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| Title: ITU logo | INTERNATIONAL TELECOMMUNICATION UNION**TELECOMMUNICATION STANDARDIZATION SECTOR**STUDY PERIOD 2022-2024 | TSAG-TD031 |
| TSAG |
| **Original: English** |
| **Question(s):** | N/A | Geneva, 12-16 December 2022 |
| **TD(Ref.:** [SG5-LS41](http://handle.itu.int/11.1002/ls/sp17-sg5-oLS-00041.docx)**)** |
| **Source:** | ITU-T Study Group 5 |
| **Title:** | LS/i on ITU-T SG5 Lead Study Group Report [from ITU-T SG5] |
| **LIAISON STATEMENT** |
| **For action to:** | - |
| **For information to:** | TSAG |
| **Approval:** | ITU-T Study Group 5 meeting (Rome, 27 October 2022) |
| **Deadline:** | N/A |
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A new liaison statement has been received from SG5.

This liaison statement follows and the original file can be downloaded from the ITU ftp server at <http://handle.itu.int/11.1002/ls/sp17-sg5-oLS-00041.docx>.

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|  | INTERNATIONAL TELECOMMUNICATION UNION**TELECOMMUNICATIONSTANDARDIZATION SECTOR**STUDY PERIOD 2022-2024 | **SG5-LS41** |
| **STUDY GROUP 5** |
| **Original: English** |
| **Question(s):** | All/5 | Rome, 17-27 October 2022 |
| **Ref.: SG5-TD476-R1** |
| **Source:** | ITU-T Study Group 5 |
| **Title:** | LS on ITU-T Study Group 5 Lead Study Group Report  |
| **LIAISON STATEMENT** |
| **For action to:** | - |
| **For information to:** | TSAG |
| **Approval:** | ITU-T Study Group 5 meeting (Rome, 27 October 2022) |
| **Deadline:** | N/A |
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| **Abstract:** | This Liaison Statement informs TSAG on SG5 lead roles and gives an update on SG5 activities from 10 March until 27 October 2022. |

ITU-T Study Group 5 is actively fulfilling its mandate as the lead study group on electromagnetic compatibility, resistibility and lightning protection​, soft error caused by particle radiations, human exposure to electromagnetic fields, circular economy, and e-waste management​ and ICTs related to the environment, energy efficiency, clean energy, and sustainable digitalization for climate actions.

# ITU-T SG5 Structure

Following the World Telecommunication Standardization Assembly (WTSA-20) held in ​Geneva, Switzerland​, from 1 to 9 March 2022, ITU-T SG5 approved its new structure. Three Working Parties were created and one Question, Question 8/5: “Guides and terminology on environment” reports to plenary.

* WP1/5 “EMC, lightning protection, EMF”
* WP2/5 “Environmental efficiency, e-waste, circularity and sustainable ICT networks”
* WP3/5 “Climate change, adaptation, mitigation and net-zero emissions”
* Q8/5 “Guides and terminology on environment” reports to the plenary.

Please see below the ITU-T SG5 structure, which is also available at: <https://www.itu.int/net4/ITU-T/lists/sgstructure.aspx?Group=5&Period=17>

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| --- | --- |
| **ACRONYM** | **TITLE** |
| **PLEN** | **Plenary**  |
| [**Q8/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=8&Lang=en) | Guides and terminology on environment  |
| **WP1/5** | **EMC, lightning protection, EMF** |
| [**Q1/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=1&Lang=en) | Electrical protection, reliability, safety, and security of ICT systems  |
| [**Q2/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=2&Lang=en) | Protecting equipment and devices against lightning and other electrical events  |
| [**Q3/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=3&Lang=en) | Human exposure to electromagnetic fields (EMFs) due to digital technologies |
| [**Q4/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=4&Lang=en) | Electromagnetic compatibility (EMC) aspects in ICT environment  |
| **WP2/5** | **Environmental efficiency, e-waste, circularity and sustainable ICT networks** |
| [**Q6/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=6&Lang=en) | Environmental efficiency of digital technologies  |
| [**Q7/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=7&Lang=en) | E-waste, circular economy, and sustainable supply chain management  |
| [**Q13/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=13&Lang=en) | Building circular and sustainable cities and communities  |
| **WP3/5** | **Climate change, adaptation, mitigation and net-zero emissions**  |
| [**Q9/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=9&Lang=en) | Climate change and assessment of digital technologies in the framework of the Sustainable Development Goals (SDGs) and the Paris Agreement  |
| [**Q11/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=11&Lang=en) | Climate change mitigation and smart energy solutions  |
| [**Q12/5**](https://www.itu.int/net4/ITU-T/lists/q-text.aspx?Group=5&Period=17&QNo=12&Lang=en) | Adaptation to climate change through sustainable and resilient digital technologies  |

* The appointed Working Party Chairmen and Vice-Chairmen are the following:
	+ **WP1/5 “EMC, lightning protection, EMF”**
		- WP1/5 Chairman: Fryderyk Lewicki
		- WP1/5 Vice-Chairmen: Michael Maytum, Xia Zhang, Beniamino Gorini, and Alfredo Debattista.
	+ **WP2/5 “Environmental efficiency, e-waste, circularity and sustainable ICT networks”**
		- WP2/5 Chairman: Paolo Gemma
		- WP2/5 Vice-Chairman: Nevine Tewfik
	+ **WP3/5 “Climate change, adaptation, mitigation and net-zero emissions”**
		- WP3/5 Chairman: Shuguang Qi
		- WP3/5 Vice-Chairman: Paolo Gemma

Designation of Liaison Rapporteurs to the collaborating organizations can be found [here](https://www.itu.int/net4/ITU-T/lists/representatives.aspx?Group=5&Period=17).

# 2 Main achievements

The list of results pertaining to ITU-T SGs Recommendations on electromagnetic compatibility, resistibility and lightning protection​, soft error caused by particle radiations, human exposure to electromagnetic fields, circular economy, and e-waste management​ and ICTs related to the environment, energy efficiency, clean energy, and sustainable digitalization for climate actions, since March 2022, are provided in Annex 1 (status: until 27 October 2022).

The main highlights are described in the following text.

**Working Party 1/5** experts consented ten revised Recommendations: ITU-T K.87 “Guide for the application of electromagnetic security requirements – Overview”, ITU-T K.21 “Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents”, ITU-T K.114 “Electromagnetic compatibility requirements and measurement methods for digital cellular mobile communication base station equipment”, ITU-T K.123 “Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities”, ITU-T K.76 “EMC requirements for DC power ports of telecommunication network equipment in the frequency range below 150 kHz”, ITU-T K.147 “Protection of networked information technology equipment”, ITU-T K.20 “Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents”, ITU-T K.45 “Resistibility of telecommunication equipment installed in the access and trunk networks to overvoltages and overcurrents”, ITU-T K.80 “EMC requirements for telecommunication network equipment in the frequency range 1 GHz-40 GHz”, and ITU-T K.136 Electromagnetic compatibility requirements for radio telecommunication equipment"

One new Recommendation was consented: ITU-T K.152 “Electromagnetic compatibility requirements for power equipment in telecommunication facilities”​

Nine new or revised supplements were agreed: ITU-T K.Suppl.24 to ITU-T K.20 “Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning”, ITU-T K.Suppl.27 to ITU-T K.44 “The 100 kHz ring wave generator”, ITU-T K.Suppl.28 to ITU-T K.44 “Electric shock and related terms and definitions”, ITU-T K.Suppl.29 “EMF strength inside and outside of electric vehicle using wireless power transfer (WPT) technology”, ITU-T K.Suppl.16 “Electromagnetic field compliance assessments for 5G wireless networks”, K.Suppl.30 ITU-T K.118 - Requirements for lightning protection of fibre to the distribution point equipment – Overview”, K.Suppl.31 to ITU-T K.118 - Requirements for lightning protection of fibre to the distribution point equipment - Modelling earth potential rise (EPR)”, K.Suppl.32 “Case Studies of RF-EMF assessments”, Corrigendum 1 to ITU-T K.123 “Corrigendum for Recommendation ITU-T K.123 "Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities".

Three ITU-T Recommendations have been agreed to be submitted for deletion: ITU-T K.43 “Immunity requirements for telecommunication network equipment”, ITU-T K.48 “EMC requirements for telecommunication equipment – Product family Recommendation”, and ITU-T K.88 “EMC requirements for next generation network equipment” as this material is included in new ITU‑T Recommendations.

Seven new work items were established: ITU-T K.21 “Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents”, ITU-T K.Suppl.RingWave to ITU-T K.44 “The 100 kHz ring wave generator”, ITU-T K.Suppl.24 “Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning”, ITU-T K.Suppl.ElectricShock to ITU-T K.44 “Electric shock and related terms and definitions”, ITU-T K.DMEI “Determination and mitigation of electromagnetic interference between base stations due to tropospheric radio-duct”, ITU-T K.80 “EMC requirements for telecommunication network equipment (1 GHz – 6 GHz)” and K.143rev “Guidance on safety relating to the use of surge protective devices and surge protective components in telecommunication terminal equipment”.

Under the umbrella of **Working Party 2/5**, nine new Recommendations were consented: ITU-T L.1390 “Energy-saving technologies and best practices for 5G RAN equipment”, ITU-T L.1318 “Q factor: A fundamental metric expressing integrated circuit energy efficiency”, ITU-T L.1333 “Carbon data intensity for network energy performance monitoring”, ITU-T L.1034 “Adequate assessment and sensitisation on counterfeit ICT products and their environmental impact​”, ITU-T L.1040 “Effects for ICT enabled autonomy on vehicles longevity and waste creation”, ITU-T ​L.1604 “Development framework for bioeconomy in cities and communities”, ITU-T ​L.1610 “​City Science Application Framework”, ITU-T ​L.1620 “Guide to Circular Cities”, and ITU-T L.1630 “Framework of building infrastructure management system for sustainable city”.

Six new Supplements were agreed: ITU-T L.Suppl.47 “Examples of resource-saving within the ICT Sector”, ITU-T L.Suppl.50 “Case Studies on Implementation of Cities' circular actions”, ITU-T L.Suppl.51 “Case studies on city science application framework”, ITU-T L.Suppl.52) Computer processing, data management and energy perspective, ITU-T L.Suppl.53 “Guidelines on the implementation of environmental efficiency criteria for AI and other emerging technologies” and ITU-T L.Suppl.56 “Guidelines for connecting cities and communities with the Sustainable Development Goal”.

Eleven new work items were established: ITU-T L.FEMS “Reference Model of Factory Energy Management System”, ITU-T L.Suppl.MDEE “Multidimensional energy efficiency”, ITU-T L.DLB “Guidelines for the durability assessment of Lithium-ion Batteries”, ITU-T L.DMTT “Specification for the durability assessment of mobile telecommunication terminals”, ITU-T L.1023\_rev “Assessment method for circular scoring”, ITU-T L.Suppl.CaseStudies\_Circular “Case Studies on Implementation of Cities' circular actions”, ITU-T L.FCC “Energy consumption management and optimization platform Framework for cloud computing”, ITU-T L.MCI\_Gen “Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks) -– Generic Interface"”, ITU-T L.MCI\_MIM “Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks) – ICT equipment power, energy and environmental parameters monitoring information model”, ITU-T L.D4PI “An information model for digital product information on sustainability and circularity” and ITU-T L.FIMS “Reference model of firefighting infrastructure management system for buildings in sustainable cities”.

As for **Working Party 3/5**, experts consented five new Recommendations: ITU-T L.1480 “Enabling the Net Zero transition: Assessing how the use of ICT solutions impacts GHG emissions of other sectors”, ​ ITU-T L.1481 “​Guidance on how to address Connect 2030 targets on net abatement”, ITU-T L.1230 “​Specifications of 10 kVAC input and up to 400 VDC output integrated, and ITU-T L.1240 “​Evaluation method of safety operations and energy saving for power supply system in telecommunication room/building” and ITU-T L.1306 “Specification of Edge Data Center infrastructure”. Experts also consented the revision of Recommendation ITU-T L.1400 “Overview and general principles of methodologies for assessing the environmental impact of ICT”.

Four new supplements were agreed: ITU-T L.Suppl.48 “Data centre energy saving: Application of artificial intelligence technology in improving energy efficiency of telecommunication room and data center infrastructure” ITU-T L.Suppl.49 “Overview on Adaptation to Climate Change for ICT Networks”, ITU-T L.Suppl.54 “Guidance for assessing the GHG emissions consequences of the financial effects generated by ICT” and ITU-T L.Suppl.55 “Environmental efficiency and impacts on United Nations Sustainable Development Goals of data centres and cloud computing”.

**3 Plan of work for this study period and towards the next study period and progress**

The list of Recommendations and other texts on electromagnetic compatibility, lightning protection, electromagnetic effects, environment, climate change, energy efficiency, clean energy and circular economy, including e-waste that are currently under development in ITU-T SG5, can be found at: <https://www.itu.int/ITU-T/workprog/wp_search.aspx?sg=5>

**4 SG5 as Lead Study Group on electromagnetic compatibility, resistibility and lightning protection, soft error caused by particle radiations, human exposure to electromagnetic fields, circular economy, and e-waste management and ICTs related to the environment, energy efficiency, clean energy, and sustainable digitalization for climate actions**

**4.1 Electrical protection, reliability, safety and security systems**

The protection, reliability, safety and security of ICT systems are studied by Question 1/5. The reliability of the infrastructure is essential for stability of society. The purpose of this Question is to produce new or revised Recommendations or Supplements regarding the protection of telecommunication systems against the effects of nearby lightning strikes and disturbances from nearby electric power systems.

Q1/5 is currently working on four work items.

**4.2 Protecting equipment and devices against lightning and other electrical events**

The resistibility and safety applied to telecommunications equipment and infrastructure is studied by Question 2/5. The purpose of this Question is to produce new or revised Recommendations or Supplements regarding the resistibility of ICT equipment, and also specifications, test methods and principles of application for protective components and assemblies.

Q2/5 is currently working on five work items.

**4.3 Human exposure to electromagnetic fields (EMFs) due to digital technologies**

The EMF aspect of ICTs and digital technologies is studied by Question 3/5. The purpose of this Question is to develop international standards and guidelines relating to the assessment of human exposure to electromagnetic fields (EMF) produced by ICT installations and devices, including cellular phones and base stations; this concerns the construction, maintenance and use of radiocommunication installations, and the proper use of devices and information on factors affecting exposure from transmitting stations and mobile devices in order to assure compliance with RF EMF limits. These Recommendations and guidelines should provide the appropriate support to countries in establishing national regulations concerning the assessment and compliance of RF EMF exposure. The Question will also develop standards, technical papers and methodologies for compliance with exposure limits of the general public and workers to electromagnetic fields.

Q3/5 is currently working on five work items.

**4.4 Electromagnetic compatibility (EMC) aspects in ICT environment**

The EMC aspects in the ICT environment are studied by Question 4/5. The electromagnetic environment is changing rapidly through the development and installation of new types of electric/electronic equipment and evolving the telecommunication infrastructure. This Question aims to establish the EMC requirements, including emission and immunity requirements for ICT equipment, and countermeasures for facilities to reduce electromagnetic compatibility issues and maintain a controlled electromagnetic environment for ICT systems and services.

The Question is closely in collaboration with ITU-R SG1, SG5 and SG6, ITU-T SG9, IEC ACEC (Advisory Committee on Electromagnetic Compatibility), IEC CISPR and SC77B.

Q4/5 is currently working on three work items.

**4.5 Environmental efficiency of digital technologies**

The environmental performance and efficiency aspects of digital and frontier technologies are studied under Question 6/5. These technologies are capable of unlocking the next level of efficiency for the public and manufacturing sector, while accelerating progress on the SDGs. However, the environmental performance of digital and frontier technologies themselves is often overlooked. This Question identifies the environmental efficiency requirements of digital and frontier technologies, including their water, materials, and energy efficiency. It focuses on studying technical solutions, enhancements, metrics, key performance indicators and related accurate measurement methods, and reference values for different type of technologies.

Q6/5 is currently working on sixteen work items.

**4.6 E-waste, circular economy, and sustainable supply chain management**

The e-waste challenge and the potential of the circular economy to facilitate sustainability in ICTs and add new values to supply chain management is studied by Question 7/5. This Question seeks to address the e-waste challenge by identifying the environmental requirements of digital technologies, including IoT, end-user equipment and ICT infrastructures or installations, based on the circular economy principles and improving the supply chain management.

Q7/5 is currently working on seventeen work items.

**4.7 Guides and terminology on environment**

The activities on the development of Guides and terminology on environment and climate change are studied by Question 8/5. Q8/5 is tasked with working on all terms, definitions, abbreviations, letter symbols and schematic symbols used in the ITU-T Study Group 5 Recommendations, Supplements, Handbooks and Directives; harmonize with terminology used by other parties outside of ITU-T Study Group 5; and liaise with other bodies regarding terminology used in the Study Group 5 Recommendations, among others.

Q8/5 is currently working on four work items.

Q8/5 works closely with ITU-T Standardization Committee for Vocabulary (SCV).

**4.8 Climate change and assessment of digital technologies in the framework of the Sustainable Development Goals (SDGs) and the Paris Agreement**

Question 9/5 aims to develop assessment methodologies and guidance that allow objective, transparent and practical assessments of the sustainability impacts of digital technologies, including information and communication technologies (ICTs), artificial intelligence and 5G, in order to align their developmental trajectories with the Paris Agreement and the United Nations Sustainable Development Agenda. This Question also aims to study how environmental assessments may be used in the frame of broader sustainable development assessments, including economic, environmental and social assessments.

Q9/5 is currently working on twenty work items.

**4.9 Climate change mitigation and smart energy solutions**

The use of ICTs and smart technologies to improve the efficiency of energy management systems and reduce carbon emissions is being studied by Question 11/5. This Question aims to develop standards, guidance, Supplements and/or Technical Reports to create a smart energy system using ICT and digital technologies such as artificial intelligence, apply smart energy solutions to achieve a low-carbon economy, and develop effective and efficient ICT and digital technologies-based solutions for energy management and energy saving solutions.

Q11/5 is currently working on fifteen work items.

**4.10 Adaptation to climate change through sustainable and resilient digital technologies**

The use of sustainable and resilient ICTs and digital technologies to adapt to the effects of climate change is being studied by Question 12/5. This Question looks to support the development of energy efficiency ICT architectures, add energy-saving features to ICTs equipment and applications, improve air-flow controlling technology, cooling technology and renewable energy systems, and more. It also recognizes the lack of adequate broadband infrastructure in rural areas. Question 12/5 aims to develop Recommendations, Supplements and/or Technical Reports that support the deployment of digital technologies in accelerating climate adaptation actions. Particular emphasis has been placed on expanding the capacity of rural communities and areas to build and maintain climate resilient ICT infrastructures.

Q12/5 is currently working on five work items.

**4.11 Building circular and sustainable cities and communities**

The building of circular and sustainable cities and communities is being studied by Question 13/5**.** ThisQuestion aims to develop Recommendations, Supplements and/or Technical Reports identifying requirements and providing guidance, innovative frameworks and tools that support the transition to a circular city.

Q13/5 is currently working on one work item.

**5 Collaboration with other SGs and external organizations**

WP1/5 maintains collaboration with ITU-T SG15 on conformance and interoperability, IEC TC81 and CENELEC TC 81X on lightning protection, IEC TC 108 on safety (especially on remote power feeding), IEEE PES SPDC, IEC SC 37A and 37B on surge protective devices, IEC SC 77B on high frequency transients, and ETSI ERM on lightning protection, CIGRÉ, CIRED and UIC on power frequency interference, IEC TC 64 on safety (protection against electric shock), and IEEE PES SPDC on surge protective devices.

It also maintains collaboration with ITU-T SG9 and ITU-R WP1A, WP1C, WP4A, WP4C, WP5A, WP5B, WP5C, WP5D and WP6A on EMC issues; with ITU-D, WHO, ICNRIP and IEC TC106 on topics on assessment of human exposure to electromagnetic fields (RF EMF); with ITU-T SG17 and IEC SC77C on topics on security of telecommunication and information systems concerning the electromagnetic environment. WP1/5 collaborates also with ITU-T SG12, IEC TC47 and IEC TC 107 for studies on soft error by particle radiations. Additionally, WP1/5 exchanges information with IEC SC77B, SC77C, TC106 and CISPR through liaisons with IEC ACEC. WP1/5 also maintains collaboration with CISPR/I.

WP2/5 and WP3/5 maintains close collaboration with ETSI TC EE, ITU-T SG11; ITU-T SG2; FAO, CEN-CENELEC (SABE)and the World Bank on ICTs and adaptation to the effects of climate change topics; with IEC SEG4 on advance and low impact power feeding solutions and with 3GPP; ATIS; CCSA; CEDARE; ETNO; ETSI TC ATTM, FG AI4H; FG ML5G; FG NET2030; FG-VM; ISO; IEC; IEEE; CEN/CLC/JTC 10; IEC SyC LVDC; JCA-IMT2020; JCA-IoT and SC&C; ITU-T SG2; ITU-T SG3; ITU-T SG9; ITU-T SG11; ITU‑T SG12; ITU-T SG13; ITU-T SG15; ITU-T SG16; ITU-T SG17; ITU-T SG20, SCV, ISO TC323, CEN/CENELEC/ETSI SF-SSCC “Circular Economy” on e-waste management, energy efficiency, circular economy and other green ICT standard topics. WP2/5 has also collaborated with ISO/TMBG/CCCC “Climate Change Coordination Committee (CCCC)”. Additionally, WP2/5 exchanges information with ISO TC 207, CEN/CLC environmental TC, IEC SyC Smart Cities through liaisons with IEC ACEA.

Additionally, WP2/5 and WP3/5 collaborate closely with GSMA, GESI, SBTi and IEA on the topics related to GHG emissions trajectories for the ICT sector. ITU-T SG5 collaborates and cooperates with the Basel Convention and UNIDO on e-waste management.

ITU-T SG5 is member of the Advisory Board of the European Green Digital Coalition.

**6 ITU-T Study Group 5 Regional Groups**

ITU-T Study Group 5 has the following Regional Groups:

* [SG5 Regional Group for the Africa Region](https://www.itu.int/en/itu-t/regionalgroups/sg05-afr/Pages/default.aspx)
* [SG5 Regional Group for the Arab Region](https://www.itu.int/en/itu-t/regionalgroups/sg05-arb/Pages/default.aspx)
* [SG5 Regional Group for Latin America](https://www.itu.int/en/itu-t/regionalgroups/sg05-latam/Pages/default.aspx)
* [SG5 Regional Group for Asia and the Pacific](https://www.itu.int/en/itu-t/regionalgroups/sg05-ap/Pages/default.aspx)

**7 Focus Group on “Environmental Efficiency for Artificial Intelligence and other Emerging Technologies” (FG-AI4EE)**

The fifth meeting was held in Vienna, Austria, on 4 May 2022, with remote participation. The meeting was hosted by the Austrian Economics Center and the Vienna Chamber of Commerce and Industry, at the invitation of FG-AI4EE Vice-Chairman Dr Barbara Kolm.

The meeting was preceded by a full-day [ITU Workshop on Advancing Environmental Efficiency of Emerging Technologies](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2022/0503/Pages/default.aspx).

FG-AI4EE plans to hold its final meeting from 1 to 2 December 2022, in Ålesund, Norway. The meeting will be preceded by a one-day interactive ITU Workshop on 30 November 2022

The FG-AI4EE has the following structure:

* **Working Group 1** - Requirements of AI and other Emerging Technologies to Ensure Environmental Efficiency. [List of WG1 deliverables.](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG1deliverables.aspx)
* **Working Group 2** - Assessment and Measurement of the Environmental Efficiency of AI and Emerging Technologies. [List of WG2 deliverables.](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG2deliverables.aspx)
* **Working Group 3** – Implementation Guidelines of AI and Emerging Technologies for Environmental Efficiency. [List of WG3 deliverables.](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG3deliverables.aspx)

The previous FG-AI4EE meetings are the following:

* Fourth FG-AI4EE meeting, 21 October 2021, [Meeting report](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/output/Forms/04.aspx).
	+ [Webinar on AI for environmental sustainability](https://aiforgood.itu.int/event/ai-for-environmental-sustainability/) on 20 October 2021.
* Third FG-AI4EE meeting, virtual, 8 April 2021. [Meeting report.](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Documents/Report%20of%20ITU%20FG-AI4EE%203rd%20meeting%2C%2008%20April%202021.docx)
	+ Webinar on AI for sustainable transformation in smart cities, mobility & energy, virtual, 7 April 2021.
* Second FG-AI4EE meeting, virtual, 10 December 2020. [Meeting report](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Documents/AI4EE-O-002_Report%20of%20ITU%20FG-AI4EE%202nd%20meeting%2C%2010%20December%202021.docx).
	+ [Virtual Workshop on AI & environmental efficiency](https://www.itu.int/en/ITU-T/climatechange/Pages/20201209.aspx), virtual, 9 December 2020.
* Frist FG-AI4EE meeting, Vienna, Austria, 12 December 2019. [Meeting report](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame2.aspx?sourcedoc=%7b111E60E9-0339-4D29-BC3D-157FA2F70ED1%7d&file=AI4EE-O-001.docx&action=default).

The FG-AI4EE website is available [here](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx).

**8 Other activities**

**8.1 Events on Environment, Climate Change and Circular Economy**

The following events were organized:

* [Workshop on Global Digital ICT Product Passport to achieve a Circular Economy​](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2022/0601/Pages/default.aspx), Virtual, 1 June 2022.
* [14th Symposium on ICT, Environment, Climate Change and Circular Economy](https://www.itu.int/en/ITU-T/climatechange/symposia/202210/Pages/default.aspx), Rome, Italy, 25 October 2022.

During CO27, ITU was involved in the following events:

ITU participated and contributed in COP27 through a broad range of activities, including:

* **Climate classroom - “​Enabling the Net Zero transition: Assessing how the use of ICT solutions impacts GHG emissions of other sectors​”**

​Date: 10 November 2022

Time:1200 – 1300 hours ​EET
Virtual event

* **Climate classroom - “​Digital Transformation for people-oriented cities and communities: Reducing the Environmental Impact of Cities”**

​Date: 10 November 2022

Time: 1700 – 1800 hours ​EET
Virtual event​

* **Side event - “​Leveraging private sector development to drive green transition”**

​Date: 15 November 2022

Time: 1700 – 1830 hours ​EET

* **Climate classroom - “An introduction to e-waste policy and statistics”**

​Date: 16 November 2022

Time: 1100 – 1200 hours ​EET
Virtual event

* **Climate classroom - “​Green and digital entrepreneurship [sharing experiences from women and young people”**
Date: 16 November 2022
Time: 1700 – 1800 hours ​EET
Virtual event
* **Tutorial on ITU Standards related to Green Digital Transformation; The role of the ICT sector in reducing GHG emissions globally**

​Date: 17 November 2022

Time: 1600 – 1700 hours ​E

Additionally, it is planned to organize the 11th Green Standards Week, virtual, from 19 to 21 December 2022.

**Annex 1**

**Achievements of ITU-T Study Group 5 on electromagnetic compatibility, resistibility and lightning protection, soft error caused by particle radiations, human exposure to electromagnetic fields, circular economy, and e-waste management and ICTs related to the environment, energy efficiency, clean energy, and sustainable digitalization for climate actions
(status from January to October 2022)**

* 1. **WP1/5 - EMC, lightning protection, EMF**
		1. **Recommendations approved**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.147 | Protection of networked information technology equipment |
| 5 | K.124 | Overview of particle radiation effects on telecommunication systems |
| 5 | K.130 | Neutron irradiation test methods for telecommunication equipment |
| 5 | K.131 | Design methodologies for telecommunication systems applying soft error measure |
| 5 | K.138 | Quality estimation methods and application guidelines for mitigation measures based on particle radiation tests |
| 5 | K.139 | Reliability requirements for telecommunication systems affected by particle radiation |
| 5 | K.83 | Monitoring of the electromagnetic field levels |
| 5 | K.91 | Guidance for assessment, evaluation and monitoring of the human exposure to radio frequency electromagnetic fields |
| 5 | K.137 | Electromagnetic compatibility requirements and measurement methods for wireline telecommunication network equipment |
| 5 | K.151 | Electrical safety and lightning protection of medium voltage input and up to ±400VDC output power system in ICT data centre and telecommunication centre |
| 5 | K.87 | Guide for the application of electromagnetic security requirements – Overview​ |
| 5 | K.21 | Resistibility of telecommunication equipment installed in customer premises to o​vervoltages and overcurrents |
| 5 | K.114 | Electromagnetic compatibility requirements and measurement methods for digital cellular mobile communication base station equipment |
| 5 | K.123 | Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities |
| 5 | K.76 | EMC requirements for DC power ports of telecommunication network equipment in the frequency range below 150 kH |

**1.1.2 Informative texts agreed**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.Suppl.13 to Recommendation ITU-T K. | Radiofrequency electromagnetic field (RF-EMF) exposure levels from mobile and portable devices during different conditions of use |
| 5 | K.Suppl.20 to Recommendation ITU-T K. | Supplement on radiofrequency exposure evaluation around underground base stations |
| 5 | Appendix I to Recommendation ITU-T K.70 | Software “EMF-estimator” v8.0.32 and v8.64  |
| 5 | K.Suppl.24 to ITU-T K.20 | ​Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning |
| 5 | K.Suppl.27 to ITU-T K.44 | The 100 kHz ring wave generator |
| 5 | K.Suppl.28 to ITU-T K.44 | Electric shock and related terms and definitions |
| 5 | K.Suppl.29 | EMF strength inside and outside of electric vehicle using wireless power transfer (WPT) technology​ |
| 5 | K.Suppl.16​ | Electromagnetic field compliance assessments for 5G wireless networks |
| 5 | K.Suppl.30 to ITU‑T K.118 | Requirements for lightning protection of fibre to the distribution point equipment - Overview |
| 5 | K.Suppl.31 to ITU‑T K.118 | Requirements for lightning protection of fibre to the distribution point equipment - Modelling earth potential rise (EPR) |
| 5 | K.Suppl.32 | Case Studies of RF-EMF assessments |
| 5 | Corrigendum 1 to K.123 | Corrigendum for Recommendation ITU-T K.123 "Electromagnetic compatibility requirements for electrical equipment in telecommunication facilities".  |

**1.1.3 Deleted Recommendations**

|  |  |  |
| --- | --- | --- |
| SG | No. | Title |
| 5 | K.43 | Immunity requirements for telecommunication network equipment |
| 5 | K.48 | EMC requirements for telecommunication equipment – Product family Recommendation |
| 5 | K.88 | EMC requirements for next generation network equipment |

**1.1.4 Discontinued Supplement**

|  |  |  |
| --- | --- | --- |
| SG | No. | Title |
| None |  |  |

**1.1.5 Recommendation consented (in AAP Last Call)**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.147 | Protection of networked information technology equipment |
| 5 | K.20 | Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents |
| 5 | K.45 | Resistibility of telecommunication equipment installed in the access and trunk networks to overvoltages and overcurrents |
| 5 | K.80 | EMC requirements for telecommunication network equipment in the frequency range 1 GHz-40 GHz |
| 5 | K.136 | Electromagnetic compatibility requirements for radio telecommunication equipment |

**1.2 WP2/5 - Environmental efficiency, e-waste, circularity, and sustainable ICT networks**

**1.2.1 Recommendations approved**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.1331 | Assessment of mobile network energy efficiency |
| 5 | L.1035 | Sustainable Management of Batteries |
| 5 | L.1016 | Method for Evaluation of the Environmental, Health and Safety Performance of True Wireless Stereo Headphones |
| 5 | L.1036 | Scheduled waste management for base station (inclusive of e-waste) |
| 5 | L.1050 | Methodology to identify the key equipment in order to assess the environmental impact and e-waste generation of different network architectures |
| 5 | L.1390 | Energy-saving technologies and best practices for 5G RAN equipment |
| 5 | L.1318 | Q factor: A fundamental metric expressing integrated circuit energy efficiency |
| 5 | L.1333 | Carbon data intensity for network energy performance monitoring |
| 5 | L.1034 | Adequate assessment and sensitisation on counterfeit ICT products and their environmental impact​ |
| 5 | L.1040 | Effects for ICT enabled autonomy on vehicles longevity and waste creation |
| 5 | ​L.1604 | ​Development framework for bioeconomy in cities and communities |
| 5 | L.1610 | ​City Science Application Framework |
| 5 | ​L.1620​ | ​Guide to Circular Cities |

**1.2.2 Informative texts agreed**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.Suppl.45 | Radio base station site best practices |
| 5 | L.Suppl.46 | Definitions and Recent Trends in Circular Cities |
| 5 | L.Suppl.47 | Examples of resource-saving within the ICT Sector |
| 5 | L.Suppl.50 | Case Studies on Implementation of Cities' circular actions |
| 5 | L.Suppl.51 | Case studies on city science application framework     |
| 5 | L.Suppl.52 | Computer processing, data management and energy perspective |
| 5 | L.Suppl.53 | Guidelines on the implementation of environmental efficiency criteria for artificial intelligence and other emerging technologies |
| 5 | L. Suppl.56 | Guidelines for connecting cities and communities with the Sustainable Development Goal |

**1.2.3 Deleted Recommendations**

|  |  |  |
| --- | --- | --- |
| Q | No. | Title |
| None |  |  |

**1.2.4 Recommendations consented (in AAP Last Call)**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.1630 | Framework of building infrastructure management system for sustainable city |

**1.3 WP3/5 - Climate change, adaptation, mitigation, and net-zero emissions**

**1.3.1 Recommendations approved**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.1230 | ​Specifications of 10 kVAC input and up to 400 VDC output integrated power system in data centre and telecommunication room​ |
| 5 | L.1240 | ​Evaluation method of safety operations and energy saving for power supply system in telecommunication room/building |

**1.3.2 Informative texts agreed**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.Suppl.48 | Data center energy saving: Application of artificial intelligence technology in improving energy efficiency of telecommunication room and data centre infrastructure |
| 5 | L.Suppl.49 | Overview on Adaptation to Climate Change for ICT Networks |
| 5 | L.Suppl.54 | Guidance for assessing the GHG emissions consequences of the financial effects generated by ICT |
| 5 | L.Suppl.55 | Environmental efficiency and impacts on United Nations Sustainable Development Goals of data centres and cloud computing |

**1.3.3 Deleted Recommendations**

|  |  |  |
| --- | --- | --- |
| Q | No. | Title |
| None |  |  |

**1.3.4 Recommendations consented (in AAP Last Call)**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | ​L.1480​ | Enabling the Net Zero transition: Assessing how the use of ICT solutions impacts GHG emissions of other sectors |
| 5 | ​L.1481 | ​Guidance on how to address Connect 2030 targets on net abatement |
| 5 | L.1400 | Overview and general principles of methodologies for assessing the environmental impact of ICT |
| 5 | L.1306 | Specification of Edge Data Centre infrastructure |

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