New ITU-T Study Group 5 Structure and Deliberations

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Abstract

The NTT Group is participating in the international standardization activities in the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Study Group (SG) 5 to protect telecommunication facilities from electromagnetic interference and lightning surges, assess the impact of information and communication technologies on climate change, address the issue of a circular economy that enables sustainable development, and contribute to improving the reliability of telecommunication services and reducing the environmental impact of its business activities. In this article, we introduce the study structure of ITU-T SG5 for the new study period (2022–2024), which has finally started due to the COVID-19 pandemic, as well as the latest discussion trends at the first meeting held in June 2022.

Keywords: ITU-T SG5, electromagnetic compatibility, climate change

1. Overview of the study structure of ITU-T Study Group 5 and the first meeting for the new study period (2022–2024)

The new study period (2022–2024) started one year later than the originally planned due to the COVID-19 pandemic, and a new study structure was established in the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Study Group (SG) 5 (**Fig. 1**). Compared with the previous study period, the old Working Party (WP) 1, which mainly discussed electromagnetic compatibility (EMC) and electromagnetic exposure, was continued as the new WP1, while the old WP2, which mainly discussed eco-efficiency, e-waste, circular economy, and sustainable information and communication technology (ICT) networks, was renamed as the new WP2. The new WP3 is mainly concerned with climate-change adaptation and mitigation, and net zero emissions.

The first meeting was held from June 21 to July 1, 2022, in Geneva, Switzerland, in a hybrid online format. There were 164 participants, 12 of whom were from Japan (all online), and a total of 97 contributions (including 6 from Japan). At the Opening Plenary, WP chairs and rapporteurs for the new study period were nominated and approved, then each subject was discussed. The results of the deliberations are introduced in the next section, and a summary of the deliberations can be found on the ITU-T website (https://www.itu.int/en/ITU-T/studygroups/2022-2024/05/Pages/exec-sum-202207.aspx).

2. Results of WP1 discussion

2.1 Question 1

Question 1 is studying the requirements for protection of telecommunication systems against lightning strikes, grounding, and power system disturbances, countermeasures against soft errors in telecommunication equipment caused by particle radiation, and protection methods against attacks by high-power electromagnetic waves. At this meeting, NTT proposed the second draft of K.87 “Guide for the application of electromagnetic security requirements – Overview,” and the revision was agreed upon in the final draft incorporating the opinions of IEC (International Electrotechnical Commission) experts expressed during the meeting. The 1st draft of K.lp “Using data of lightning positioning system for

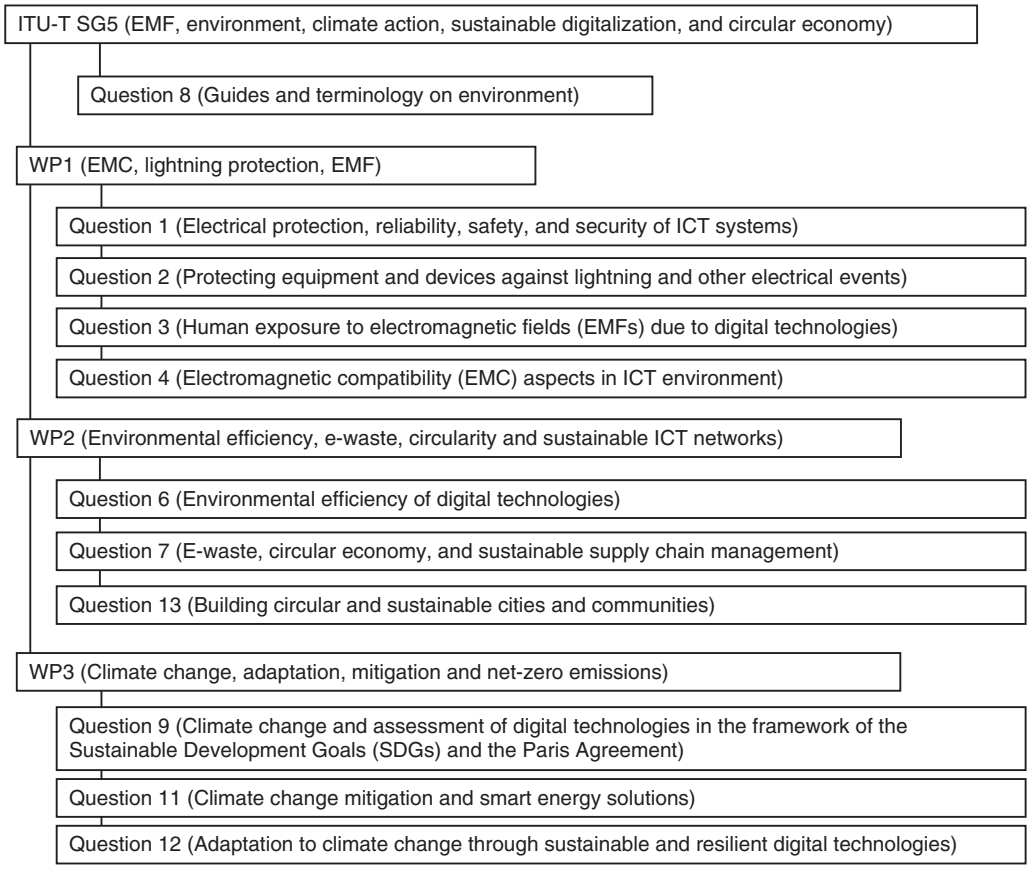

Fig. 1. Study structure of ITU-T SG5 in the new study period (2022–2024).

network protection" was proposed by China, and after discussion, it was decided to revise some parts of the chapter structure, add NTT as an editor, and continue the discussion in the next meeting.

2.2 Question 2

Question 2 is studying the requirements for protection of telecommunication systems against overvoltages and overcurrents and protecting devices. At this meeting, NTT proposed to revise some exceptions in the test application of K.21 "Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents," and the revision was agreed after discussion. NTT also proposed to add the test items added to K.20 "Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents" at the May 2021 meeting to K.Supplement 24 "ITU-T K.20 – Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning." After discussion, the revision was agreed.

2.3 Question 3

Question 3 is studying the estimation procedure, calculation method, and measurement method of electromagnetic field (EMF) intensity around antennas of cellular phones and wireless systems to protect human exposure to EMF. In this meeting, Korea proposed the 2nd draft of K.Supplement WPT "EMF strength inside and outside of electric vehicle using wireless power transfer (WPT)" on the basis of the results of EMF measurement and numerical analysis inside and outside of dynamic and electric vehicles using WPT technology. After discussion, it was agreed to publish as K.Supplement 29. For K.Supplement 16 "Electromagnetic field compliance assessments for 5G wireless networks," the GSM Association proposed the addition of a map showing the measurement results of radio-frequency exposure from fifth-generation mobile communications system (5G) base stations, and Japan proposed the update of

the description of international standards related to 5G, which were agreed after deliberation.

2.4 Question 4

Question 4 is studying EMC standards for new telecommunication equipment, telecommunication services, and wireless systems. At this meeting, NTT proposed and discussed a revised draft of K.123 "Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities," which removes power equipment from the scope, and K.power_emc "Electromagnetic compatibility requirements for power equipment in telecommunication facilities." Both drafts had been continued for discussion due to disagreement on the disturbance rules below 150 kHz, but as a result of discussion with new contributions, it was agreed to revise the drafts and establish new Recommendations. As for K.76 "EMC requirements for telecommunication network equipment (9 kHz–150 kHz)," the emission provisions considering power-line communication protection, which is under discussion by CISPR (International Special Committee on Radio Interference), were added as provisional limits, and the title of the Recommendation was changed to "EMC requirements for DC power ports of telecommunication network equipment in the frequency range below 150 kHz." The revision was agreed after the discussion.

3. Results of WP2 discussion

3.1 Question 6

Question 6 is defining eco-efficiency and requirements for digital and new advanced technologies and developing Recommendations on technical solutions, indicators, key performance indicators (KPIs), and related measurements.

At this meeting, L.1318, L.1333, and L.1390 were consented. L.1318 defines the Q-factor (quality factor), a metric applicable to measuring and improving the energy efficiency of integrated circuits in ICT. L.1333 defines the greenhouse gas (GHG) emissions from energy use in networks. L.1333 defines a KPI called Network Carbon Intensity Energy (NCIe) to evaluate GHG emissions from energy use in networks and study ways to reduce emissions and discusses the correlation between carbon intensity indicators and energy efficiency indicators. L.1390 provides principles for power saving in 5G radio access network devices and best practices for using and controlling power-saving technologies using artificial intelligence (AI). Two new work items were also approved for consideration.

3.2 Question 7

Question 7 is developing Recommendations on the concept of the circular economy, environmental requirements for digital technologies based on improved supply chain management, and eco-rating programs for products, networks, and services.

At this meeting, L.1034 and L.1040 were consented and L.Supplement 47 was agreed. L.1034 provides guidance to raise awareness of the health and environmental impact of counterfeit ICT products, particularly in developing countries. L.1040 provides guidance on the environmental impact of e-waste, including that of self-driving cars. L.Supplement 47, proposed by NTT and NEC, provides a case study on the provision of Internet services using Single Pair Ethernet cables and provides a resource-saving example of chiplet design introduced by Orange for central processing unit/graphics processing unit manufacturing, to show how resource saving can be promoted in factories, buildings, and homes. Three new work items were also approved for consideration.

3.3 Question 13

Question 13 develops Recommendations on requirements for the use and operation of digital technologies (AI, 5G, etc.) and the application of circular-society thinking in cities and communities, technical specifications, effective frameworks, guidance in applying circular-society thinking to assets in cities, and indicators and KPIs needed to establish a baseline scenario for circular cities and communities.

At this meeting, L.1604, L.1610, and L.1620 were consented, L.Supplement 51 and L.Supplement 50 were agreed. L.1604 focuses on the bioeconomy, which covers both sustainability and circularity, and includes the definition and role of the bioeconomy in cities. L.1610 provides urban science methods to analyze and solve urban sustainability problems. L.1620 provides an implementation framework for circular cities to evaluate and prioritize improvement actions to support and facilitate actions to improve urban circularity. L.Supplement 51 presents examples of successful implementation of urban scientific methods in accordance with L.1610. L.Supplement 50 provides 17 case studies on the deployment of circular cities according to L.1620.

4. Results of WP3 discussion

4.1 Question 9

Question 9 develops Recommendations on how to use environmental impact assessment methods, including methods and guidance for assessing the sustainability impact of digital technologies, including ICT, AI, 5G, and others; consideration of the importance of climate change and biodiversity issues; and assessment from an environmental, social, and governance (ESG) perspective.

At this meeting, L.1480 and L.1481 were consented. L.1480 provides a methodology to assess the impact of using ICT solutions on GHG emissions, including a quantitative assessment of the second-order effects of ICT solutions. L.1481 provides examples of ICT solutions related to GHG emission reductions to facilitate the ITU's work towards the Connect 2030 target considering Sustainable Development Goal 13 (climate change), the Paris Agreement, and the Glasgow Climate Agreement. Seven new work items were also approved for consideration.

4.2 Question 11

Question 11 develops Recommendations on standards, frameworks, and requirements and conditions that facilitate real-time energy service and control solutions for more effective and efficient energy management using ICT and digital technologies, as well as energy management improvements aimed at increasing energy efficiency and reducing carbon dioxide emissions.

At this meeting, L.1230 and L.1240 were consented and L.Supplement 48 was agreed. L.1230 specifies the power-supply-system configuration with 10 kVAC input and up to 400 VDC, general requirements for output voltage, safety, and EMC, and the architecture of power-monitoring systems. L.1240 specifies a power-supply system of telecommunication center buildings, safe system operation, and evaluation framework of a power-supply system applicable to energy conservation evaluation, classification of telecommunication center buildings, and methods for evaluating reliability. L.Supplenent 48 specifies power-management methods using AI and the digital twin computing technology in telecommunication center buildings and datacenter infrastructure. Four new work items were also approved for consideration.

4.3 Question 12

Question 12 develops Recommendations for improving the efficiency of power and air conditioning systems, supporting the development of energy-efficient ICT architectures with power systems up to 400 VDC, as well as early warning systems for climate change-induced events, applications in smart agriculture, micro-smart grids, and building optimization.

At this meeting, L.Supplement 49 was agreed, which presents an overview of Recommendations and technical standards on the impact of ICT on climate-change adaptation in other sectors, as well as on strengthening the resilience of ICT networks against natural disasters. Four new work items were also approved for consideration.

5. Future development

This article introduced the latest deliberation trends in ITU-T SG5. We will continue to promote timely standardization activities in response to changes in the environment surrounding telecommunications infrastructure and services and contribute to improving the quality and reliability of telecommunications services and reducing environmental impact.

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