘server’ means a computing product that provides services and manages networked resources for client devices, such as desktop computers, notebook computers, desktop thin clients, internet protocol telephones, smartphones, tablets, tele-communication, automated systems or other servers, primarily accessed via network connections, and not through direct user input devices, such as a keyboard or a mouse and with the following characteristics:

   (a) it is designed to support server operating systems (OS) and/or hypervisors, and targeted to run user-installed enterprise applications;

   (b) it supports error-correcting code and/or buffered memory (including both buffered dual in-line memory modules and buffered on board configurations);

   (c) all processors have access to shared system memory and are independently visible to a single OS or hypervisor;

(2) ‘server with more than four processor sockets’ means a server containing more than four interfaces designed for the installation of a processor. For multi-node servers, this term refers to a server having more than four processor sockets in each server node;

(3) 'embedded application' means a software application that permanently resides in an industrial or consumer device, typically stored in a non-volatile memory such as read-only memory or flash memory;

(4) 'server appliance' means a server that is not intended to execute user-supplied software, delivers services through one or more networks, is typically managed through a web or command line interface and is bundled with a pre-installed OS and application software that is used to perform a dedicated function or set of tightly coupled functions;

(5) 'resilient server' means a server designed with extensive reliability, availability, serviceability and scalability features integrated in the micro architecture of the system, central processing unit (CPU) and chipset;

(6) ‘large server’ means a resilient server which is shipped as a pre-integrated/pre-tested system housed in one or more full frame racks and that includes a high connectivity input/output subsystem with a minimum of 32 dedicated input/output slots;

(7) 'multi-node server' means a server that is designed with two or more independent server nodes that share a single enclosure and one or more power supply units. In a multi-node server, power is distributed to all nodes through shared power supply units. Server nodes in a multi-node server are not designed to be hot-swappable;

(8) 'fully fault tolerant server' means a server that is designed with complete hardware redundancy (to simultaneously and repetitively run a single workload for continuous availability in mission critical applications), in which every computing component is replicated between two nodes running identical and concurrent workloads (i.e., if one node fails or needs repair, the second node can run the workload alone to avoid downtime);

(9) ‘hyperconverged server’ means a highly integrated server which contains the additional features of large network equipment and storage products;

(10) 'network server' means a network product which contains the same components as a server in addition to more than 11 network ports with a total line rate throughput of 12 Gb/s or more, the capability to dynamically reconfigure ports and speed and support for a virtualized network environment through a software defined network;

(11) ‘data storage product' means a fully-functional storage system that supplies data storage services to clients and devices attached directly or through a network. Components and subsystems that are an integral part of the data storage product architecture (e.g., to provide internal communications between controllers and disks) are considered to be part of the data storage product. In contrast, components that are normally associated with a storage environment at the data centre level (e.g. devices required for operation of an external storage area network) are not considered to be part of the data storage product. A data storage product may be composed of integrated storage controllers, data storage devices, embedded network elements, software, and other devices;

(12) 'Hard Disk Drive' (HDD) means a data storage device which reads and writes to one or more rotating magnetic disk platters;

(13) 'Solid State Drive' (SSD) means a data storage device that reads and writes to non-volatile solid state memory instead of rotating magnetic platters for data storage;

(14) ‘data storage device’ means a device providing non-volatile data storage, with the exception of aggregating storage elements such as subsystems of redundant arrays of

independent disks, robotic tape libraries, filers, and file servers and storage devices which are not directly accessible by end-user application programs, and are instead employed as a form of internal cache;

(15) ‘online data storage product' means a data storage product designed for online, random-access of data, accessible in a random or sequential pattern, with a maximum time to first data of less than 80 milliseconds;

(16) 'small data storage product' means a data storage product containing a maximum of three data storage devices;

(17) 'large data storage product' means a high end or mainframe data storage product that supports more than 400 data storage devices in its maximum configuration and with the following required attributes: no single point of failure, non-disruptive serviceability and integrated storage controller.

2. For the purposes of Annexes II to V, additional definitions are set out in Annex I.

Article 3
Ecodesign requirements and timetable

The ecodesign requirements for servers and online data storage products are set out in Annex II. Unless otherwise proved in Annex II, the ecodesign requirements shall apply from the date of entry into force of this Regulation.

Article 4
Conformity assessment

1. The conformity assessment procedure as referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.

2. For the purposes of conformity assessment pursuant to Article 8(2) of Directive 2009/125/EC, the technical documentation shall contain a copy of the product information provided in accordance with Annex II to this Regulation, and the details and the results of the calculations set out in Annex III to this Regulation.

3. Where the information included in the technical documentation for a particular model has been obtained:

(a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or

(b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both,

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

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

4. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to point 2(g) of Annex IV to Directive 2009/125/EC, refer to the

technical documentation uploaded to the product database which contains the same information laid down in Delegated Regulation (EU) 2023/1669.

Article 5

Verification procedure for market surveillance purposes

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

Article 6

Circumvention

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

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

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

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

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

Article 7

Indicative benchmarks

The indicative benchmarks for best-performing servers and data storage products available on the market on [OP – please insert the date of entry into force of this Regulation] are set out in Annex V.

Article 8

Review

The Commission shall assess this Regulation and shall present the results of this assessment, including, if appropriate, a draft revision proposal, to the Consultation Forum by March 2022. This assessment shall review the requirements in the light of the technological progress and shall address in particular the appropriateness:

(a) to update the specific ecodesign requirements on server active state efficiency;

(b) to update the definitions or the scope of the Regulation;

(c) to exempt network servers from the scope of the Regulation,

(d) to exclude resilient servers, High Performance Computing (HPC) servers and servers with integrated APA from the ecodesign requirements set out in Annex II point 2.1 and point 2.2;

(e) to set specific ecodesign requirements on the operating condition class;

Article 9

Amendment to Regulation (EU) No 617/2013

Regulation (EU) No 617/2013 is amended as follows:

1. Article 1 is amended as follows:

(a) paragraph 1 is replaced by the following: "1. This Regulation establishes ecodesign requirements for the placing on the market of computers.",

(b) in paragraph 2, point (h) is deleted,

(c) in paragraph 3, points (a) to (d) are deleted;

2. Article 2 is amended as follows:

(a) point 2 is deleted,

(b) point 4 is replaced by the following: "(4) ‘Internal power supply’ means a component designed to convert AC voltage from the mains to DC voltage(s) for the purpose of powering the computer and has the following characteristics:

(a) is contained within the computer casing but is separate from the main computer board;

(b) the power supply connects to the mains through a single cable with no intermediate circuitry between the power supply and the mains power; and

(c) all power connections from the power supply to the computer components, with the exception of a DC connection to a display in an integrated desktop computer, are internal to the computer casing.

Internal DC-to-DC converters used to convert a single DC voltage from an external power supply into multiple voltages for use by a computer are not considered internal power supplies;",

(c) points 12 to 16 are deleted,

(d) point 22 is replaced by the following: "(22) ‘Product type’ means desktop computer, integrated desktop computer, notebook computer, desktop thin

client, workstation, mobile workstation, small-scale server, game console, docking station, internal power supply or external power supply;"

3. Article 3 is replaced by the following: "Article 3

Ecodesign requirements

The ecodesign requirements for computers are set out in Annex II.

Compliance of computers with the applicable ecodesign requirements shall be measured in accordance with the methods set out in Annex III.";

4. in Article 7, the second paragraph is replaced by the following: "Checking of computers for compliance with the applicable ecodesign requirements shall be carried out in accordance with the verification procedure set out in point 2 of Annex III to this Regulation.";

5. Annex II is amended as follows:

(a) point 5.2 is deleted,

(b) the title of point 7.3 is replaced by the following: "Workstation, mobile workstation, desktop thin client and small-scale server".

Article 10

Repeal

Commission Regulation (EU) 2019/424 is repealed.

Article 11
Entry into force

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

xxx..

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

Done at Brussels,

For the Commission
The President

ANNEX I
Definitions applicable to Annexes II to V

1. For the purposes of Annexes II to V the following definitions shall apply:

(2) 'server with one or two processor sockets' means a server containing one or two interfaces designed for the installation of a processor. For multi-node servers, this term refers to a server having one or two processor sockets in each server node;

(3) ‘Input/Output (I/O) device’ means a device, which provides data input and output capability between a server or a data storage product and other devices. An I/O device may be integral to the server motherboard or may be connected to the motherboard via expansion slots (such as Peripheral Component Interconnect, or Peripheral Component Interconnect Express);

(4) ‘motherboard’ means the main circuit board of a server or a data storage product. For purposes of this regulation, the motherboard includes connectors for attaching additional boards and typically includes the following components: processor, memory, BIOS, and expansion slots; ‘processor’ means the logic circuitry that responds to and processes the basic instructions that drive a server or a data storage product. For purposes of this regulation, the processor is the CPU of the server. A typical CPU is a physical package to be installed on the server motherboard via a socket or direct solder attachment. The CPU package may include one or more processor cores;

(5) ‘memory’ means a part of a server or a data storage product external to the processor in which information is stored for immediate use by the processor, expressed in gigabyte (GB);

(6) 'expansion card' means an internal component connected by an edge connection over a common/standard interface such as Peripheral Component Interconnect Express providing additional functionality;

(7) 'graphics card' means an expansion card containing one or more graphics processing units with a local memory controller interface and local graphics-specific memory;

(8) 'buffered double data rate (DDR) channel' means a channel or memory port connecting a memory controller to a defined number of memory devices in a server. A typical server may contain multiple memory controllers, which may in turn support one or more buffered DDR channels. As such, each buffered DDR channel serves only a fraction of the total addressable memory space in a server;

(9) 'blade server' means a server that is designed for use in a blade chassis. A blade server is a high-density device that functions as an independent server and includes at least one processor and system memory, but is dependent upon shared blade chassis resources (e.g., power supply units, cooling) for operation. A processor or memory module will not be considered a blade server when the technical documentation for the product does not indicate that it scales up a standalone server;

(10) 'blade chassis' means an enclosure that contains shared resources for the operation of blade servers, blade storage, and other blade form-factor devices. Shared resources provided by a blade chassis may include power supply units,

data storage, and hardware for direct current power distribution, thermal management, system management, and network services;

(11) 'High Performance Computing (HPC) system' a computing system which is designed, marketed, sold, and optimised to execute highly parallel applications for high performance, deep learning, or artificial intelligence applications. HPC systems consist of multiple clustered computer servers, primarily for increased computational capability, high speed inter-processing interconnects, large and high bandwidth memory capability and often auxiliary processing accelerators. HPC systems may be purposely built, or assembled from more commonly available computer;

(12) 'server product family' means a high-level description referring to a group of servers sharing one chassis and motherboard combination that may contain more hardware and software configurations. All configurations within a server product family must share the following common attributes:

(a) be from the same model line or machine type;

(b) either share the same form factor (i.e., rack-mounted, blade, pedestal) or share the same mechanical and electrical designs with only superficial mechanical differences to enable a design to support multiple form factors;

(c) either share processors from a single defined processor series or share processors that plug into a common socket type;

(d) share the power supply unit(s);

(e) have the same number of available processor sockets and number of available processor sockets populated;

(13) 'resilient server' means a server designed with extensive reliability, availability, serviceability and scalability features integrated in the micro architecture of the system, central processing unit (CPU) and chipset;

(14) 'power supply unit' (PSU) means a device that converts alternate current (AC) or direct current (DC) input power to one or more DC power outputs for the purpose of powering a server or a data storage product. A server or data storage product PSU must be self-contained and physically separable from the motherboard and must connect to the system via a removable or hard-wired electrical connection;

(15) 'power factor' means the ratio of the real power consumed in Watts to the apparent power drawn in Volt Amperes;

(16) 'single output PSU' means a PSU designed to deliver the majority of its rated output power to one primary DC output for the purpose of powering a server or a data storage product. Single output PSUs may offer one or more standby outputs that remain active whenever connected to an input power source. The total rated power output from any additional PSU outputs that are not primary and standby outputs shall be no greater than 20 Watts. PSUs that offer multiple outputs at the same voltage as the primary output are considered single-output PSUs unless those outputs:

(a) are generated from separate converters or have separate output rectification stages, or

(b) have independent current limits;

(17) ‘multi output PSU’ means a PSU designed to deliver the majority of its rated output power to more than one primary DC output for the purpose of powering a server or a data storage product. Multi output PSUs may offer one or more standby outputs that remain active whenever connected to an input power source. The total rated power output from any additional PSU outputs that are not primary and standby outputs shall be no greater than or equal to 20 Watts;

(18) 'product type' means the design of the server or of the data storage product including the chassis (rack, tower or blade), the number of sockets and, for servers, whether it is a resilient server, a blade server, a multi node server, a HPC server, a server with integrated APA, a direct current server or none of the previous categories;

(19) 'direct current server' means a server that is designed solely to operate on a DC power source;

(20) ‘idle state’ means the operational state in which the OS and other software have completed loading, the server is capable of completing workload transactions, but no active workload transactions are requested or pending by the system (i.e., the server is operational, but not performing any useful work). For servers where Advanced Configuration and Power Interface standards are applicable, idle state corresponds only to System Level S0;

(21) 'idle state power' (Pidle) is the power demand, in Watts, in idle state;

(22) ‘low-end performance configuration’ of a server product family means the combination of two data storage devices, processor with the lowest product of core count and frequency (in GHz) and memory capacity (in GB) that is at least equal to the product of the number of memory channels and the lowest capacity dual in-line memory module (DIMM) (in GB) offered on the server that represents the lowest performance product model within the server product family. All memory channels shall be populated with the same DIMM raw card design and capacity;

(23) ‘high-end performance configuration’ of a server product family means the combination of two data storage devices, processor with the highest product of core count and frequency and memory capacity (in GB) equal to or greater than 3 times the product of the number of CPUs, cores and hardware threads that represents the highest performance product model within the product family. All memory channels shall be populated with the same DIMM raw card design and capacity;

(24) 'hardware thread': means the hardware resources in a CPU core to execute a stream of software instructions. A CPU core may have the resources to execute more than one thread simultaneously;

(25) 'active state efficiency' (Eff_{server}) means the numerical value for server efficiency as measured and calculated according to Annex III point 3;

(26) 'active state' means the operational state in which the server is carrying out work in response to prior or concurrent external requests (e.g., instruction over the network). Active state includes both active processing and data seeking/retrieval from memory, cache, or internal/external storage while awaiting further input over the network;

(27) 'server performance' means the number of transactions per unit of time performed by the server under standardised testing of discrete system components (e.g. processors, memory and storage) and subsystems (e.g. RAM and CPU);

(28) ‘maximum power’ (P_{max}) means the highest power, in Watts, recorded on the eleven worklet scores according to the standard;

(29) 'CPU performance ($Perf_{CPU}$)' means the number of transactions per unit of time performed by the server under standardised testing of the CPU subsystem;

(30) 'Auxiliary Processing Accelerator' (APA) means a specialized processor and associated subsystem that provide an increase in computing capacity such as graphical processing units or field programmable gate arrays. An APA cannot operate in a server without a CPU. APAs can be installed in a server either on Graphics or Extension add-in cards installed in general-purpose add-in expansion slots or integrated into a server component such as the motherboard;

(31) 'Expansion APA' means an APA that is on an add-in card installed in an add-in expansion slot. An expansion APA add-in card may include one or more APAs and/or separate, dedicated removable switches;

(32) 'Integrated APA' means an APA that is integrated into the motherboard or CPU package;

(33) ‘processor power management functionality’ means a function enabled by default in the BIOS and/or through a management controller, service processor, and/or the operating system shipped with the computer server. All processors must be able to reduce power consumption in times of low utilisation by: reducing voltage and/or frequency through Dynamic Voltage and Frequency Scaling, or by enabling processor or core reduced power states when a core or socket is not in use.

(34) 'disassembly' means a process whereby an item is taken apart in such a way that it can subsequently be reassembled and made operational;

(35) ‘firmware’ means system, hardware, component, or peripheral programming provided with the product to provide basic instructions for hardware to function inclusive of all applicable programming and hardware updates;

(36) ‘secure data deletion’ means the effective erasure of all traces of existing data from a data storage device, overwriting the data completely in such a way that access to the original data, or parts of them, becomes infeasible for a given level of effort;

(37) ‘spare part’ means a separate part that can replace a part with the same or similar function in a server or data storage product. The functionality of the server or data storage product is restored or upgraded when the part is replaced by a spare part. Spare parts may be used parts;

(38) ‘serialised part’ means a part which has a unique code that is paired to an individual unit of a device and whose replacement by a spare part requires the pairing of that spare part to the device by means of a software code to ensure full functionality of the spare part and the device;

(39) ‘professional repairer’ means an operator or undertaking which performs repair and professional maintenance of servers or data storage products, either as a service or with a view to the subsequent resale of the repaired device;

(40) ‘fastener’ means a hardware device or substance that mechanically, magnetically or by other means connects or fixes two or more objects, parts or pieces. A hardware device which in addition serves an electrical function shall also be considered a fastener;

(41) ‘removable fastener’ means a fastener that is not a reusable fastener, but whose removal does not damage the product, or leave residue, which precludes reassembly;

(42) ‘resupplied fastener’ means a removable fastener that is supplied at no additional cost with the spare part which it is intended to connect or fix; adhesives shall be considered resupplied fasteners if they are supplied with the spare part in a quantity that is sufficient for the reassembly, at no additional cost;

(43) ‘reusable fastener’ means a fastener that can be completely reused in the reassembly for the same purpose and that does no damage either to the product or to the fastener itself during the disassembly or reassembly process in a way that makes their multiple reuse impossible;

(44) ‘disassembly’ means a process whereby a product is separated into its parts and/or components in such a way that it could subsequently be reassembled and made operational;

(45) 'basic tools' means a screwdriver for slotted heads, a screwdriver for cross recess screws, a screwdriver for hexalobular recess heads, a hexagon socket key, a combination wrench, combination pliers, combination pliers for wire stripping and terminal crimping, half round nose pliers, diagonal cutters, multigrip pliers, locking pliers, a prying lever, tweezers, magnifying glass, a spudger and a pick;

(46) ‘commercially available tool’ means a tool that is available for purchase by the general public and is neither basic tools nor a proprietary tool;

(47) ‘generalist’ means a person with general knowledge of basic repair techniques and safety precautions;

(48) ‘use environment’ means an environment where the product is in use;

(49) ‘workshop environment’ means an environment, that is neither a use environment nor a production-equivalent environment, and where machinery and/or tools are used under controlled conditions as suitable for the repair activities;

(50) ‘declared values’ means the values provided by the manufacturer, importer or authorised representative for the stated, calculated or measured technical parameters in accordance with Article 4, for the verification of compliance by the Member State authorities.

2. In addition to the definitions referred to in paragraph 1, the following definitions apply to data storage products:'data storage product family' means a group of data storage products sharing the following common attributes, that are variations on a basic design:

(a) made by the same manufacturer;

(b) be from the same model line or machine type;

(c) utilize the same model of storage controller;

(d) fall under the same taxonomy category; and

(e) contain equal or greater amount of cache than the corresponding certified configuration.

(51) 'direct current data storage product' means a data storage product that is designed solely to operate on a DC power source;

(52) ‘optimal configuration’ of a storage product family means a product configuration which is representative of a product’s maximum peak energy efficiency performance (performance/watt) for a given workload type. This configuration represents all products certified within the family under the associated workload type specified. This configuration is provided by the manufacturer and may be optimized for transaction or streaming workloads. More than one optimal configuration can be defined for each product family;

(53) ‘Sequential Read workload’ means any I/O load consisting of consecutively issued read requests to adjacently addressed data.

(54) ‘Sequential Write workload’ means any I/O load consisting of consecutively issued write requests to adjacently addressed data.

(55) ‘Hot Band workload’ means any I/O load consisting of a collection of read and write requests that models areas of higher frequency I/O activity over the addressed data.

ANNEX II
Ecodesign requirements

1. Specific ecodesign requirements for servers and online data storage products

1.1. PSU efficiency and power factor requirements

For servers and online data storage products, with the exception of direct current servers, large servers and of direct current data storage products, the PSU efficiency at 10%, 20%, 50% and 100% of the rated load level and the power factor at 50% of the rated load level shall not be less than the values reported in Table 1.

Table 1 Minimum PSU efficiency and power factor requirements

	Minimum PSU efficiency				Minimum power factor
% of rated load	10%	20%	50%	100%	50%
Multi output	-	90%	94%	91%	0.95
Single output	90%	94%	96%	91%	0.95

1.2. Material efficiency requirements for servers and data storage products, with the exception of HPC servers

1.2.1. Design for repair and reuse

(1) Availability of spare parts

(a) From [*OP: please insert the date = 21 months after the entry into force of this Regulation*] or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, until at least 5 years after the date of end of placement on the market, when present:

(i) memory cards;

(ii) CPU;

(iii) motherboard;

(iv) graphics cards;

(v) PSU;

(vi) chassis;

(vii) batteries[1];

(viii) fans;

[1] PENDING CHECK with the provisions laid down in Article 11.3 of the Battery Regulation 2023/1542

(ix) integrated switch;

(x) RAID controllers;

(xi) network interface cards.

(b) From *[OP: please insert the date = 21 months after the entry into force of this Regulation]* or from one month after the date of placement on the market, whichever is later, the list of spare parts concerned by point (a) and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, until the end of the period of availability of these spare parts.

(2) Access to repair and maintenance information

From *[OP: please insert the date = 21 months after the entry into force of this Regulation]* or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 5 years after the date of end of placement on the market, provide access to repair and maintenance information to professional repairers for parts covered by point 1(a) in the following conditions, unless that information is made publicly available at the free access website of the manufacturer, importer or authorised representative:

(a) The manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:

(i) the professional repairer has the technical competence to repair smartphones and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;

(b) Manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;

(c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

(d) Once registered, a professional repairer shall have access, within 1 working day after requesting it, to the requested repair and maintenance information.

The information may be provided for an equivalent model or model of the same family, if relevant;

(e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace parts covered by point 1(a) and shall at least include:

(i) the unequivocal product identification;

(ii) a disassembly map or exploded view;

(iii) wiring and connection diagrams, as required for failure analysis;

(iv) electronic board diagrams;

(v) a list of necessary repair and test equipment;

(vi) technical manual of instructions for repair, including marking of the individual steps;

(vii) diagnostic fault and error information (including manufacturer-specific codes, where applicable);

(viii) component and diagnosis information (such as minimum and maximum theoretical values for measurements);

(ix) instructions for software and firmware (including reset software);

(xi) information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with points 2 (a) and (b);

(f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information.

(3) Maximum delivery time of spare parts

(a) manufacturers, importers or authorised representatives shall ensure that:

(i) during the first 3 years of the period referred to in point 1(a), spare parts are delivered within 10 working days after having received the order;

(ii) during the remaining years of the period referred to in points 1(a), spare parts are delivered within 15 working days after having received the order;

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

(4) Information on the price of spare parts

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

(5) Disassembly requirements

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

(a) From *[OP: please insert the date = 21 months after the entry into force of this Regulation]*, manufacturers, importers or authorised representatives shall ensure that the process for replacement of the parts referred to in point 1(a) with the exception of the PSU, meets the following criteria:

(i) fasteners shall be removable, resupplied or reusable;

(ii) the process for replacement shall be feasible in at least one of the following ways:

– with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;

– with commercially available tools;

(iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;

(iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.

(b) From [OP: please insert the date = 21 months after the entry into force of this Regulation], manufacturers, importers or authorised representatives shall ensure that the process for replacement of the PSU and the data storage device(s) meets the following criteria:

(i) fasteners shall be removable, resupplied or reusable;

(ii) the process for replacement shall be feasible with no tool, a tool or set of tools that is supplied with the product or spare part, or basic tools;

(iii) the process for replacement shall, as a minimum, be able to be carried out in a workshop environment;

(iv) the process for replacement shall, as a minimum, be able to be carried out by a generalist.

(6) Replacement of serialised parts

From *[OP: please insert the date = 21 months after the entry into force of this Regulation]* or from one month after the date of placement on the market, whichever is later, manufacturers, importers or authorised representatives shall, at least until 5 years after the date of end of placement on the market:

(a) in case the parts to be replaced by spare parts referred to in point 1(a) are serialised parts, provide non-discriminatory access for professional repairers to any software tools, firmware or similar auxiliary means needed to ensure the full functionality of those spare parts and of the device in which such spare parts are installed during and after the replacement;

(b) provide, on a free access website of the manufacturer, importer or authorised representative, a description of the procedure for the notification and authorisation of the intended replacement of serialised parts by the owner of the device referred to in point (d); the procedure shall allow for remotely providing the notification and authorisation;

(c) Before providing access to the software tools, firmware or similar auxiliary means referred to in point (a), the manufacturer, importer or authorised representative may only require to have received a notification and authorisation of the intended part replacement by the owner of the device. Such notification and authorisation may also be provided by a professional repairer with the explicit written consent of the owner;

(d) Manufacturers, importers or authorised representatives shall provide access to the software tools, firmware or similar auxiliary means referred to in point (a) within 10 working days after having received the request and, where applicable, the notification and authorisation referred to in point (c);

(e) The access to the software tools, firmware or similar auxiliary means referred to in point (a) may, as regards professional repairers, be limited to professional repairers registered in accordance with points 2(a) and (b).

1.2.2. Requirements on secure data deletion

A functionality for secure data deletion shall be made available for the deletion of data contained in all data storage devices of the product.

1.2.3. Requirement on firmware availability

The latest available version of the firmware shall be made available from two years after the placing on the market of the first product of a certain product model for a minimum period of eight years after the placing on the market of the last product of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmwares shall be made available from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model, free of charge.

2. Specific ecodesign requirements on the energy efficiency of servers and data storage products, with the exception of large servers, server appliances, fully fault tolerant servers, hyperconverged servers, resilient servers, HPC servers and servers with integrated APA.

2.1. Idle state power

From *[OP: please insert the date = 21 months after the entry into force of this Regulation]*, the idle power to workload ratio shall be calculated using the equation below, where the measured idle power is divided by the 100% utilized Hybrid SSJ workload power.

$$Idle\ power\ to\ workload\ ratio = \frac{idle\ power\ (in\ Watts)}{100\%\ SSJ\ workload\ power\ (in\ Watts)}$$

The resulting idle power to workload ratio shall not exceed the limits shown in Table 2 below:

Table 2 Idle power consumption to workload ratio limits

	Product type	Idle to workload ratio maximum value
Product models that are not part of a server product family	1-socket or 2-socket servers (neither blade nor multi-node servers)	0.38
	Blade or multi-node servers	0.16
Product models that are part of a server product family	typical configuration and high-end performance configuration	0.38
	low-end performance configuration	0.51

2.2. Active state efficiency

From *[OP: please insert the date = 21 months after the entry into force of this Regulation]*, the active state efficiency (Eff_{server}) of servers shall not be lower than the values in Table 3.

Table 3 Active state efficiency requirements for servers

Product type	Minimum active state efficiency score (SERT)
1-socket rack servers	15.3
2-socket rack servers	23.4
4-socket rack servers	20.3
2-socket Blade or multi-node servers	21.1
4-socket Blade or multi-node servers	22.4

From *[OP: please insert the date = 21 months after the entry into force of this Regulation]:*

- Data storage products designed for transaction workloads shall be compliant with the applicable requirements specified in Table 4.

- Data storage products designed for streaming workloads shall be compliant with at least one of the two applicable requirements specified in Table 4.

Data storage products may be declared to be designed for transaction workloads, for streaming workloads, or for both. They shall comply with the requirements of each category for which they are declared.

Table 4 Active state efficiency requirements for data storage products

Data storage product type	Load type	Minimum performance / Watt Ratio of the Optimal Configuration
data storage product designed for transaction workloads	Block I/O, transaction workload- Hot Band	28.0 (IOPS/Watt)
data storage product designed for streaming workloads	Block I/O, streaming workload- Sequential Read	2.3 (MiBS/Watt)
	Block I/O, streaming workload- Sequential Write	1.5 (MiBS/Watt)

3. Information to be provided by manufacturers

3.1. With the exception of custom made servers, made on a one-off basis, the following product information on servers shall be provided in the instruction manuals for installers and end-users (when present with the product), and on the free-access websites of manufacturers, their authorised representatives and importers from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model:

(a) product type;

(b) manufacturer's name, registered trade name and registered trade address at which they can be contacted;

(c) product model number, and if applicable the low-end performance configuration and the high-end performance configuration model numbers;

(d) year of manufacture;

(e) PSU efficiency at 10 % (if applicable), 20 %, 50 % and 100 % of rated output power, with the exception of direct current servers, expressed in % and rounded to the first decimal place;

(f) power factor at 50% of the rated load level, with the exception of direct current servers, rounded to three decimal places;

(g) PSU rated power output (Watts), rounded to the nearest integer. If a product model is part of a server product family, all PSUs offered in a server product family shall be reported with the information specified in (e) and (f);

(h) idle state power, expressed in Watts and rounded to the first decimal place;

(i) idle power to workload ratio;

(j) maximum power, expressed in Watts and rounded to the first decimal place;

(k) declared operating condition class, as detailed in Table 5;

(l) idle state power (Watts) at the higher boundary temperature of the declared operating condition class;

(m) the active state efficiency, rounded to one decimal place, and the performance in active state of the server or storage product;

(n) information on the secure data deletion functionality referred to in point 1.2.2 of this Annex, including instructions on how to use the functionality, the techniques used and the supported secure data deletion standard(s), if any;

(o) for blade servers, a list of recommended combinations with compatible chassis;

(p) if a product model is part of a server product family, a list of all model configurations that are represented by the model shall be supplied.

If a product model is part of a server product family, the product information required for items e) to m) under point 3.1 shall be reported for the low-end and high-end performance configurations of the server product family.

3.2. With the exception of custom made data storage products, made on a one-off basis, the following product information on online data storage products shall be provided in the instruction manuals for installers and end-users (when present with the product), and on the free-access websites of manufacturers, their authorised representatives and importers from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model:

(q) product type;

(r) manufacturer’s name, registered trade name and registered trade address at which they can be contacted;

(s) product model number;

(t) year of manufacture;

(u) PSU efficiency at 10 % (if applicable), 20 %, 50 % and 100 % of rated output power, with the exception of direct current online data storage products, expressed in % and rounded to the first decimal place;

(v) power factor at 50% of the rated load level, with the exception of direct current online data storage products, rounded to three decimal places;

(w) if the data storage product is designed for transaction workloads or for streaming workloads;

(x) the minimum performance/ Watt ratio for transaction workload, the minimum performance/ Watt ratio for sequential read and the minimum performance/ Watt ratio for sequential write of the data storage product;

(y) declared operating condition class, as detailed in Table 5; it shall also be indicated that 'This product has been tested in order to verify that it will function within the boundaries (such as

temperature and humidity) of the declared operating condition class';

(z) information on the data deletions tool(s) referred to in point 1.2.2 of this Annex, including instructions on how to use the functionality, the techniques used and the supported secure data deletion standard(s), if any.

3.3. The following product information on servers and online data storage products shall be made available from the time a product model is placed on the market until at least eight years after the placing on the market of the last product of a certain product model free of charge by manufacturers, their authorised representatives and importers to third parties dealing with maintenance, repair, reuse, recycling and upgrading of servers (including brokers, spare parts repairers, spare parts providers, recyclers and third party maintenance) upon registration by the interested third party on a website provided:

(aa) A list of components, their number codes and material content covering the following components: CPU, PSUs, data storage devices, memory, motherboard, graphic card, chassis, batteries, fans, integrated switch, RAID controllers and Network Interface Cards.

(bb) For the components listed above, the indicative weight range (less than 5g, between 5g and 25g, above 25g) at component level, of the following critical raw materials:

(a) Cobalt in the batteries;

(b) Neodymium in the HDDs;

(c) Silicon in all components;

(d) Germanium in all components;

(e) Tantalum in all components;

(f) Gold in all components;

(g) Dysprosium in all components.

(cc) a description of the disassembly steps for each spare part concerned by point 1.2.1(a), including the tool(s) and fastener(s) needed at each step, if any.

In the case of servers, if a product model is part of a server product family, the product information required for items a) and b) under point 3.3 shall be reported either for the product model or, alternatively, for the low-end and high-end configurations of the server product family.

3.4. The following product information on servers and online data storage products shall be provided in the technical documentation for the purposes of conformity assessment pursuant to Article 4:

(dd) Information listed in points 3.1 and 3.3, in the case of servers

(ee) Information listed in points 3.2 and 3.3, in the case of data storage products

3.5. From [OP: please insert the date = 21 months after the entry into force of this Regulation] manufacturers, importers or authorised representatives of online 3 and online 4 data storage products shall include in the product a feature to measure and report input power (Watts) and inlet air temperature (°C). The data shall be made available in a published or user-accessible format that is readable by third-party, non-proprietary management systems. This data shall be available over a standard network for end users and third-party management systems.

3.6. From [OP: please insert the date = 21 months after the entry into force of this Regulation] manufacturers, importers or authorised representatives of servers, with the exception of large servers, server appliances, fully fault tolerant servers, hyperconverged servers, resilient servers and HPC servers, shall include in the product a processor power management functionality, enabled and shipped as default.

3.7. From [OP: please insert the date = 21 months after the entry into force of this Regulation] manufacturers, importers or authorised representatives of servers shall include in the product a feature to make available real-time data on:

(a) input power consumption (W) and average utilisation of all logical CPUs. Data shall be made available in a published or user-accessible format that is readable by third-party, non-proprietary management software over a standard network. For blade and multi-node servers and systems, data may be aggregated at the chassis level. Average processor utilisation shall be estimated for each logical CPU that is visible to the OS and shall be reported to the operator or user of the computer server through the operating environment (OS or hypervisor).

(b) real-time data on inlet air temperature (°C) monitoring and fan speed management capability that is enabled by default. Data shall be made available in a published or user-accessible format that is readable by third-party, non-proprietary management software over a standard network. For blade and multi-node servers and systems, data may be aggregated at the chassis level.

Table 5 Operating condition classes

	Dry bulb temp °C		Humidity range, non-condensing			
Operating condition class	Allowable range	Recommended range	Allowable range	Recommended range	Max dew point (°C)	Maximum rate of change (°C/hr)
A1	15- 32	18-27	–12°C Dew Point (DP) and 8% relative humidity (RH) to 17°C DP and 80%	–9°C DP to 15°C DP and 60% RH	17	5/20

			RH			
A2	10-35	18-27	–12°C DP and 8% RH to 21°C DP and 80% RH	Same as A1	21	5/20
A3	5-40	18-27	–12°C DP and 8% RH to 24°C DP and 85% RH	Same as A1	24	5/20
A4	5-45	18-27	–12°C DP and 8% RH to 24°C DP and 90% RH	Same as A1	24	5/20

ANNEX III
Measurements and calculations

1. For the purposes of compliance and verification of compliance with the applicable requirements of this Regulation, measurements and calculations shall be made using harmonised standards, the reference numbers of which have been published in the Official Journal of the European Union, or using other reliable, accurate and reproducible methods which take into account the generally recognised state of the art, and produce results deemed to be of low uncertainty.

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

2. Servers shall be tested either in their individual product model configuration or, for servers which are part of a server product family, in the low-end performance configuration, typical configuration and the high-end performance configuration as declared for Annex II, point 3.1.(p), which includes both hardware configuration and system settings, unless otherwise specified.

   All configurations offered within a server product family shall contain the same number of populated processor sockets used during testing. A server product family can be defined for a server with only partially populated sockets (e.g. one processor populated in a two socket server) as long as the configuration(s) are tested as a separate server product family, as required, and meet the same requirements for the number of populated sockets within that separate server product family.

   For servers with expansion APA, the unit under test shall be tested with the expansion APA removed, when measuring the idle state power, the active state efficiency) and the server performance in active state. Where an expansion APA relies on a separate Peripheral Component Interconnect Express switch for communication between the APA and CPU, the separate Peripheral Component Interconnect Express card(s) or riser(s) shall be removed for Active State and Idle State testing of all configurations.

   For multi-node servers, the unit under test shall be tested for per node power consumption in the fully-populated chassis configuration. All multi-node servers in the multi-node chassis shall share the same configuration (homogeneous).

   For blade servers, the unit under test shall be tested for blade server power consumption in the half-populated chassis configuration, and the chassis shall be populated as follows:

   (56) Individual blade server configuration

      (a) All individual blade servers installed in the chassis shall be identical, sharing the same configuration

   (57) Half chassis population

      (a) The number of blade servers required to populate half the number of single-wide blade server slots available in the blade chassis shall be calculated.

(b) For blade chassis having multiple power domains, the number of power domains that is closest to filling half of the chassis shall be chosen. If there are two choices that are equally close to filling half of the chassis, the test shall be performed with the domain or combination of domains which use a higher number of blade servers.

(c) All user manual or manufacturer recommendations for partially populating the chassis, which may include disconnecting some of the power supply units and cooling fans for the unpopulated power domains, shall be followed.

(d) If user manual recommendations are not available or are incomplete, then the following guidance shall be used:

(i) Completely populate the power domains;

(ii) If possible, disconnect the power supply units and cooling fans for unpopulated power domains;

(iii) Fill all empty bays with blanking panels or an equivalent airflow restriction for the duration of testing.

3. The data to calculate the active state efficiency (Eff_{server}) and the idle power (P_{idle}) shall be measured during the same test according to the relevant standard, where the idle power can be measured either before or after running part of the test for the active state efficiency.

The active state efficiency (Effserver) of servers shall be calculated as:

$$Eff_{server} = \exp\left[W_{cpu} \times \ln\left(Eff_{cpu}\right) + W_{Memory} \times \ln\left(Eff_{Memory}\right) + W_{Storage} \times \ln\left(Eff_{Storage}\right)\right]$$

where: W_{CPU}, W_{Memory} and $W_{Storage}$ are the weightings applied to the CPU, Memory and Storage worklets respectively, as follows:

– W_{CPU} is the weighting assigned to the CPU worklets = 0,65;

– W_{Memory} is the weighting assigned to the Memory worklets = 0,30;

– $W_{Storage}$ is the weighting assigned to the Storage worklets = 0,05;

and

$$Eff_{CPU} = \left(\prod_{i=1}^{7} Eff_i\right)^{1/7}$$

where:

– i = 1 for worklet*Compress;*

– i = 2 for worklet*LU;*

– i = 3 for worklet*SOR;*

– i = 4 for worklet*Crypto;*

– i = 5 for worklet*Sort*;

– i = 6 for worklet*SHA256;*

– i = 7 for worklet*Hybrid SSJ;*

$$Eff_{Memory} = \left(\prod_{i=1}^{2} Eff_i \right)^{1/2}$$

where:

– i = 1 for workletFlood3;

– i = 2 for workletCapacity3;

$$Eff_{Storage} = \left(\prod_{i=1}^{2} Eff_i \right)^{1/2}$$

where:

– i = 1 for workletSequential;

– i = 2 for workletRandom;

and

$$Eff_i = 1000 \frac{Perf_i}{Pwr_i}$$

where

– $Perf_i$: Geometric mean of the normalized interval performance measurements;

– Pwr_i : Geometric mean of the measured interval power values;

In order to create a single energy efficiency metric for a server the interval efficiency values for all the different worklets shall be combined using the following procedure:

a) combining the interval efficiency values for the individual worklets using the geometric mean to obtain individual worklet Efficiency values for the worklet;

b) combining worklet efficiency scores using the geometric mean function by workload type (CPU, Memory, Storage) to obtain a workload type value;

c) combining the three workload types using a weighted geometric mean function to obtain a single, total server efficiency value.

4. For data storage products, the manufacturer must choose a workload type for testing (transaction or streaming), in line with declared classification (for transaction workloads, for streaming workloads, or for both). The manufacturer must choose a single type or combination of types (in the case of a hybrid hard disk/solid state storage device product) of hard disk storage devices and/or solid state storage devices which result in the highest work/watt for that chosen workload type.

The weighted percentages provided below shall be used to calculate the appropriate optimal configuration for a given workload type point for a data storage product.

For block I/O systems:

- transaction based optimal points shall be weighted 100% to the hot band workload;

- streaming based optimal points shall be be weighted 50% for each of the sequential read and sequential write workloads.

ANNEX IIIa

Transitional Methods

Table 6

References and qualifying notes for servers

Parameter	Source	Reference Test Method / Title	Notes	
Server efficiency and server performance in active state	ETSI	ETSI EN 303 470:2019		General notes on the testing with EN 303 470: 2019: a. Testing shall be conducted at an appropriate EU voltage and frequency (e.g. 230v, 50Hz). b. Similar to the provision on expansion APA cards under point 2 of Annex III , the unit under test shall be tested with other types of add-in cards (for which no allowance is provided and not exercised in SERT testing) removed, when measuring the idle state power, the active state efficiency and server performance in active state[2]'. c. In the case of servers which i. are not declared as being part of a server product family ii. are as-shipped in a configuration without all memory channels populated with the same dual in-line memory modules (DIMMs) a configuration with all memory channels populated with the same DIMMs shall be tested[3].
Idle power to workload ratio	ETSI	ETSI EN 303 470:2019	'100% utilized SSJ workload' represents the worklet *Hybrid SSJ*, specifically the measurement taken at the 100% utilization point.	
Maximum power	ETSI	ETSI EN 303 470:2019	Maximum power is the highest measured power demand reported by SERT testing under any single workload and load level.	
Idle state power at the higher boundary temperature of the declared operating condition class	The Green Grid	Simplified high temperature idle power reporting for (EU) 2019/424 SERT collection	The test shall be conducted at a temperature corresponding to the highest allowable temperature for the specific operating condition class (A1, A2, A3 or A4).	
Power Supply Efficiency	EPRI and Ecova	Generalized Test Protocol for Calculating the Energy Efficiency	Testing shall be conducted at an appropriate EU voltage and frequency (e.g. 230v, 50Hz).	

[2] This is necessary because of the wide variation of APA cards in the market and the fact that the SERT tool does not include any worklets which exercise APAs. Therefore, SERT efficiency results for servers with the expansion APA cards or other add-in cards would not be representative of the performance/power capability of the server.

[3] In the case of servers which are declared as being part of a server product family, point 1 of Annex IV to Regulation (EU) 2019/424 foresees that the Member State authorities can test the low-end performance configuration or the high-end performance configuration and, as per definitions 21 and 22 of Annex I, these configurations shall have all memory channels populated with the same DIMM raw card design and capacity.

Parameter	Source	Reference Test Method / Title	Notes
		of Internal AC-DC and DC-DC Power Supplies Revision 6.7	
Power Supply Power Factor	EPRI and Ecova	Generalized Test Protocol for Calculating the Energy Efficiency of Internal AC-DC and DC-AC Power Supplies Revision 6.7	
Operating condition class		The manufacturer has to declare the product operating condition class: A1, A2, A3 or A4. The unit under test is placed at a temperature corresponding to the highest allowable temperature for the specific operating condition class (A1, A2, A3 or A4), which the model is declared to be compliant with. The unit shall be tested with SERT (Server Efficiency Rating Tool) and run test cycle(s) for a duration of 16 hours. The unit shall be considered to comply with the declared operating condition, if SERT reports valid results (i.e. if the unit under test is in its operational state for the whole duration of the 16 hours test).	The unit under test shall be placed in a temperature chamber which is then elevated in temperature to the highest allowable temperature for the specific operating condition class (A1, A2, A3 or A4) at a maximum rate of change of 0.5 °C per minute. The unit under test shall be left in an idle state for 1 hour to attain a state of temperature stability prior to the start of testing.
Firmware availability		Not available	
Secure data deletion	NIST	Guidelines for Media Sanitization, NIST Special Publication 800-88 - Revision 1	
Ability of the server to be disassembled		Not available	

Parameter	Source	Reference Test Method / Title	Notes
Critical raw material (CRM) content		EN 45558:2019	

Table 7

References and qualifying notes for data storage products

Parameter	Source	Reference Test Method / Title	Notes
Power Supply Efficiency	EPRI and Ecova	Generalized Test Protocol for Calculating the Energy Efficiency of Internal AC-DC and DC -DC Power Supplies Revision 6.7	Testing shall be conducted at an appropriate EU voltage and frequency (e.g. 230v, 50Hz).
Power Supply Power Factor	EPRI and Ecova	Generalized Test Protocol for Calculating the Energy Efficiency of Internal AC-DC and DC -DC Power Supplies Revision 6.7	
Minimum performance/ Watt ratio	ISO/IEC	ISO/IEC 24091:2019	Transaction workload: Streaming workload- Sequential Read: EP_{SR} for Sequential Read (MiB/s/W); Streaming workload- Sequential Write: EP_{SW} for Sequential Write (MiB/s/W);
Operating condition class	The Green Grid	'Operating condition class of data storage products'	The manufacturer, importer or authorised representative has to declare the product operating condition class: A1, A2, A3 or A4. The unit under test is placed at a temperature corresponding to the highest allowable temperature for the specific operating condition class (A1, A2, A3 or A4), which the model is declared to be compliant with.
Firmware availability		Not available	
Secure data deletion	NIST	Guidelines for Media Sanitization, NIST Special Publication 800-88 - Revision 1	
Ability of the data storage product to be disassembled		Not available	.
Critical raw material (CRM) content		EN 45558:2019	

ANNEX IV
Verification procedure for market surveillance purposes

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

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

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

1. The Member State authorities shall verify one single unit of the model or, in case the manufacturer reports on a server product family, of the model configuration. If the verification is done on the low-end performance configuration or the high-end performance configuration, the declared values shall be the values for the respective configuration. If the verification is performed on a randomly selected or ordered model configuration, the declared values shall be the values for the high-end performance configuration.

2. The model or model configuration shall be considered to comply with the applicable requirements where all of the following conditions are fulfilled:

(a) the values given in the technical documentation pursuant to Annex IV, point 2, to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and

(b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;

(c) when the Member State authorities test the unit of the model or alternatively, in case the manufacturer declared the server to be represented by a server product family, of the low-end performance configuration or the high-end performance configuration of the server product family, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 8.

3. If the results referred to in points 2(a) or 2(b) are not achieved, the model and all model configurations that are covered by the same product information (according to Annex II point 3.1(p) shall be considered not to comply with this Regulation;

4. If the result referred to in point 2(c) is not achieved:

(a) for models or model configurations from a server product family that are produced in quantities of less than five per year, the model and all model configurations that are covered by the same product information (according to Annex II point 3.1(p)) shall be considered not to comply with this Regulation;

(b) for models that are produced in quantities of five or more per year, the Member State authorities shall select three additional units of the same model or alternatively, in case the manufacturer, importer or authorised representative declared the server to be represented by a server product family, a unit of both the low-end performance configuration and the high-end performance configuration for testing.

5. The model or model configuration shall be considered to comply with the applicable requirements if, for the units referred to in point 4(b), the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 8.

6. If the result referred to in point 5 is not achieved, the model and all model configurations that are covered by the same product information (according to Annex II point 3.1(p)) shall be considered not to comply with this Regulation.

7. The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision being taken on the non-compliance of the model according to points 3, 4(a), 6 or the second paragraph of this Annex.

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

The Member State authorities shall only apply the verification tolerances that are set out in Table 8 of this Annex and shall only use the procedure described in points 1 to 7 for the requirements referred to in this Annex. For the parameters in Table 8, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 8— Verification tolerances

Parameters	*Verification tolerances*
PSU efficiency (%)	The determined value shall not be lower than the declared value by more than 2 %.
Power factor	The determined value shall not be lower than the declared value by more than 10 %.
Idle state power, P_{idle} and maximum power (W)	The determined value shall not exceed the declared value by more than 10 %.
Active state efficiency and performance in active state of servers	The determined value shall not be lower than the declared value by more than 5 %.
Minimum performance/Watt Ratio of data storage products of data storage products	The determined value shall not be lower than the declared value by more than 10 %.

ANNEX V
Indicative benchmarks referred to in Article 6

The following indicative benchmarks are identified for the purpose of Part 3, point 2 of Annex I to Directive 2009/125/EC.

They refer to the best available technology by [OP – please insert the date of entry into force of this Regulation].

The indicative benchmarks for the best available technology on the market for servers and online data storage products are as follows.

Table 9 Benchmark for idle state power, server efficiency and operating condition

Product type	Idle power, W	Active state efficiency	Operating condition class
Tower server, 1 socket	45.8	33.4	A3
Rack server, 1 socket	34.1	75.3	A4
Rack server, 2 socket, low performance	62.8	35.8	A4
Rack server, 2 socket, high performance	63.7	79.8	A4
Rack server, 4 socket	123.4	35.7	A4
Blade server, 2 socket	72.2	34	A3
Blade server, 4 socket	63.3	33.2	A3
Resilient server, 2 socket	251.1	34.2	A3
Block I/O Data storage products, Transaction workload	Not Available	427	Not Available
Block I/O Data storage products, Streaming workload- Sequential Read	Not Available	11.68	Not Available
Block I/O Data storage products, Streaming workload- Sequential Read	Not Available	13.32	Not Available

Table 10 Benchmark for PSU efficiency at 10%, 20%, 50% and 100% load level and power factor at 20% or 50% load level

PSU nameplate power	10%	20%	50%	100%
< 750W	91.17%	93.76%	94.72% Power factor >0.95	94.14%
≥ 750W	95.02%	95.99% Power factor >0.95	96.09%	94.69%