Certification Rule Complement - Computer Goods

Summary

Certification Rule Complement - Computer Goods

1 OBJECTIVE

This document presents the complementary criteria of the "Rules for Certification of Products" RC-001_EN for granting and maintaining the license to use the Mark of Conformity of TÜV Rheinland do Brasil Ltda., voluntary certification. Sets out the requirements for the Program for Conformity Assessment of IT Goods with a focus on safety, electromagnetic compatibility and energy efficiency, through the voluntary certification mechanism, in compliance with regulatory requirements, aiming to reduce accidents, increase quality, and reduce the energy consumption of products

2 ACRONYM

CISPR	Comité International Spécial des Perturbations Radioélectriques
EMC	Electromagnetic Compatibility

3 DEFINITIONS

For this CRC the definitions of RGCP are valid, in addition to the ones below:

3.1 Critical Components

One whose characteristics directly impact the safety, immunity and/or electromagnetic interference or energy efficiency of the final product.

3.2 Most Unfavorable Product Condition

A condition in which maximum performance of the product or accessory is required. Examples of most unfavorable conditions are the maximum data transfer and recording rate, the condition of maximum simultaneous operation of communication ports and the condition of maximum emission of radio frequency power and occupation of the radioelectric spectrum. This condition will be analyzed case by case, according to the criterion to be evaluated and the configurations available for the equipment.

3.3 Reduced Configuration

A particular piece of equipment is in reduced configuration when it is derived from a more complete object whose conformity has already been assessed. An object in reduced configuration will differ from the complete equipment by the removal of accessory(s) and/or equipment(s).

3.4 Complementary Tests

Tests performed to analyze variations in relation to an equipment already tested. Examples of these variations are differences in configuration, supply voltage or critical components.

3.5 Production Quality Control Testing

Routine tests in which manufacturers control the quality of 100% of the equipment produced, during or at the end of production, in order to ensure the safety and operation of the product before it is delivered to the customer.

3.6 Family for Computer Goods

Grouping of equipment models for the same purpose, derived from a maximum configuration, including list of components and sub-assemblies, besides the description of how the models are built and that, typically, have in common the basic design, construction, essential parts and/or assemblies, with allowed variations of a main product and that are, necessarily, from the same manufacturer, the same manufacturing unit and the same production process.

3.7 Cabinet

Enclosure designed to contain the electro-electronic circuits and devices that compose the product and/or accessories.

3.8 Prototype

It is the product in its testing or planning phase. In this phase, it consists of parts and final tooling, but its production process is not yet completely definitive, and it is not intended for commercialization.

3.9 Highly specialized equipment

Equipment for specific professional use, installed in an environment specially built and adapted for its operation, with an individualized and specific power supply network, in such a way that the maintenance of the equipment needs to be performed at the place where it is installed. Bank equipment (bank self-service teller machines and consultation and self-service terminals), and data storage equipment (storages) and servers are classified as such.

4 CONFORMITY ASSESSMENT MECHANISMS

The Conformity Assessment Mechanism used in this document is Voluntary Certification.

5 STAGES OF CONFORMITY ASSESSMENT

The conformity assessment process consists of several steps. Each stage shall follow a sequence of procedures, according to the certification Models, as follows.

5.1 Definition of the Certification Model(s) used

The voluntary certification models used for the objects covered by this CRC are models 5 or 7, according to RGCP.

5.1.1 Certification Model Steps

The sequence of steps for certification by model 5 is:

- Initial assessment - item 6.2 of RGCP
- Maintenance Assessment - item 6.3 of RGCP
- Recertification assessment - item 6.4 of RGCP

The sequence of steps for certification by model 7 is:

– Initial assessment - items 6.2.1, 6.2.2, 6.2.4, 6.2.5 and 6.2.6 of RGCP.

5.2 Initial Evaluation

This item describes the steps of the process that aims to certify the conformity of the object.

5.2.1 Certification Request

All the documentation requested in RGCP must be forwarded, plus the following:

a) models that compose the family of the object in question and respective configurations, as well as the rule of formation of the family, if any;

b) descriptive memorial, referencing its functional technical description, nominal specifications, resources, functionalities, use of accessories, limitations of use, special care and other relevant data;

c) photo documentation of the object: external and internal photos of all faces, detailing labels, logos, warnings, inputs, outputs, actuation buttons, etc. and photos allowing detailed view of critical components and critical points of the equipment assembly;

d) option as to the Certification model (item 5.1), as mentioned in this CRC;

e) user manual and service instructions in Portuguese, except for highly specialized equipment that may be in English, alternatively;

f) list and specifications of critical components and certified components; and

g) electrical or connection diagrams, printed circuit board layout (when applicable) and exploded view or assembly drawings of the models.

Note: the documents mentioned in letters "a", "b", "f" and "g", must be provided in Brazilian Portuguese, preferably, or alternatively in English.

5.2.1.1 In case of Model 7, the definition and identification of the batch subject of Certification and the Import License shall be attached, in case of imported objects.

Note: the batch shall be composed of products from the same manufacturer, same model and sequential serial numbers.

5.2.2 Analysis of the Application and of the Conformity of the Documentation

The criteria for Analysis of the Application and Compliance of the Documentation shall follow the conditions described in RGCP.

5.2.3 Initial audit of the Management System(s)

The criteria for the Initial Audit of the Management System shall follow the conditions described in RGCP, in addition to what is described in the item below.

5.2.3.1 During the initial audit the following requirements shall be verified:

- The production quality control tests being performed in the production line of the product to be certified;
- The measuring equipment for production quality control tests, which shall have specifications compatible with the normative requirements and be properly calibrated;
- The existence of a procedure for handling non-conforming products detected in production;
- That the critical components related to the composition of the family, their original specifications and approved suppliers are being used in the production line.

5.2.4 Initial Test Plan

The criteria for establishing the Initial Test Plan shall follow the conditions described in RGCP. The tests shall be performed in the sample that represents the family as defined in 5.2.4.1 and 5.2.4.2.

The Test Plan shall also consider the complementary tests resulting from model variations within the family, as defined in Annex B.

The initial tests shall be performed and recorded according to the steps below:

5.2.4.1 Definition of tests to be performed

The tests shall be performed, in the configuration that represents the most unfavorable condition, on a sample representative of the family.

When there is variation in the critical components among the models of the family, it shall be followed what is described in Annex B, which discriminates the critical components for each category of equipment and the rules for the performance of additional tests that may be necessary.

Type tests performed previously shall be accepted, provided they are issued no more than 2 years ago and by laboratories that comply with item 5.2.4.3 of this CRC, except for highly specialized equipment where, exceptionally, reports issued three (3) years ago shall be admitted.

5.2.4.2 Definition of sampling

TÜV Rheinland is responsible for witnessing the collection of samples of the object to be certified. For the purposes of initial testing, samples shall be tested according to the tables below:

Model 5 Certification

Requirement	Reference Document	Proof	Counter-Evidence	Witness	Acceptance Criteria
Safety	All tests of IEC 60950-1	1	1	1	No nonconformities
EMC	All the items of the applicable standards (CISPR 22 and 24)	1	1	1	No nonconformities
Energy Efficiency	In accordance with Annex E	1	1	1	Fulfillment of maximum consumption values

Note 1: The number of samples defined as evidence means the number of samples necessary to obtain a valid result for conformity assessment. The total number of samples, or other replacement components required to perform the tests, shall be agreed with the laboratory according to the sequence and the tests that may cause damage to the product and prevent the continuation of the rest of the tests.

Note 2: If non-conformity is detected in the test sample, on request of the manufacturer the test shall be repeated on the counter sample.

If the counterevidence shows non-conformity, the contestation is closed and the sample is considered to have failed the test.

If the counterevidence is found not to be non-compliant, then the witness sample shall be tested.

If the witness is found to be nonconforming, the objection is closed and the sample is considered to have failed the test.

If the witness is found not to be non-compliant, the sample is considered to have passed the test.

Note 3: At the discretion of the manufacturer, the counter and witness samples do not necessarily need to be taken. In this case, there can be no dispute about any non-conformity detected.

Certification Model 7 - Batch

Requirement	Reference Document	Sample Testing
Safety	IEC 60950-1	Complete tests to IEC 60950-1 standard on two samples plus tests C.2 to C.4 of Annex C, according to Annex B, in accordance with NBR 5426, AQL 0.25, special inspection level S3.
EMC	CISPR 22 and 24	Complete tests on two samples in the standards CISPR-22 and CISPR-24 plus tests in the standards IEC 61000-4-2 / 4-4 and 4.6 on nº of samples in accordance with NBR 5426 AQL 0.25, special inspection level S3.
Energy Efficiency	Annex E	Tests on 2 samples as per Annex E.

5.2.4.2.1 Additional safety and EMC testing on definitive products may be requested by TÜV Rheinland when prototype is used in initial testing.

5.2.4.2.2 For energy efficiency, models within the same family should be evaluated in their minimum (basic) and maximum settings.

5.2.4.2.3 The tests performed for a model of the same family may be considered valid for reduced configurations of the equipment, provided that TÜV Rheinland analyzes and documents the impacts on the risks related to energy, electrical, mechanical, fire, heating, radiation, and chemicals. Specific details on reduced equipment configuration can be found in Annex B.

5.2.4.3 Definition of the Laboratory

The definition of the laboratory shall follow the conditions described in RGCP.

5.2.4.3.1 In addition to what is established by RGCP, test reports issued by 1st party laboratories accredited by Inmetro or by accreditation bodies signatory to ILAC shall be accepted.

5.2.4.3.2 In addition to what is established by RGCP, test reports issued by laboratories recognized under the *Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components* - IECEE CB SCHEME (Global System for Conformity Testing and Certification of Electrical Equipment and Components) shall also be accepted.

5.2.4.3.3 The tests previously carried out shall only be accepted if the holder of the report can demonstrate that the product to be certified is the same as the one tested, including in relation to its project, its components, its specifications and its suppliers.

5.2.4.3.4 In addition to what is established by RGCP, the procedures and criteria as to measurement uncertainties adopted by IECEE CB SCHEME (ABNT IEC Guide 115 or IEC Guide 115) shall be accepted.

5.2.5 Treatment of non-compliances in the initial assessment stage

The criteria for treatment of non-compliances in the initial assessment stage shall follow the conditions described in RGCP.

5.2.6 Issuance of the Certificate of Compliance

The criteria for Issuance of the Certificate of Compliance shall follow the conditions described in RGCP and in Annex B.

5.2.6.1 Certification Committee

Not applicable, being the critical analysis and the certification decision made by a technician from TÜV Rheinland who was not part of the certification process.

5.2.6.2 Certificate of Compliance

The Certificate of Compliance issued according to the conditions described in 5.2.6 shall be valid for a period of 3 (three) years and shall contain the following wording, when it comes to certification according to Model 5: "The validity of this Certificate is linked to the performance of maintenance assessments and treatment of possible non-conformities in accordance with the guidelines of TÜV Rheinland and provided for in the specific RAC of Ordinance No. 407:2015.

Note: If more than one page is required for the composition of the certificate, they shall be unequivocally identified, referring in correspondence to the numbering and coding of the Certificate of Compliance. In this case, the certificate shall contain the expression "Certificate of Compliance valid only accompanied by all its pages".

5.2.6.2.1 The Certificate of Compliance, as a formal instrument issued by TÜV Rheinland, shall, in addition to the provisions of RGCP, contain at least:

a) identification of the certification model (model 5 or 7);

b) IEC 60950-1 standard and the applicable standards for electromagnetic compatibility, with their respective years of publication and reference to the Ordinance that approved this CRC;

c) all commercial and import identification numbers, if any, of the models of the certified family;

d) list of all accessories and critical items (manufacturer and model) that define the configuration of the equipment.

5.3 Maintenance Assessment

The Maintenance Assessment process occurs between the initial certification of the object and its recertification. The frequency of these assessments is annual.

5.3.1 Maintenance Audit

The criteria contemplated in RGCP shall be followed. In addition, the described in the item below shall be verified.

5.3.1.1 During the audit, the following requirements shall be verified:

- The production quality control tests being performed in the production line of the product to be certified; (routine tests, according to Annex C)
- The measuring equipment for production quality control tests, which shall have specifications compatible with the normative requirements and be duly calibrated;
- The existence of a procedure for handling non-conforming products detected in production;
- That the critical components listed in the family composition, their original specifications and approved suppliers are being used in the production line.

5.3.2 Maintenance Test Plan

The maintenance tests, defined in 5.3.2.2, shall be performed by laboratories that meet the described in 5.2.4.3, in periods of 12 months.

The highly specialized equipment (as defined in sub-item 3.9) shall be exempted from maintenance tests, provided that the same initial conditions of certification are maintained at

the time of maintenance audit. In case of modification in the process, project or components of the product, TÜV Rheinland shall be informed in advance for analysis and decision on the need for new or complementary tests.

Note: Initial condition of certification means maintenance of the basic design and critical components (approved suppliers and original specification)

5.3.2.1 Definition of tests to be performed

The maintenance tests are described in item 5.3.2.2.

5.3.2.2 Definition of sampling and testing of Maintenance

At each maintenance, at the discretion of TÜV Rheinland, a model of the family shall be collected for testing, giving preference to different models at each maintenance and if possible combining with the variations of parameters and configuration. Tests and sampling to be fulfilled are described according to the table below:

Requirement	Tests	Reference Document	Proof	Counter-evidence	Witness	Criterion of acceptance
Security	Maintenance (12 months)	Items 1.5/ 1.6/ 1.7 / 2 / 3 and 5 of the IEC 60950-1 Standard	1	1	1	No nonconformities
	Recertification **(36 months)**	Items 1.5 / 1.6 / 1.7 / 4 / 5.2 / 6 and 7 of the IEC 60950-1 Standard	1	1	1	
EMC	Maintenance (12 months)	Tests of CISPR 22, IEC 61000-3-2 / 3-3	1	1	1	
	Recertification (36 months)	CISPR Tests - 24	1	1	1	
Energy Efficiency	Maintenance (12 months)	Annex E	1	1	1	Compliance with maximum consumption values
	Recertification (36 months)		1	1	1	

Note 1: The number of samples defined as evidence means the number of samples necessary to obtain a valid result for conformity assessment. The total number of samples, or other replacement components required to perform the tests, shall be agreed with the laboratory according to the sequence and the tests that may cause damage to the product and prevent the continuation of the rest of the tests.

Note 2: If non-conformity is detected in the test sample, on request of the manufacturer the test shall be repeated on the counter sample.

If the counterevidence shows non-conformity, the contestation is closed and the sample is considered to have failed the test.

If the counterevidence is found not to be non-compliant, then the witness sample shall be tested.

If the witness is found to be nonconforming, the objection is closed and the sample is considered to have failed the test.

If the witness is found not to be non-compliant, the sample is considered to have passed the test.

Note 3: At the discretion of the manufacturer, the counter and witness samples do not necessarily need to be taken. In this case there can be no dispute about any non-conformity detected.

5.3.2.3 Definition of Laboratory

The criteria for laboratory definition shall follow the conditions described in sub-item 5.2.4.3.

5.3.3 Treatment of non-compliances in the stage of Maintenance

The criteria for treatment of non-compliances in the stage of maintenance evaluation shall follow the conditions described in RGCP.

5.3.4 Maintenance Confirmation

The criteria for maintenance confirmation shall follow the conditions described in RGCP.

5.4 Recertification Assessment

The criteria for the Recertification Assessment shall follow the conditions of item 6.3 of RGCP and this CRC.

The Recertification Assessment shall be carried out every **36 (thirty-six)** months and shall include the results of the Compliance Documentation, Recertification Audit of the Management System and the Recertification Test Plan.

5.4.1 Treatment of non-compliances in the Recertification stage

The criteria for treatment of non-compliances in the stage of Recertification Assessment shall follow the conditions described in RGCP.

5.4.2 Confirmation of Recertification

The criteria for the confirmation of recertification shall follow the conditions described in RGCP.

6 HANDLING OF COMPLAINTS

The criteria for handling complaints shall follow the conditions described in RGCP.

7 ACTIVITIES CARRIED OUT BY FOREIGN OACs

The criteria for activities performed by foreign OACs shall follow the conditions described in RGCP.

8 CLOSURE OF CERTIFICATION

The criteria for closing the Certification shall follow the conditions described in RGCP.

9 IDENTIFICATION SEAL OF COMPLIANCE

9.1 The criteria for the authorization of use of the Conformity Identification Seal shall follow the conditions of RGCP.

9.2 According to Annex D, there are two models of Seals foreseen. One of them is "Safety and Performance", covering safety, EMC and energy efficiency, of exclusive and mandatory use for desktop computers (desktops) and portable computers (notebook, laptop and netbook). The other model is "Safety", covering safety and EMC, of mandatory use for all other equipment covered by this regulation.

10 AUTHORIZATION FOR USE OF THE SEAL OF CONFORMITY IDENTIFICATION

The criteria for Authorization for the use of the Seal of Conformity Identification shall follow the conditions described in RGCP.

11 RESPONSIBILITIES AND OBLIGATIONS

The criteria for responsibilities and obligations shall follow the conditions described in RGCP.

12 MARKET MONITORING

The criteria for market monitoring shall follow the conditions described in RGCP.

13 PENALIDADES PENALTIES

The criteria for the application of penalties shall follow the conditions described in RGCP.

14 REVISION HISTORY

Revision	Change	Date	Responsible
0	Translation of document CRC-P0301 Rev. 0 for English version	21.04.2021	Débora Reis

15 RELATED DOCUMENTS

- RC-001_EN – Products and Mobility Certification Rule

16 EXTERNAL REFERENCE DOCUMENTS

• Current Inmetro Ordinance	General Requirements for Product Certification – (RGCP in Portuguese)
• ABNT NBR 5426 Standard	Sampling Plan and procedures in inspection by attributes
• IEC 60950-1 Standard	Information Technology Equipment – Safety
• IEC 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
• IEC 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
• IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
• IEC 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
• IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
• IEC 61000-4-8	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
• IEC 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
• IEC 61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

• IEC 61000-3-3	Electromagnetic compatibility (EMC) -Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
• CISPR22	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
• CISPR24	Information technology equipment - Immunity characteristics - Limits and methods of measurement
• ***Inmetro Ordinance***	***Ordinance no. 170, of April 10, 2012.***
• ***Inmetro Ordinance***	***Ordinance No. 407, of August 21, 2015.***
• ***Inmetro Ordinance***	***Ordinance No. 48, of March 08, 2017***

Note: the most recent normative references in force at the publication of this CRC should be adopted, provided that they are compatible. If new editions, inclusions or amendments are published, the deadline for their adoption is 12 months or the deadline for adequacy of the standard itself, and the greater of these two deadlines shall be adopted.

During the period of adequacy referred above, Inmetro will analyze the content of the changes and if it considers that they do not meet the objective of the regulation, it may determine the maintenance of the current requirements.

ANNEX A - COVERED EQUIPMENT AND ITS RESPECTIVE ASSESSED REQUIREMENTS

Group	Equipment	Evaluated Requirements	
Banking Equipment	Bank self-service kiosks	Safety and electromagnetic compatibility	Energy Efficiency
	Consultation and self-service terminals	X	-
Data and text processing machines and associated equipment	Servers	X	-
	Terminal client (thin client)	X	-
	Data storage equipment (storages)	X	-
	Workstation	X	-
	Desktop Computers	X	X
	Integrated Desktop Computers	X	-
	Portable computers (notebook, laptop and netbook)	X	X
	Text and image scanning equipment (scanners)	X	-
	Printers	X	-
	Plotters	X	-
	Monitors (see **Note 1**)	X	-
Electrical and electronic equipment for office use	Calculators	X	-
	Copiers	X	-
	Shredder	X	-
	Paper sheet handling equipment	X	-
	Paper Sorting Machines	X	-
	Electric Bookbinder	X	-
	Electric Stapler	X	-
Other information technology equipment	Projectors and *datashow*	X	-
	Switched power supplies for Information Technology Equipment (see **Note 2**)	X	-

Note 1: Only monitors for computer related use are covered. TV equipment is not covered.

Note 2: power supplies for direct-to-market sales are included in this item.

ANNEX B - CRITERIA AND COMPOSITION OF FAMILIES

B.1 To verify the need for additional tests it is necessary to compare the critical components of each equipment model, to verify if there are different characteristics or different manufacturers of these components that may require such tests. The critical components for each category of equipment are listed in item B.3.

Note 1: in the case of energy efficiency, among the models of the family, the model with the lowest consumption configuration (basic configuration) and the one with the highest consumption (configuration with the highest number of critical components installed and also the highest consumption) must be measured. Once both have been approved, the models with intermediate configurations will be considered compliant.

Note 2: in exceptional cases, it is possible to perform complementary tests for objects whose components are not foreseen in the critical components tables of Appendix B. To support this analysis, TÜV Rheinland shall take into consideration the impacts on risks related to energy, mechanical, fire, heating, radiation, chemicals and electromagnetic compatibility.

B.2 For each family there will be a Certificate of Conformity issued. However, as provided for in item **5.2.4.2.3**, it is possible that a Certificate includes several configurations for an equipment, in which case, a list of possible critical components, their manufacturers and models shall be attached to the certificate.

B.3 - Variations and tests for families

The tests below shall be applied to the family's representative sample(s) and to its variations when applicable. Examples of such variations are the replacement, inclusion or alteration of critical components.

Note: Critical components in the tables below (**B.3.1** to **B.3.6**), of equal or lesser power, safety certified to their respective standard, do not require testing. In case the critical component is

not certified or has no particular standard, or is of higher power than initially certified, the treatment shall be that provided in item 1.5 of IEC 60950-1.

B.3.1 - Desktop, integrated desktop, thin client, graphic workstation, servers and storage equipment.

Critical Components	Safety Tests (IEC 60950)	Energy Efficiency	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 /4	Exempt	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Power Supply	Items 1.5 / 1.6 / 1.7 / 4 / 5	Energy efficiency tests must be performed for each new source	CISPR 22 - conducted emission (AC) and IEC 610004-4-4, 4-6 and 4-11 of CISPR 24 IEC 61000-3-2 and 3-3
Layout/ technology (motherboard, etc.)	Items 1.5/ 1.6 / 4 /5.2	Energy efficiency tests must be carried out for each new component	CISPR 22 and IEC 61000-4-2, 4-3, 4-4, 4-6, 4-8 and 4-11 of the CISPR 24
Motors/fans/fan	Items 1.5/ 1.6 / 4 / 5	Energy efficiency tests must be carried out for each new component	CISPR 22 - conducted emission (AC) and radiated
I/O Peripherals (Readers, HDD, Writers, etc.)	Items 1.5/ 1.6 / 4 / 5.2 / 6 and 7	The energy efficiency tests must be carried out for each new peripheral	CISPR 22 - conducted emission (AC)

Note: Energy efficiency testing is required for desktop computers only.

B.3.2 - Portable computers (notebooks, laptops and netbooks).

Critical Components	Safety Testing (IEC 60950)	Energy Efficiency	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 / 4	Exempt	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Power Supply	Items 1.5 / 1.6 / 1.7 / 4 / 5	Energy efficiency tests shall be carried out for each new source	CISPR 22 - conducted emission (AC) and IEC 610004-4, 4-6 and 4-11 of CISPR 24 IEC 61000-3-2 and 3-3
Layout/ technology (motherboard, etc.)	Items 1.5/ 1.6 / 4 / 5	Energy efficiency tests must be carried out for each new component	CISPR 22 and IEC 61000-4-2, 4-3, 4-4, 4-6, 4-8 and 4-11 of CISPR 24
Motors/fans/fan	Items 1.5/ 1.6 / 4 / 5	Energy efficiency tests must be carried out for each new component	CISPR 22 - conducted (AC) and radiated emission
I/O Peripherals (Readers, HDD, Writers, etc.)	Items 1.5/ 1.6 / 4 / 5 / 6 e 7	Energy efficiency tests shall be carried out for each new peripheral component	CISPR 22 - conducted emission (AC)
Displays	Items 1.5/ 1.6 / 4 / 5	Energy efficiency tests must be carried out for each new display	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Battery	Items 1.5/ 1.6 / 4 / 5	Energy efficiency tests must be carried out for each new battery	Does not require

B.3.3 - Printers of all kinds (plotters, copiers and multifunction printers), shredders, staplers, paper handlers, bookbinders, single or incorporated in other equipment; paper-sorting machines, calculators, scanners (text and image scanners), single or incorporated in other equipment.

Critical Components	Safety Testing (IEC 60950)	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 /4	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Power supply	Items 1.5/ 1.6 /1.7 /4/ 5	CISPR 22 - conducted emission (AC) and IEC 610004-4, 4-6 and 4-11 of CISPR 24 IEC 61000-3-2 and 3-3
Layout / technology (processing and/or control boards, etc.)	Items 1.5/ 1.6 /4 /5	CISPR 22 and IEC 61000-4-2, 4-3, 4-4, 4-6, 4-8 and 4-11 of CISPR 24
Motors, fans, blowers	Items 1.5/ 1.6 /4 /5	CISPR 22 - conducted (AC) and radiated emission
I/O Peripherals (Readers, HDD, Writers, etc.)	Items 1.5/ 1.6/ 4/ 5/ 6/ 7	CISPR 22 - conducted emission (AC)
Displays	Items 1.5/ 1.6 /4 /5	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24

B.3.4 - Monitors, touch screen displays, multimedia displays and projectors.

Critical Components	Safety Testing (IEC 60950)	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 /4	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Power supply	Items 1.5/ 1.6/ 1.7/ 4/ 5	CISPR 22 conducted emission (AC) and IEC 610004-4, 4-6 and 4-11 of CISPR 24IEC 61000-3-2 and 3-3
Layout / technology / processing and control boards	Items 1.5/ 1.6 / 4 /5	CISPR 22 and IEC 61000-4-2, 4-3, 4-4, 4-6, 4-8 and 4-11 of CISPR 24
Motors, fans, blowers	Items 1.5/ 1.6 / 4 / 5	CISPR 22 - conducted (AC) and radiated emission
Display	Items 1.5/ 1.6 / 4 / 5	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24

B.3.5 - Self-service bank cashier and consultation and self-service terminals.

Critical Components	Safety Testing (IEC 60950)	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 /4 /	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Power Supply	Items 1.5/ 1.6/ 1.7/ 4/ 5	CISPR 22 - conducted emission (AC) and IEC 610004-4, 4-6 and 4-11 of CISPR 24 IEC 61000-3-2 and 3-3
Layout / technology / processing and control boards	Items 1.5/ 1.6 / 4 / 5	CISPR 22 and IEC 61000-4-2, 4-3, 4-4, 4-6, 4-8 and 4-11 of CISPR 24
Motors, fans, blowers	Items 1.5/ 1.6 / 4 / 5	CISPR 22 - conducted (AC) and radiated emission
I/O Peripherals (Readers, HDD, Writers, etc.)	Items 1.5/ 1.6/ 4/ 5/ 6/ 7	CISPR 22 - conducted emission (AC)
Display	Items 1.5/ 1.6 / 4 / 5	CISPR 22 - radiated emission and IEC 61000-4-2, 4-3 and 4-8 of CISPR 24
Equipment / assemblies / sub-assemblies included in the basic equipment	Items 1.5/ 1.6/ 1.7 / 4 / 5 / 6 / 7	CISPR 22 and 24 complete in equipment / assembly / sub-assembly

B.3.6 - Switched-mode power supplies for ETI

Critical Components	Safety Testing (IEC 60950)	EMC Testing
Cabinet	Items 1.5 / 2.1/ 2.6/ 2.9/ 2.10 /4	CISPR 22 and CISPR 24
Transformers	Items 1.5/ 1.6 / 4/ 5	Does not require
Layout/ technology/ printed circuit board	All tests	CISPR 22 and CISPR 24
Electrolytic and X and Y series capacitors	Items 1.5 / 4 /5	CISPR 22 - conducted emission (AC)
Fans, fans and blowers	Items 1.5/ 1.6/ 4/ 5	Does not require
Switching transistors/ diodes	Items 1.5/ 1.6 / 4/ 5	CISPR 22 - conducted emission (AC)

ANNEX C - PRODUCTION QUALITY CONTROL TESTS

C.1 The production quality control tests shall be conducted by the manufacturer himself for his entire line of certified products. The requirements to be met are described in items C.2 to C.5.

C.2 Protective earth resistance test (for class I equipment)

The protective earthing resistance (or earth continuity) test shall be carried out by applying a test current of 1,5 times the current capacity of any hazardous voltage circuit, but not greater than 25A (AC or DC), with a duration between 1 second and 4 seconds. The measured resistance must not exceed 0,1Ω. If the result exceeds 0.1 Ω the supply cord resistance should be subtracted.

C.3 Dielectric strength test

Production quality control tests for dielectric strength shall be performed between the primary circuit and accessible conductive parts.

For accessible secondary circuits, it is permitted to test separately, before final assemblies, sub-assemblies and components, such as transformers, if the relevant insulation cannot be tested on the complete equipment. The test procedure of section 5.2.2 of IEC Standard 60950-1 shall be used, with the following exceptions:

- The test voltage is 1500V AC (for basic insulation) or 3000V AC (for reinforced insulation), 50Hz or 60Hz, or DC voltage equal to the peak value of the AC voltage test.
- The voltage test is maintained for a duration between 1s and 4s.
- In the case of detachable supply cord, this should be tested together with the equipment, or proof of compliance with the test in 100% of the cords, through test reports from the manufacturer or upon receipt from the supplier.

C.4 Functional Test

The functional test shall be comprehensive by verifying the proper functioning of the product and all its components and accessories individually.

C.5 Records

Pass and fail results shall be recorded and made available for verification by TÜV Rheinland during periodic audits.

Note: it shall be checked whether the critical components as listed on the certificate are being employed on the certified production line.

ANNEX D CONFORMITY IDENTIFICATION MARK

D.1 – Use of the Seal on the Product

a) The use of the Conformity Identification Seal is mandatory on the body of the product, which may be affixed via a label, or inserted into its label, or engraved on its body (silk-screened, molded, stamped, padlocked, or by other means), with the approval of TÜV Rheinland.
b) The seal may be printed on the product label, or a label may be used, as long as the minimum dimensions defined in this Annex are complied with;
c) The black and white (transparent) version may be used on the product label instead of the colored version. In this case, the background color shall be that of the product label itself.
d) Compact seals may be used on the product, with TÜV Rheinland's approval, when the product's dimensions do not accommodate the normal seal;
e) Although the color seal should preferably be used on the product, the black and white version is permitted.

D.2 – Use of the Seal on the Packaging

a) The use of the complete seal on the package is mandatory. It can be printed or fixed through an adhesive label;
b) The black and white version may be used on the packaging only if its color is similar to that of the colored seal;

D.3 – Models of Conformity Identification Seal

a) For this program, two models of seals are foreseen:

- Model for safety and performance, of exclusive and mandatory use for Desktop computers (desktops) and Portable computers (notebook, laptop and netbook).
- Model for safety, mandatory use for other products (Figure D.2)

Figure D.1 - Safety and Performance Model

Figure D.2 - Safety Model

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ANNEX E - ENERGY EFFICIENCY

E.1 Particular Definitions for Energy Efficiency

E.1.1- Computer

A device that performs logical operations and processes data. For the purposes of this specification, computers include both stationary and mobile units, including desktop computers, integrated desktop computers, portable computers, small servers, thin clients, and workstations. Although computers are capable of using input and image display devices, these devices are not required to be included with the computer at the time of factory shipment. Computers are composed of, at a minimum:

a) the central processing unit (CPU) to perform operations;
b) User interface devices such as a keyboard controller, mouse, digitizer, or game controller, and
c) An integrated display and/or the ability to support an external display for output information.

E.1.1.1 - Desktop Computer

A computer whose main unit is designed to be located in a permanent location, often on a desk or floor. Desktop computers are not designed for portability and are designed for use with an external monitor, keyboard, and mouse. They are intended for a wide range of home and office applications.

E.1.1.2 - Integrated desktop computer

A desktop computer in which the computing and display hardware are integrated into a single cabinet, connected to the electric current (AC) through a single cable. There are two basic configurations for this equipment:

(1) a system where the display and computer are physically combined into a single unit, or

(2) a system packaged as a single system, where the monitor is separate but is connected to the main chassis by a DC power cable and both the computer and monitor/display are powered from a single power supply. As a subset of desktop computers, they are typically designed to provide similar functionality.

E.1.1.3 - Laptop Computers

A computer designed specifically for portability and to be operated for extended periods of time with or without a direct connection to a major AC power source. Notebook computers include an integrated display and are capable of being powered by an integrated battery or other portable power source. In addition, most portable computers use an external power supply and have an integrated keyboard and pointing device.

Laptop computers are typically designed to provide similar functionality as desktop computers, including software operation.

Note: other names may be found for such equipment, such as: *notebook, laptop, netbook.*

E.1.2 - Typical Energy Consumption (TEC)

A method of testing and comparing the energy performance of computers, which focuses on the typical electricity consumption of a product in normal operation over a representative period of time. The key criterion of the TEC approach is a value for normal annual energy use, measured in kilowatt-hours (kWh), using measurements of scaled average operational mode power levels by an assumed normal use model (cycle).

E.1.3 – Wake On

Any event (user, program, or external stimulus) that causes the computer to transition from suspend mode or off mode to the active mode of operation. These events include, but are not limited to: mouse movement, keyboard activity, controller input, real-time clock events, stimuli transmitted via a remote control, control, network, modem, etc.

E.1.4 - Awakening through the net *(WOL-Wake On LAN)*

Feature that allows you to activate the computer remotely over the ethernet network. .

E.1.5 - Uninterruptible Power Supply (UPS)

Power supply source formed by the combination of converters, switches and energy storage means, such as batteries, constituting a power supply to maintain continuity of power supply in case of input power failure.

E.1.6 - Network interface

Components (hardware and software) whose primary function is to make the computer capable of communicating via one or more network technologies. Examples of network interfaces are IEEE 802.3 (Ethernet) and IEEE 802.11 (Wi-Fi).

E.1.7- Off Mode

The power consumption level in the lowest power mode which cannot be switched off (influenced) by the operator and that may persist for an indefinite time when the appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions.

For systems where *"Advanced Configuration & Power Interface"* (ACPI) standards are applicable, off mode corresponds to the "ACPI System Level S5" state.

E.1.8 - Sleep or Suspend Mode

A low-power state in which the computer is capable of starting automatically after a period of inactivity or by manual selection. A computer with sleep capability can quickly "wake up" in response to network connections or user interface devices with a latency of ≤ 5 seconds from initiation of the wake event to the system becoming fully usable, including the display. For systems where ACPI standards are applicable, the sleep mode most commonly correlates to the ACPI S3 system state level (suspend to RAM).

E.1.9 - Idle or Idle mode

The state in which the operating system and other software have completed loading, a user profile has been created, the machine is not asleep, and activity is limited to those basic applications that the system starts by default.

E.1.10 - Separate graphics processing unit (GPU)

Graphics processor with a local memory controller interface and a specific local graphics memory.

E.1.11 - Unit under Test (USE)

Computer being tested.

E.2 Definition of products that will be submitted to Energy Efficiency Tests.

The products subject to energy efficiency tests are:

- Desktop computers;
- Portable computers (*notebook, laptop and netbook*).

Note: for the tests to be carried out, the equipment must enable measurement in off mode, sleep and idle.

E.3 Energy Efficiency and Energy Management Criteria

The method of testing and comparing the energy performance of computers will be by calculating the typical energy consumption (TEC).

Due to the different possible configurations of computers and the fact that these different configurations imply different energy consumption, it is necessary to divide computers into categories. Tables 1 and 3 inform, respectively, the criteria for desktop and notebook computer categories.

The formula for calculating the TEC is:

ETEC = [(8760/1000)*(Pd*Td + Pa*Ta + Pi*Ti)]

Where:

Pd , Pa and **Pi** – These are the power ratings (in Watts) in off mode, sleep mode, and idle mode, respectively.

Td, Ta and **Ti –** These are the weighting factors (as per Table 5) in off mode, sleep mode and idle mode respectively.

E_{TEC} – Expressed in kWh and represents the annual energy consumption based on the respective powers of the modes and the weighting described in the previous item.

The result given by the above calculation will serve to compare with the maximum consumption value allowed for each category. This maximum value is composed of a constant plus a variable (δ). This variable considers the additional presence of memory, graphic cards and storage. Such values can be found in tables 2 and 4, respectively, the criteria for categories of desktops and laptops.

Table 1 - Criteria for defining categories and maximum E_{TEC} per category - *desktops*

Criterion for category	**E_{TEC} Maximum (kWh)**
Category A: all computers that do not meet the definition for Category B, Category C and D.	**$E_{TEC} \leq 148,0+\delta$**
Category B: desktops must have: - 2 physical cores, and - System memory greater than or equal to 2 gigabytes (GB).	**$E_{TEC} \leq 175,0+\delta$**

Category C: desktops must have: - More than 2 physical cores. In addition to the above requirement, the equipment must have one or both of the following characteristics: - 2 or more gigabytes (GB) of system memory; - Discrete GPU.	**$E_{TEC} \leq 209,0+\delta$**
Category D: Desktops must have: - 4 or more physical cores. In addition to the above requirement, the equipment must have one or both of the following characteristics: - 4 or more gigabytes (GB) of system memory; - Discrete GPU with a Frame Buffer width greater than 128-bit.	**$E_{TEC} \leq 234,0+\delta$**

Table 2 - Criteria for adjustments based on capacity – desktops

Adjustments according to capacity		
Memory	**Graphics cards (Note 2)**	**Additional internal storage (no. of hard drives)**
Add **1 kWh** for each GB of memory the computer owns that is larger than the base memory (see Note 1).	Add: **- For Categories A and B:** • 35 kWh for FB Width ≤ 128 bits • 50 kWh for FB Width > 128-bit **- For Categories C and D:** • 50 kWh (FB width > 128 bits	Add 25 kWh for each additional hard drive the computer has.

Note 1: Memory base

- Categories A, B and C: **2 GB.**
- Category D: **4 GB.**

Note 2: This criterion is applied for external graphics cards, discrete GPUs with specified Frame Buffer widths.

Table 3 - Criteria for defining categories and maximum E_{TEC} per category - notebook computers

Criterion for category	**E_{TEC} Maximum (kWh)**
Category A: all portable computers that do not meet the definition of Category B or Category C.	$E_{TEC} \leq 40,0+\delta$
Category B: to be classified in Category B, they must have the discrete GPU.	$E_{TEC} \leq 53,0+\delta$
Category C: must have: • 2 or more physical cores; • 2 or more gigabytes (GB) of system memory; and • A discrete GPU with a Frame Buffer width greater than 128 bits.	$E_{TEC} \leq 88,5+\delta$

Table 4 - Criteria for capacity adjustments - notebook computers

Adjustments according to capacity		
Memory	Graphics cards (Note 2)	Additional internal storage (n° of HDs)
Add **0.4 kWh** for each GB of memory the computer holds in excess of the base memory (see Note 1).	Add: **- B Categories:** • 3 kWh for FB Width ≥ 64 bits	Add 3 kWh for each extra hard drive the computer has.

Note 1: Memory base: **4 GB.**

Note 2: This criterion is applied for external graphics cards, discrete GPUs with specified Frame Buffer widths. Criterion applicable to Category B notebooks only.

Table 5 - Operational Mode Weighting - Desktops and Notebooks

Weighting Factors	**Desktops**	**Laptops**
T_d	0,55	0,60
T_a	0,05	0,10
T_i	0,40	0,30

E.4 Test Procedure for Determining the Off, Sleep and Idle Power Consumption of Computers

The following procedure shall be followed to measure power consumption of computers in off, sleep, and idle modes.

The hardware configuration of the measured computer shall be exactly the same as that delivered to the end customer in the market. This procedure shall be performed in the indicated sequence and the test mode is indicated where required.

Computers shall be tested with the BIOS settings as delivered to the end customer unless otherwise specified.

E.4.1 - Test requirements

E.4.1.1 - Power or energy meter

Energy or power meters to be used for the collection of consumption values shall have the following specifications at a minimum:

- Manufacturer specified maximum error of ±0.5% for all ranges used during the test;
- Available current crest factor of 3 or more at the range value used;
- Lower current range limit of 10 mA or less;

Note: If power measurement was chosen, the measuring equipment shall be capable of integrating the power during any time interval selected by the operator with a power resolution of 0,1 mW or less and integrating the time displayed with a resolution of 1 second or less.

E.4.1.2 - Test conditions

The test conditions are summarised in Table 6.

Table 6 - Test conditions

Supply voltage	127 (± 1%) Volts AC, 60 Hz (± 1%). For products with a rated value greater than 1.5 kW maximum power, the allowable voltage range is ± 4% .
Total Harmonic Distortion (THD) (voltage)	Less than 2%. For products with a rated value greater than 1.5 kW the tolerance is 5%.
Ambient temperature	23 °C ± 5 °C
Relative humidity	10% to 80%

E.4.1.3 - Test configuration

The power consumption of the computer shall be measured when it is powered by an AC power supply with the specifications shown in Table 6.

If the USE has an ethernet interface (network card), it shall be connected to an ethernet network switch capable of operating at the highest and lowest network speeds specified for the USE. The network connection shall be active during all testing.

E.4.1.4 - Measurement procedure for off-mode, sleep, and idle modes for all types of computers

The measurement of alternating current consumption of a computer should be conducted as follows:

Preparation of the USE

1. Record the name of the manufacturer and the model of the USE.

2. Ensure that the USE is connected to network resources as detailed below and that the USE keeps this connection alive for the duration of the test, ignoring brief intervals during link speed changes.

a. Desktops, and compact computers should be connected to an ethernet (IEEE 802.3) network switch as specified in test configuration. The computer shall maintain this live connection to the switch for the duration of the test, ignoring brief intervals of switching from one link speed to another. Computers without ethernet connection capability shall maintain a wireless connection to a wireless router or network access point the entire duration of the test.

b. Small-scale servers shall be connected to an ethernet (IEEE 802.3) network switch, as specified in test configuration, and keep the connection kept alive.

c. Client terminals shall be connected to an active server via an ethernet network switch (IEEE 802.3) and shall run the remote connection software intended for the terminal.

3. Connect an energy or power meter as described before to the C.A. mains supply with the appropriate voltage / frequency for the test.

4. Connect the USE to the power output of the power meter. No power strips or UPS units should be connected between the meter and the USE. For a valid test, the meter shall remain so connected until all Off, Sleep, and Idle mode tests are completed and recorded.

5. Record CA power supply voltage and frequency.

6. Power up and boot the computer waiting until the operating system is fully loaded. If necessary, perform the initial installation of the operating system and allow all preliminary file indexing and other periodic / single run processes to complete.

7. Record basic information about the computer configuration - computer type, operating system name and version, processor type and speed, physical memory available and total, etc.

8. Record basic information about the video card or graphics chipset (if applicable) - video card/chipset name, frame buffer width, resolution, amount of *onboard* memory, and *bits* per pixel.

9. Ensure that the USE is configured as shipped, including all accessories, WOL enabled, and standard software included. The USE must also be configured using the following requirements for all tests:

a. *Desktop* systems delivered without accessories must be configured with a mouse, a keyboard, and an external monitor. Naturally the monitor must be powered separately from the USE.

b. *Notebooks* must include all accessories supplied with the system, and need not include a separate keyboard or mouse when equipped with a pointing device or digitizer.

c. Notebooks must have the battery removed for all testing. For systems where battery-free operation is not a supported configuration, the test may be performed with a full charge of battery(s) installed, making sure to report this configuration in the test results.

d. Small-Scale Servers Servers and Client Terminals delivered without accessories should be configured with a mouse, keyboard, and external monitor (if the server has display output functionality).

e. For Ethernet capable computers, power to Wi-fi radios used in wireless networking must be turned off during all testing. This applies to wireless network adapters (e.g. 802.11) or internal devices for wireless networking. For computers not capable of connecting to an Ethernet LAN the power supply to radios for wireless networking (e.g. IEEE 802.11) shall remain switched on during testing and shall maintain a live wireless connection to a wireless router or network access point supporting the maximum and minimum data rates of the client radio, during the testing period.

f. Primary hard disk(s) may not have power management ("spin-down") during idle mode testing unless it contains some type of non-volatile cache memory integral to the drive (e.g. "hybrid" hard disk drives). If more than one internal hard drive is installed as shipped, the non-primary internal hard drive(s) may be tested with hard drive power management enabled as

shipped from the factory. If such additional drives are not covered by power management when delivered to customers, they shall be tested without such features implemented.

10. The following guidelines must be followed to configure power settings for computer monitors (do not adjust other power management settings):

a. For computers with external displays (most desktops): use the computer's power management settings to prevent the monitor from turning off, ensuring that it remains on for the full length of the idle test as described below.

b. For computers with integrated computer monitors (notebooks and embedded systems): use the power management settings to set the display to turn off after 1 minute.

11. Turn off the USE.

12. Measuring consumption in off mode

With the USE connected to the power meter, in the OFF mode, set the meter to begin accumulating actual consumed power values with an interval less than or equal to 1 reading per second. Accumulate power values for 5 minutes and record the average value (arithmetic mean) noted that during the 5 minute period or if using an energy meter, multiply the value read in Wh by 12 to obtain the power value in Watts.

13. Measuring Idle Power Consumption

Turn on the computer and begin logging the time spent, starting when the computer is initially turned on, or immediately after completing any logging on activities required to fully load the system.

Once the operating system is fully loaded and ready, close any open windows so that the standard operating system screen or equivalent is shown.

Set the meter to begin accumulating actual consumed power values at an interval less than or equal to 1 reading per second. Accumulate power values for 5 minutes and record the average value (arithmetic mean) noted that during the 5 minute period or if using an energy meter, multiply the value read in Wh by 12 to obtain the power value in Watts.

14. Measuring consumption in Sleep Mode

After completing measurements in idle mode, place the computer in sleep mode. Reset the power consumption meter (if necessary) and begin accumulating true consumed power values at an interval greater than or equal to 1 reading per second. Accumulate the power values for an additional 5 minutes and record the average value (arithmetic mean) observed during this 5 minute period, or if using an energy meter, multiply the value read in Wh by 12 to obtain the power value in Watts. If testing sleep mode power consumption with the wake by network (WOL) feature enabled and disabled, wake the computer and change the WOL setting through the operating system or other means. Put the computer back into sleep mode and repeat step 14, recording the sleep consumption in this new condition.