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| ITU logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | | | TSAG-TD1041 |
| **TSAG** |
| **Original: English** |
| **Question(s):** | | N/A | | | E-Meeting, 25-29 October 2021 |
| **TD (Ref.:** [SG5-LS224](http://handle.itu.int/11.1002/ls/sp16-sg5-oLS-00224.docx)) | | | | | |
| **Source:** | | ITU-T Study Group 5 | | | |
| **Title:** | | LS on ITU-T Study Group 5 Lead Study Group Report [from ITU-T SG5] | | | |
| **Purpose:** | | Information | | | |
| **LIAISON STATEMENT** | | | | | |
| **For action to:** | | | - | | |
| **For comment to:** | | | - | | |
| **For information to:** | | | TSAG | | |
| **Approval:** | | | ITU-T Study Group 5 management team (18 October 2021 by correspondence) | | |
| **Deadline:** | | | N/A | | |
| **Contact:** | | | Shuguang Qi  Acting Chairman ITU-T SG5 | Tel: +86 10 82053589-8858 E-mail: [qishuguang@caict.ac.cn](mailto:qishuguang@caict.ac.cn) | |
| **Contact:** | | | Fryderyk Lewicki Chairman of WP1/5 | Tel: +48 71 321 09 24 E-mail: [fryderyk.lewicki@orange.com](mailto:fryderyk.lewicki@orange.com) | |
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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/sp16-sg5-oLS-00224.docx>.

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| ITU logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | | | **SG5-LS224** | |
| **STUDY GROUP 5** | |
| **Original: English** | |
| **Question(s):** | | | All/5 | |  | |
| **LIAISON STATEMENT** | | | | | | |
| **Source:** | | | ITU-T Study Group 5 | | | |
| **Title:** | | | LS on ITU-T Study Group 5 Lead Study Group Report | | | |
| **LIAISON STATEMENT** | | | | | | |
| **For action to:** | | | | - | | |
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| **Deadline:** | | | | N/A | | |
| **Contact:** | | Shuguang Qi  Acting Chairman ITU-T SG5 | | | | Tel: +86 10 82053589-8858 E-mail: [qishuguang@caict.ac.cn](mailto:qishuguang@caict.ac.cn) |
| **Contact:** | | Fryderyk Lewicki Chairman of WP1/5 | | | | Tel: +48 71 321 09 24 E-mail: [fryderyk.lewicki@orange.com](mailto:fryderyk.lewicki@orange.com) |
| **Contact:** | | Paolo Gemma Chairman of WP2/5 | | | | Tel: +39 02 3999 4947 Fax: +39 01119743499 Email: [paolo.gemma@huawei.com](mailto:paolo.gemma@huawei.com) |

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| **Keywords:** | SG5; lead roles; electromagnetic compatibility; lightning protection; electromagnetic effects; ICTs; environment; climate change; energy efficiency; circular economy; e‑waste; |
| **Abstract:** | This liaison statement informs TSAG on SG5 lead roles and gives an update on SG5 activities from January until 15 October 2021. |

ITU-T Study Group 5 is actively fulfilling its mandate as the lead study group on electromagnetic compatibility, lightning protection and electromagnetic effects; ICTs related to the environment, climate change, energy efficiency and clean energy and circular economy, including e‑waste.

# 1 Main achievements

The list of results pertaining to ITU-T SGs Recommendations on electromagnetic compatibility, lightning protection and electromagnetic effects; ICTs related to the environment, climate change, energy efficiency and clean energy and circular economy, including e‑waste, since January 2021, are provided in Annex 1 (status: until 15 October 2021).

The main highlights are described in the following text.

**Working Party 1/5** approved two Recommendations: ITU-T K.56 (rev.) “Protection of radio base stations against lightning discharges” and ITU-T K.112 (rev.) “Lightning protection, earthing and bonding: Practical procedures for radio base stations”. Additionally, experts consented five revised Recommendations: ITU-T K.147 “Ethernet port resistibility testing for overvoltages and overcurrents”, ITU-T K.20 “Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents”, ITU-T K.52 “Guidance on complying with limits for human exposure to electromagnetic fields”, and ITU-T K.100 “Measurement of radio frequency electromagnetic fields to determine compliance with human exposure limits when a base station is put into service”.

Experts consented the Corrigendum to ITU-T K.50 “Safe limits for operating voltages and currents in telecommunication systems powered over the network”.

Three new Supplements were agreed: ITU-T K.Suppl.24 to Recommendation ITU-T K.20 “Rationale for setting resistibility requirements of telecommunication equipment installed in a telecommunication centre against lightning”, ITU-T K.Suppl.25 to Recommendation ITU-T K.117 “Long reach single twisted-pair Ethernet resistibility testing”, and ITU-T K.Suppl.26 “Analysis of electromagnetic compatibility requirements and test methods of 5G Active Antenna System base statio”. Furthermore, three Supplements were revised and agreed: ITU-T K.Suppl.21 to Recommendation ITU-T K.44 “Rationale for setting resistibility requirements of telecommunication equipment installed in customer premises against lightning”, K.Suppl.22 to Recommendation ITU-T K.45 “Rationale of resistibility of telecommunication equipment installed in the access and trunk networks against lightning”, and K.Suppl.1 to Recommendation ITU-T K.91 “Guide on electromagnetic fields and health”.

WP1/5 experts also agreed on the revision of Appendix II to Recommendation ITU-T K.90 on Software “EMFACDC”.

Under the umbrella of **Working Party 2/5**, six new ITU-T Recommendations were consented: Recommendation ITU-T L.1317 “Guidelines on Energy Efficient Blockchain Systems”, ITU-T L.1050 “Methodology to identify key equipment in order to assess the environmental impact and e‑waste generation of different network architectures”, ITU-T L.1033 “Guidance for institutions of higher learning to contribute in the effective life cycle management of e-equipment and e-waste”, ITU-T L.1060 “General principles for the green supply chain management of ICT manufacturing industry”, ITU-T L.1471 “Guidance and criteria for ICT organisations on setting Net Zero targets and strategies”, and ITU-T L.1383 “Smart energy solutions for cities and home applications”.

Four new Supplements were agreed: ITU-T L.Suppl.41 “Requirements on energy efficiency measurement models and the role of AI and big data”, ITU-T L.Suppl.42 “Guidelines on the Environmental Efficiency of Machine Learning Processes in Supply Chain Management”, ITU-T L.Suppl.43 “Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption”, and ITU-T L.Suppl.44 “A Guideline on best practices and environment friendly policies for effective ICT deployment methods”.

**2 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?isn_sp=3925&isn_sg=3928&isn_status=-1,1,3,7&details=0&field=acdefghijo>

**3 SG5 as Lead Study Group on electromagnetic compatibility lightning protection and electromagnetic effects; ICTs related to the environment, climate change, energy efficiency and clean energy and circular economy, including e‑waste**

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

The protection, reliability, safety and security of ICT systems is studied by Question 1/5. The reliability of 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, disturbances from nearby electric power systems.

Q1/5 is currently working on thirteen work items.

**3.2 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. During the last SG5 meeting, experts agreed to start working on draft Recommendation K.isolator “Integrated circuit isolators for telecommunications use”, and to keep as active work items the revisions of draft Supplement ITU-T K.Sup.21.rev “Rationale for setting resistibility requirements of telecommunication equipment installed in customer premises against lightning”, and draft Supplement K.Sup.22.rev “Rationale for setting resistibility requirements of telecommunication equipment installed in the access and trunk networks against lightning”.

**3.3 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 concerning construction and maintenance, use of radiocommunication installations and proper use of devices and information on factors affecting exposure from devices in order to assure compliance with RF EMF limits. These Recommendations and guidelines should provide appropriate support to countries in establishing national regulations concerning assessment and compliance of RF EMF exposure. The Question will also develop standards, technical papers and methodologies for compliance with exposure limits of general public and workers to electromagnetic fields.

Q3/5 is currently working on six work items.

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

The EMC aspects in ICT environment is 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 six work items.

**3.5 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. During the last SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L.soft\_ES “Functional requirements and test methods of software energy-saving for 5G network”, draft Recommendation ITU-T L.BBU “Requirements and use cases of liquid cooling solutions and high energy efficiency solutions for 5G BBU in C-RAN mode”, draft Recommendation ITU-T L.TIME “Q-factor: fundamental metric expressing Integrated Circuit energy-efficiency”, and draft Recommendation L.SDT “Definition of Sustainable Digital Transformation”.

Taking into consideration the first set of approved deliverables of the FG-AI4EE. Q6/5 agreed to adopt one technical specification into draft Recommendation ITU-T L.gee\_bs “Guidelines on Energy Efficient Blockchain Systems”. This Recommendation was consented during the May 2021 meeting. Additionally experts agreed to adopt three FG-AI4EE technical reports into the following draft Supplements:, draft Supplement ITU-T L.Suppl.ee\_aibd “Requirements on energy efficiency measurement models and the role of AI and big data”, draft Supplement ITU-T L.Suppl.ee\_ml\_scm “Guidelines on the Environmental Efficiency of Machine Learning Processes in Supply Chain Management”, and draft Supplement ITU-T L.Suppl.ses5Gbs “Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption”. These Supplements were agreed during the May 2021 meeting.

**3.6 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. During the last SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L.GDSPP “Requirements for a global digital sustainable product passport to achieve a circular economy”.

**3.7 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 to work 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 including: Guide to the K & relevant L-series Recommendations “Extension of the Guide to cover relevant L-series Recommendations”; Mitigation Handbook - Additional case studies “Additional case studies to be added”; Terminology Handbook “Extension of the Terminology Handbook to cover relevant L-series terminologies” and Terminology Handbook - web version “Web version of the Terminology Handbook”.

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

**3.8 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, 5G, etc., 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 five work items. During the last ITU-T SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L.VirtualMeetings “Methodology for estimating GHG emissions in the frame of virtual meetings and events”.

**3.9 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. Question 11/5 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 eight work items. During the last ITU-T SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L.NZ\_solutions “Best practices to achieve Net Zero with information and communication technologies.”.

**3.10 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 two work items. During the last ITU-T SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L. SRDT “Sustainable and Resilient Digital Technologies for Adaptation to Climate Change”, and draft Supplement ITU-T L.Suppl.oa2cc “Overview on Adaptation to Climate Change for ICT Networks".

**3.11 Building circular and sustainable cities and communities**

The building of circular and sustainable cities and communities is being studied by Question 13/5**.** Question 13/5 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 six work items. During the last ITU-T SG5 meeting, experts agreed to start working on draft Recommendation ITU-T L.GCC “Guide to Circular City”, draft Recommendation ITU-T L.FUB “Development framework for bioeconomy for cities and communities”, draft Supplement ITU-T L.Suppl. Definitions\_CC “Definitions and Recent Trends in Circular Cities”, draft Supplement L.Suppl.ConnectSDG “Guidelines for connecting cities and communities with the Sustainable Development Goal”, draft Supplement ITU-T L.Suppl.CSAF\_CaseStudies “Case studies on city science application framework”, and draft Recommendation ITU-T L.CSAF “City Science Application Framework”.

**4 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), 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 maintains close collaboration with ETSI TC EE, ITU-T SG11; ITU-T SG2; FAO, 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; 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 “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 collaborates 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. Additionally, SG5 is working together with UNIDO in a project in Latin America in the implementation of the Recommendations on e-waste management.

ITU participated in the Technical Working Group on Innovation, Technology and Data as part of the preparations for the High-level Dialogue on Energy which was held in September 2021. The technical working group produced a Theme Report on Innovation, Technology and Data. The full report is available [here](https://www.un.org/sites/un2.un.org/files/2021-twg_4-062121.pdf) and the executive summary is available [here](https://www.un.org/sites/un2.un.org/files/2021-twg_4-exesummarie-061721.pdf). The report contains a case study on the Implementation of Recommendation ITU-T L.1381 'Smart energy solutions for data centres' in China.

ITU-T SG5 is leading the subgroup on Supply Chain Transparency and Circularity of the Policy Network of Environment (PNE) of the Internet Governance Forum. The overall objective of the PNE is to produce a report that will be launched at the IGF to be held from 6 to 10 December 2021.

**5 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/studygroups/2017-2020/05/sg5rgafr/Pages/default.aspx) (SG5RG-AFR) held its first meeting in Zanzibar, Tanzania on 9 April 2018. The second meeting was held on 29-30 August 2019 in Abuja, Nigeria, during the [1st Digital African Week](https://www.itu.int/en/ITU-T/climatechange/Pages/1st-Digital-African-Week.aspx). The third meeting was held virtually on 28 September 2021 during the [Sustainable Digital Transformation Dialogues](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/Pages/default.aspx).
* [SG5 Regional Group for the Arab Region](https://www.itu.int/en/ITU-T/studygroups/2017-2020/05/sg5rgarb/Pages/default.aspx) (SG5RG-ARB) held its first meeting in Zanzibar, Tanzania on 10 April 2018. The second meeting was held on 18 December 2018 in Kuwait city, Kuwait. The third meeting was held virtually on 29 September 2021 during the [Sustainable Digital Transformation Dialogues](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/Pages/default.aspx).
* [SG5 Regional Group for Latin America](https://www.itu.int/en/ITU-T/studygroups/2017-2020/05/sg5rglatam/Pages/default.aspx) (SG5RG-LATAM) held its first meeting in Cartagena de Indias, Colombia on 19 April 2018. The second meeting was held on 24 October 2018 in Bogotá, Colombia. The third meeting was held virtually on 10 November 2020. The fourth meeting was held virtually on 30 September 2021 during the [Sustainable Digital Transformation Dialogues](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/Pages/default.aspx).
* [SG5 Regional Group for Asia and the Pacific](https://www.itu.int/en/ITU-T/studygroups/2017-2020/05/sg5rgap/Pages/default.aspx) (SG5RG-AP) held its first virtual meeting on 29 and 30 September 2020. The second meeting was held virtually on 15-16 April 2021. The third meeting will be held on 19 and 20 October 2021. The meeting will be collocated with the [Dialogue on Sustainable Digital Transformation in Asia and the Pacific](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/20211019/Pages/default.aspx) on 19 October 2021.

**6 Focus Group on "Environmental Efficiency for Artificial Intelligence and other Emerging Technologies" (FG-AI4EE)**

The third meeting of the FG-AI4EE took place virtually on 8 April 2021. The meeting was preceded by a [Webinar on AI for sustainable transformation in smart cities, mobility & energy](https://aiforgood.itu.int/events/ai-for-sustainable-transformation-in-smart-cities-mobility-and-energy/) on 7 April 2021.

During this meeting the FG-AI4EE approved the following six deliverables that were submitted to SG5 for consideration:

* Technical specification on Key performance indicators for small and medium enterprises to assess the achievement of the sustainable development goals;
* Technical report on Requirements on energy efficiency measurement models and the role of AI and big data;
* Technical specification on Guidelines on energy efficient blockchain systems;
* Technical report on Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption; and
* Technical report on Guidelines on the environmental efficiency of machine learning processes in supply chain management.

The meeting report is available [here](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Documents/Report%20of%20ITU%20FG-AI4EE%203rd%20meeting%2c%2008%20April%202021.docx).

The fourth meeting of the FG-AI4EE will take place on 21 October 2021 and will be preceded by a [Webinar on AI for environmental sustainability](https://aiforgood.itu.int/event/ai-for-environmental-sustainability/) on 20 October 2021.

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:

* 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).

**7 Other activities**

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

The following events have been organized:

* [Virtual Forum on Human Exposure to electromagnetic fields (EMFs) due to digital technologies](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2021/0510/Pages/default.aspx), 10 May 2021.
* [Side event: International Standards and Sustainable Green & Innovative Power Solutions to bring Broadband Internet Connectivity to Rural and Remote Areas](https://www.itu.int/en/action/environment-and-climate-change/Pages/Side-event-International-Standards-and-Sustainable-Green-%26-Innovative-Power-Solutions.aspx), Virtual, 22 June 2021.
* [VEF Side Event: Unlocking the potential of digital technologies for a sustainable energy transition](https://www.itu.int/en/ITU-T/studygroups/2017-2020/05/Pages/ITU-T-SG5-side-event-on-Vienna-Energy-Forum.aspx), Virtual, 6 July 2021.
* [Session on the Emerging Technology Week 2021: Towards a sustainable digital transformation and a net-zero emission with emerging technology New](https://www.itu.int/en/ITU-D/Conferences/ET/2021/Pages/Programme.aspx), Virtual, 8 July 2021.
* [Sustainable Digital Transformation Dialogues](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/Pages/default.aspx), Virtual, 28-30 September 2021 :
  + [Sustainable Digital Transformation in Africa](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/20210928/Pages/default.aspx), 28 September 2021
  + [Sustainable Digital Transformation in the Arab Region](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/20210929/Pages/default.aspx), 29 September 2021
  + [Sustainable Digital Transformation in Latin America](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/sg05rg/sdtd/20210930/Pages/default.aspx), 30 September 2021

Additionally, ITU-T SG5 experts participated in the following virtual events:

* [ITU Regional Symposium for Europe and CIS on Spectrum Management and Broadcasting,](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2020/Spectrum_EUR_CIS/Remote.aspx) 02 July 2020.
* [Webinar on safety and environmental concerns around telecommunications installations in Uganda](https://www.ucc.co.ug/safety-and-environmental-concerns-around-telecommunications-installations-in-uganda/), 11 August 2020.

**7.2 EMF mobile app**

The new version of the EMF Guide & Mobile App provides up-to-date information and education resources on Electromagnetic Fields suitable for all communities and governments stakeholders and is available online at <http://emfguide.itu.int> or via the iOS and Google Play app stores. The latest version added information related to the EMF aspects of 5G. It is available in English, Spanish, French, Arabic, Chinese, and Russian.

**Annex 1**

**Achievements of ITU-T Study Group 5 on electromagnetic compatibility, lightning protection and electromagnetic effects; ICTs related to the environment, climate change, energy efficiency and clean energy and circular economy, including e‑waste  
(status from January to 15 October 2021)**

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

**1.1.1 Recommendations approved**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.56 (rev.) | Protection of radio base stations against lightning discharges |
| 5 | K.112 (rev.) | Lightning protection, earthing and bonding: Practical procedures for radio base stations |
| 5 | Corrigendum to ITU-T K.147 | Corrigendum 1 to Recommendation ITU-T K.147: Ethernet port resistibility testing for overvoltages and overcurrents |
| 5 | K.20 (rev.) | Resistibility of telecommunication equipment installed in a telecommunication centre to overvoltages and overcurrents |
| 5 | Corrigendum to  ITU-T K.50 | Safe limits for operating voltages and currents in telecommunication systems powered over the network |
| 5 | K.52 (rev.) | Guidance on complying with limits for human exposure to electromagnetic fields |
| 5 | K.100 (rev.) | Measurement of radio frequency electromagnetic fields to determine compliance with human exposure limits when a base station is put into service |

**1.1.2 Informative texts agreed**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.Suppl.21 to ITU-T K.21 (rev.) | Rationale for setting resistibility requirements of telecommunication equipment installed in customer premises against lightning |
| 5 | K.Suppl.22 to ITU-T K.45 (rev.) | Rationale for setting resistibility requirements of telecommunication equipment installed in the access and trunk networks against lightning |
| 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.25 to Recommendation ITU-T K.117 | Long reach single twisted-pair Ethernet resistibility testing |
| 5 | K.Suppl.1 to Recommendation ITU-T K.91 | Guide on electromagnetic fields and health |
| 5 | Appendix II to Recommendation ITU-T K.90 | Software "EMFACDC" |
| 5 | K.Suppl.26 | Analysis of electromagnetic compatibility requirements and test methods of 5G Active Antenna System base station |

**1.1.3 Deleted Recommendations**

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

**1.1.4 Discontinued Supplement**

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

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

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | K.147 | Ethernet port resistibility testing for overvoltages and overcurrents |

**1.2 WP2/5 - Environment, Energy Efficiency and the Circular Economy**

**1.2.1 Recommendations approved**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.1024 | Effect for global ICT of the potential of selling services instead of equipment on the waste creation and environmental impacts |
| 5 | L.1060 | General principles for the green supply chain management of ICT manufacturing industry |
| 5 | L.1471 | Guidance and criteria for ICT organisations on setting Net Zero targets and strategies |
| 5 | L.1383 | Smart energy solutions for cities and home applications |

**1.2.2 Informative texts agreed**

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.Suppl.41 | Requirements on energy efficiency measurement models and the role of AI and big data |
| 5 | L.Suppl.42 | Guidelines on the Environmental Efficiency of Machine Learning Processes in Supply Chain Management |
| 5 | L.Suppl.43 | Smart energy saving of 5G base station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption |
| 5 | L.Suppl.44 | A Guideline on best practices and environment friendly policies for effective ICT deployment methods |

**1.2.3 Deleted Recommendations**

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

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

| **SG** | **No** | **Title** |
| --- | --- | --- |
| 5 | L.1033 | Guidance for institutions of higher learning to contribute in the effective life cycle management of e-equipment and 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.1317 | Guidelines on energy efficient blockchain systems |

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