

Recommendation

ITU-T L.1071 (11/2024)

SERIES L: Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

E-waste and circular economy

A model for digital product passport information on sustainability and circularity

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Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

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Recommendation ITU-T L.1071

A model for digital product passport information on sustainability and circularity

Summary

Recommendation ITU-T L.1071 relates to, builds on, and complements Recommendation ITU-T L.1070 and the ETSI TS 103 881 standard, which define opportunities for a global digital sustainable product passport to achieve a circular economy.

This Recommendation defines an information model to describe environmental sustainability and circularity information details about ICT goods (products) in a digital form. This information model is part of a digital product passport as environmental information that can be compared with information requirements in relevant environmental sustainability and circularity standards, specifically ETSI standards and ITU-T Recommendations. The information details can represent products at any time of their circular lifespan: design, manufacturing, use, hardware changes, and final recycling as e-waste. Several product-related standards can be expressed as a list of environmental information templates. The comparison of product information to standards' information templates allows for checking the alignment of products with the requirements of different standards when relevant.

The aim is to complement and contribute to regional (European digital product passport) and global (UNECE B2B digital product passport) standards. This Recommendation is technically aligned with ETSI standard 204 082.

History *

Edition	Recommendation	Approval	Study Group	Unique ID
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Digital product passport, DPP, environmental impact, environmental information templates, environmental information, ICT, product details.

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Introduction

This Recommendation complements other standards (ITU-T Recommendations and ETSI standards) that rely on product information in the context of the digital product passport to express environmental sustainability and circularity information about ICT products. It also facilitates the alignment verification of ICT products with other standards. For that, this Recommendation presents:

- Related regional and global standards and Recommendations about the digital product passport are described in clause 6.
- An overview of information requirements raised from existing environmental standards in clause 7.
- A mapping of the requirements to an information model that supports expressing environmental information about a product and environmental information templates about a standard in clause 8.
- A mapping of environmental information to digital data or represented as a table for digitalized conformance statements and checking the alignment with ICT standards in clause 8.4.
- A feasibility analysis of implementing these information items in a global DPP system in clause 10.

This Recommendation provides a basis for expressing circularity and environmental sustainability information about products and standards for DPPs.

This Recommendation was developed jointly by ETSI TC EE and ITU-T Study Group 5. It is published respectively by ITU and ETSI as Recommendation ITU-T L.1071 and [b-ETSI ES 204 082], which are technically equivalent.



Recommendation ITU-T L.1071

A model for digital product passport information on sustainability and circularity

1 Scope

This Recommendation provides a structure for collecting information items organized to represent circularity and environmental sustainability information about information and communication technology (ICT) products and product-related standards. It facilitates alignment verification of ICT products with standards for various actors throughout the product lifespan, up to final recycling.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation. The following Recommendations are relevant in this context:

- [ITU-T L.361] Recommendation ITU-T L.361 (2012), *ID tag requirements for infrastructure and network elements management*.
- [ITU-T L.1022] Recommendation ITU-T L.1022 (2019), *Circular economy: Definitions and concepts for material efficiency for information and communication technology*.
- [ITU-T L.1070] Recommendation ITU-T L.1070 (2023), *Global digital sustainable product passport opportunities to achieve a circular economy*.
- [ITU-T L.1100] Recommendation ITU-T L.1100 (2012), *Procedure for recycling rare metals in information and communication technology goods*.
- [ITU-T L.1102] Recommendation ITU-T L.1102 (2012), *Use of printed labels for communicating information on rare metals in information and communication technology goods*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 accountability [ITU-T L.1070]: Equivalent to answerability, liability and the expectation of account reporting, with the obligation to inform about (past or future) actions and decisions, to justify them.

NOTE – Adapted from [b-Dykstra1938] [b-Schedler1999].

3.1.2 authenticity [ITU-T L.1070]: Ability of proving an assertion, such as the identity of a computer system user.

3.1.3 centralization [ITU-T L.1070]: Data, function, process, system where a single entity, or a small group, has exclusive control or responsibility for it.

NOTE – Definition adapted from [ITU-T L.1070].

3.1.4 circularity [ITU-T L.1070]: Designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.

NOTE – The definition is based on [ITU-T L.1070].

3.1.5 collective product [ITU-T L.1070]: A product batch or product model with common characteristics for multiple product items.

3.1.6 compliance [b-ITU-T X.1400]: Adherence to specified requirements.

3.1.7 component [b-ETSI EN 303 808]: Hardware constituent of a product that cannot be taken apart without destruction or impairment of its intended use.

NOTE – A populated printed circuit board may be considered a component and/or a part from the perspective of this Recommendation.

3.1.8 conformity assessment [b-ITU-T Q.5050]: Demonstration that specified requirements relating to a product, process, system, person or body are fulfilled.

3.1.9 decentralization [ITU-T L.1070]: Data, function, process, system that is not centralized, controlled by a single or few entities.

3.1.10 digital product passport [ITU-T L.1070]: A structured collection of product-specific data conveyed through a unique identifier.

NOTE – Definition based on European Commission document [b-EC 2022].

3.1.11 digitalization [b-OECD2019]: Use of digital technologies and data as well as interconnection that results in new or changes to existing activities.

3.1.12 e-waste [b-ITU-T L.1031]: Electrical or electronic equipment that is waste, including all components, sub-assemblies and consumables that are part of the equipment at the time the equipment becomes waste.

NOTE – The terms e-waste and waste electrical and electronic equipment (WEEE) are used interchangeably.

3.1.13 economic operator [ITU-T L.1070]: Include the manufacturer, authorized representative, importer, distributor, fulfilment service provider, or any legal person with legal responsibility concerning manufacture.

NOTE – Adapted and modified from [b-EC2020].

3.1.14 extended producer responsibility [b-ITU-T L.1021]: A policy principle to promote total life cycle environmental improvements of product systems by extending the responsibility of the manufacturers of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling and final disposal of the product.

3.1.15 global digital sustainable product passport [ITU-T L.1070]: The subset of a digital product passport, global in regional scope, focused on environmental sustainability aspects.

3.1.16 ICT goods [b-ITU-T L.1410] or the technically aligned ETSI ES 203 199 [b-ETSI ES 203 199]: Tangible goods deriving from or making use of technologies devoted to or concerned with: the acquisition, storage, manipulation (including transformation), management, movement, control, display, switching, interchange, transmission or reception of a diversity of data; the development and use of the hardware, software, and procedures associated with this delivery; and the representation, transfer, interpretation, and processing of data among persons, places, and machines, noting that the meaning assigned to the data is preserved during these operations.

3.1.17 ID tag [b-ITU-T Y.2213]: A physical object which stores one or more identifiers and optionally application data such as name, title, price, address, etc.

3.1.18 identity [ITU-T L.1070]: A unique indication of a person or thing, verified by authentication.

3.1.19 individual product [ITU-T L.1070]: A product item.

3.1.20 information accessibility [ITU-T L.1070]: Ability to access and benefit from information to the widest range of actors and situations.

3.1.21 information composability [ITU-T L.1070]: Ability to combine and assemble self-contained and stateless information components, as with structured linked data.

3.1.22 information confidentiality [ITU-T L.1070]: A set of rules or a promise to limits access or places restrictions on certain types of information.

3.1.23 information privacy [ITU-T L.1070]: The relationship between the collection and dissemination of data.

3.1.24 information transparency [ITU-T L.1070]: Clarity about relevant details, needed for a decision or an assessment.

3.1.25 information verifiability [ITU-T L.1070]: The ability to review, inspect, audit, test to establish, document and confirm the veracity of an assertion.

3.1.26 integrity [ITU-T L.1070]: The maintenance of, and the assurance of, data accuracy and consistency.

3.1.27 intermediate product [b-EC2022]: A product that requires further manufacturing or transformation such as mixing, coating or assembling to make it suitable for end-users.

3.1.28 modular product [ITU-T L.1070]: A product that, in a container, includes module(s) (component product(s)) that can easily be replaced or added.

3.1.29 product [b-EC2022]: Any physical good that is placed on the market or put into service.

NOTE – ICT goods are ICT products.

3.1.30 product batch [b-EC2024]: A subset of a specific model composed of all products produced in a specific manufacturing plant at a specific moment in time.

3.1.31 product item [b-EC2024]: A single unit of a model.

3.1.32 product model [b-EC2024]: A version of a product of which all units share the same technical characteristics and the same model identifier.

3.1.33 product operator [ITU-T L.1070]: Any actor that can transform and supply modified products and therefore can supply the information a digital product passport conveys about them, as a result of manufacture or other operations.

NOTE – These other operations could be packaging, configuration, maintenance, repair, upgrade, refurbishment, remanufacturing or recycling.

3.1.34 refurbishment [b-ITU-T L.1023]: Industrial process which produces a product from used products without any changes influencing safety, original performance, purpose or type of the product.

NOTE – New and/or used parts can be used during refurbishment. The definition is based on [b-ETSI EN 303 808].

3.1.35 remanufacturing [b-ITU-T L.1023]: Industrial process which produces a product from used products or used parts where at least one change is made which influences the safety, original performance, purpose or type of the product.

NOTE – The product created by the remanufacturing process may be considered a new product when placing on the market. The definition is based on [b-ETSI EN 303 808].

3.1.36 repair [ITU-T L.1022]: Process of returning a faulty product to a condition where it can fulfil its intended use.

3.1.37 risk [b-EC2020]: The combination of the probability of occurrence of harm and the severity of that harm limited to human health or safety of persons, to property or to the environment.

3.1.38 supply chain due diligence [b-ITU-T L.1061]: The obligations of the economic operator which places a product on the market, in relation to its management system, risk management, third party verifications by notified bodies and disclosure of information with a view to identifying and addressing actual and potential risks linked to the sourcing, processing and trading of the raw materials required for product manufacturing.

3.1.39 Sustainability claim [b-UN-DPPDM2024]: A specific statement or assertion about a product, made with a structured data format, regarding its sustainability, providing details about the metrics, thresholds, and evidence supporting the claim.

NOTE – Adapted from [b-UNECE 49] and [b-UN-DPPDM2024].

3.1.40 sustainable development [b-UN1987]: Development that meets the needs of the present without compromising the ability of future generations to meet their needs.

3.1.41 tag-based identification [ITU-T Y.4108]: The process of specifically identifying a physical or logical object from other physical or logical objects by using identifiers stored on an ID tag.

3.1.42 traceability [b-ISO 9000]: Ability to trace the history, application or location of an object.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 circular economy: An economy closing the loop between different life cycles through design and corporate actions/practices that enable activities like reuse, refurbishment, remanufacture and recycling in order to use raw materials, goods and waste in a sustainable and efficient way.

NOTE 1 – The circular economy concept distinguishes between technical and biological cycles, the circular economy is a continuous, positive development cycle. It preserves and enhances natural capital, optimizes resource yields, and minimizes system risks by managing finite stocks and renewable flows, while reducing waste streams.

NOTE 2 – Definition adapted from [b-ITU-T L.1022], [b-ITU-T L.1020] and [b-ITU-T L.1604].

3.2.2 environmental information: The information related to environmental aspects, eco-design and circularity of information and communication technology goods.

NOTE 1 – Environmental information, in general, is a much wider concept than what is defined here; however, for this Recommendation, the term "environmental information" is defined in the context of information to be presented in the Digital Product Passport.

NOTE 2 – This can be part of a sustainability claim in the context of UNECE B2B DPP [b-UN-DPP2024] and Recommendation 49 [b-UNECE 49].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

B2B	Business to Business
B2C	Business to Consumer
CFP	Carbon Footprint of Products
CLP	Classification, Labelling and Packaging
DPP	Digital Product Passport
ESG	Environmental, Social and Governance
ESPR	Ecodesign for Sustainable Products Regulation