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Electromagnetic compatibility requirements for power equipment in telecommunication facilities

Recommendation ITU-T K.152

ITU-T

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Electromagnetic compatibility requirements for power equipment in telecommunication facilities

Summary

Recommendation ITU-T K.152 specifies requirements for radiated and conducted emissions from power equipment installed in telecommunication facilities. Power equipment within the scope of this Recommendation includes rectifiers that supply direct current (DC) voltages of up to 400 V, power-conditioning systems (PCSs) including grid-connected power converters (GCPCs), uninterruptible power supplies (UPSs). The power equipment usually includes power conversion devices and may generate conducted and radiated electromagnetic disturbances and cause degradation of the performance of telecommunication systems that Recommendation ITU-T K.152 aims to prevent.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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Keywords

Conducted emission, immunity telecommunication facility, power conversion device, power equipment, radiated emission.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation ITU-T K.152

Electromagnetic compatibility requirements for power equipment in telecommunication facilities

1 Scope

This Recommendation specifies emission and immunity requirements for power equipment that is installed inside or on the roof of telecommunication facilities.

This Recommendation applies to equipment including supply systems with embedded power conversion devices (e.g., direct current (DC) to alternating current (AC) inverters, DC to DC, AC to DC and AC to AC converters), power-conditioning systems (PCSs) including grid-connected power converters (GCPCs) and uninterruptible power supplies (UPSs).

Power devices integrated into equipment that directly provides telecommunication services are excluded from the scope of this Recommendation as they are covered by specific electromagnetic compatibility (EMC) Recommendations such as [b-ITU-T K.136] and [b-ITU-T K.137].

This Recommendation specifies measurement methods and limits for emission requirements and immunity requirement to ensure proper operation within the required reliability range. Guidance on any unintentional voltage or current at AC and DC power ports is also provided in this Recommendation.

2 References

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

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| [ITU-T K.38] | Recommendation ITU-T K.38 (1996), <i>Radiated emission test procedure for physically large systems</i> . |
| [ITU-T K.76] | Recommendation ITU-T K.76 (2022), <i>EMC requirements for DC power ports of telecommunication network equipment in the frequency range below 150 kHz</i> . |
| [ITU-T L.1200] | Recommendation ITU-T L.1200 (2012), <i>Direct current power feeding interface up to 400 V at the input to telecommunication and ICT equipment</i> . |
| [IEC CISPR 11] | IEC CISPR 11:2019, <i>Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement</i> . |
| [IEC CISPR 16-1-2] | IEC CISPR 16-1-2:2017, <i>Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements</i> . |
| [IEC CISPR 16-1-4] | IEC CISPR 16-1-4: 2020, <i>Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements</i> . |

- [IEC CISPR 16-2-1] IEC CISPR 16-2-1:2017, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements.*
- [IEC CISPR 16-2-3] IEC CISPR 16-2-3: 2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements.*
- [IEC CISPR 32] IEC CISPR 32:2019, *Electromagnetic compatibility of multimedia equipment – Emission requirements.*
- [IEC 61000-3-2] IEC 61000-3-2:2020, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).*
- [IEC 61000-3-3] IEC 61000-3-3: 2021, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.*
- [IEC 61000-3-11] IEC 61000-3-11:2017, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection.*
- [IEC 61000-3-12] IEC 61000-3-12:2021, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase.*
- [IEC 61000-4-2] IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.*
- [IEC 61000-4-3] IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3 : Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.*
- [IEC 61000-4-4] IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test.*
- [IEC 61000-4-5] IEC 61000-4-5: 2017, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test.*
- [IEC 61000-4-6] IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields.*
- [IEC 61000-4-8] IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test.*
- [IEC 61000-4-11] IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with Input current up to 16 A per phase.*
- [IEC 61000-4-29] IEC 61000-4-29:2000, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests.*