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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Environmental Engineering (EE).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Executive summary

The present document provides an overview of global and common opportunities to represent sustainability, mainly environmental-related, details about digital technology products, either collective ICT product models, batches or individual ICT product items. These product details are intended to be represented in digital format instead of paper-based. The details can represent design-related information, products at the time of manufacturing, including relevant information for product transparency and a potential for a circular lifecycle, such as details related to the origin of materials composition, design, manufacturing, energy consumption, maintenance, repair, preparation for reuse, final recycling, and may include links to related documentation. Product details can include or relate to details that change over the lifespan of a product as a result of reconfiguration events, including repair, upgrade, usage, sale, and final recycling. The details should exclude any personal or business-sensitive information.

NOTE: Human health can be considered part of environmental concerns. From now, just mentioned as environmental.

The present document provides an overview of sustainability opportunities, environmental related, about product-related digital information common to all ICT products, with global scope for harmonization, i.e. relevant to any region, that can support the development of the circular economy of ICT products. The product-related digital information can be represented under digital technology, such as product identifiers, data formats, linked data, and system architectures. It relates to and can complement regional and global standards.

Introduction

The 2005 World Summit on Social Development [i.1] identified **sustainable development** goals with three pillars: economic development, social development, and environmental protection. The economic pillar has to do with trade. The social pillar has to do with people: workers, users and other people and collectives affected. The environmental pillar has to do with the challenges of consuming materials to produce products and energy to power them, their use, the production of e-waste, and any indicators related to positive and negative effects on people and nature.

In the context of sustainability, the Agenda 2030 [i.2] defines a shared blueprint for peace and prosperity for people and the planet, now and into the future. It defines the Sustainable Development Goals (SDG) for social, economic, and ecologically sustainable development [i.3].

There are well-defined targets for the climate crisis. The IPCC defines the different trajectories, specifically compliance to the 1,5 °C objectives described by the IPCC Special Report on 1,5 °C [i.4]. To meet this goal, the world should cut emissions down to net zero by 2050.

ITU defined the Connect 2030 Agenda with Goal 3 on Sustainability, where ITU recognizes the need to manage emerging risks, challenges and opportunities from the rapid growth of ICT. There are several initiatives to speed up reductions in environmental impact like SDG 2030 (UNEP), Race to Zero (COP26), NetZero, and science-based targets. Data is needed for implementing all that.

The Aarhus convention [i.5] and the related Escazu agreement [i.6] recognize environmental rights related to *access to environmental information and* the need for mechanisms to render these rights effective.

ICT products (e-equipment such as routers, switches, consumer products like smartphones, etc.) have environmental, social, and economic **impacts** at each stage in their life cycle, starting from the supply chain, including the reverse supply chain, ending as e-waste at end-of-life. It has to do with energy, natural resource consumption, and emissions of various kinds, to name a few.

Currently, more than 6 billion new ICT products are sold annually worldwide. There are estimates of 1,5 billion smartphones [i.7] in 2021, 126 million desktop computers, 659 million laptops, and 513 million Wi-Fi® routers produced every year (2021). These numbers are expected to grow over the next five to ten years with new "smart" technologies see Recommendation ITU-T L.1024 [i.8].

As a result of the growing production and sales, e-waste is one of the fastest growing waste stream, most of it discarded in the municipal waste stream, leading to a loss of secondary resources [i.9] valued at US$ 57 billion in 2019 (more than the gross domestic product of many countries) Additionally, e-waste is often shipped illegally to developing countries [i.10].

The contribution of ICT in terms of electricity use is a significant factor: by 2030, ICTs could use a larger share of global electricity and globally released GHG emissions as reported in [i.11]. Clean sources of energy and locality can nevertheless help reduce GHG emissions see [i.12].

However, for some ICT products, upstream activities of raw material acquisition, transport and production contribute most to the environmental impact [i.13].

In contrast, ICTs can enable vast efficiencies in social and economic life through digital solutions that can improve energy efficiency, inventory management, and reduction of travel and transportation impacts (e.g. telework and videoconferencing, substituting physical products with digital information). This capacity is referred to as second-order or enablement effects.

Recommendation ITU-T L.1470 [i.14] defines GHG emissions trajectories for the ICT sector as compatible with the UNFCCC Paris Agreement. Therefore, *the digital world is part of the problem and may be part of the solution*.

The Circular Economy (CE), and the term circularity, is about *"designing out waste and pollution, keeping products and materials in use, and regenerating natural systems"* [i.15]. In the context of ICT products, circularity aims to achieve the best use of ICT products with maximal lifespan, which helps decarbonize the environment. A circular approach in the electronics industry is widely accepted as the required transformation to move away from a linear "take-make-waste" model of production and consumption [i.16].

With environmental sustainability and circularity focus on the DPP for ICT products, the present document presents:

- The description of the scope of the Digital Product Passport (DPP) in clause 5.
- The description of DPP opportunities.
- The definition of the required ICT product types to consider in DPPs.
- The definition of required principles and properties of digital product information in DPPs, all in clause 6.
- The feasibility of implementing these opportunities in a global DPP system is discussed in clause 7.

The present document provides a basis for other DPP standards about detailed information models for ICT products, specific ICT product categories, as well as regional and global DPP standards.

The present document 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 L1070 [i.17] and ETSI TS 103 881 (the present document), which are technically-equivalent.

1 Scope

The present defines a "digital product passport" for ICT products to be represented in digital format, including an overview of the opportunities and benefits to include information relevant to sustainability, mainly environmental related, focusing on circularity and transparency.

The present document does not intend to define which items should be filled out for all or different product families in their "digital product passport", nor define the targets, limits, or specific requirements a product has to meet.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

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2.2 Informative references

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

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[i.22] OECD: "Going Digital: Shaping Policies, Improving Lives" (2019).

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[i.25] Recommendation ITU L.1031: "Guideline on implementing the e-waste reduction target of the Connect 2020 Agenda".

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3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

accountability: equivalent to answerability, liability, and the expectation of account-giving, with the obligation to inform about (past or future) actions and decisions, to justify them

NOTE: Adapted from [i.18] and [i.19].

authenticity: ability of proving an assertion, such as the identity of a computer system user

centralization: data, function, process, system where a single entity, or a small group, has exclusive control or responsibility for it

circular economy: An economy closing the loop between different life cycles through design and corporate actions/practices that enable recycling and reuse in order to use raw materials, goods and waste in a more efficient way as defined in Recommendation ITU-T L.1604 [i.80].

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 Recommendation ITU-T L.1022 [i.31] and Recommendation ITU-T L.1020 [i.81].

NOTE 3: The definition is based on [i.15] and amended.

circularity: designing out waste and pollution, keeping products and materials in use, and regenerating natural systems

NOTE: As defined in [i.15].

collective product: product batch or product model with common characteristics for multiple product items

component: hardware constituent of a product that cannot be taken apart without destruction or impairment of its intended use

NOTE 1: See ETSI EN 303 808 [i.21].