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High altitude electromagnetic pulse immunity guide for telecommunication centres

Recommendation ITU-T K.78

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Summary

Recommendation ITU-T K.78 specifies the radiated and conducted immunity requirements against a high altitude electromagnetic pulse (HEMP) for equipment installed in telecommunication centres for functions such as switching, transmission, radiocommunication, and power distribution. The requirements consist of immunity test methods and levels for telecommunication equipment in each installation condition. Immunity levels can be improved by applying a protection concept of surge protective devices (SPDs) for surge mitigation and electromagnetic screening to the building and equipment enclosures.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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<http://handle.itu.int/11.1002/1000/11830-en>.

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Recommendation ITU-T K.78

High altitude electromagnetic pulse immunity guide for telecommunication centres

1 Scope

This Recommendation gives guidance on the protection of telecommunication centre equipment, such as switching, transmission, radio, and power, from damage and disruption due to a high altitude electromagnetic pulse (HEMP).

The overall radiated and conducted immunity is a combination of the inherent equipment immunity, SPD surge mitigation and the electromagnetic screening of building and equipment enclosures. This Recommendation discusses immunity contribution of each item and defines an immunity test approach and testing levels.

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.11] | Recommendation ITU-T K.11 (2009), <i>Principles of protection against overvoltages and overcurrents.</i> |
| [ITU-T K.20] | Recommendation ITU-T K.20 (2015), <i>Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents.</i> |
| [ITU-T K.46] | Recommendation ITU-T K.46 (2012), <i>Protection of telecommunication lines using metallic symmetric conductors against lightning-induced surges.</i> |
| [ITU-T K.47] | Recommendation ITU-T K.47 (2012), <i>Protection of telecommunication lines against direct lightning flashes.</i> |
| [ITU-T K.48] | Recommendation ITU-T K.48 (2006), <i>EMC requirements for telecommunication equipment – Product family Recommendation.</i> |
| [ITU-T K.115] | Recommendation ITU-T K.115 (2015), <i>Mitigation methods against electromagnetic security threats.</i> |
| [IEC 61000-2-9] | IEC 61000-2-9 (1996), <i>Electromagnetic compatibility (EMC) – Part 2 Environment – Section 9: Description of HEMP environment – Radiated disturbance. Basic EMC publication.</i> |
| [IEC 61000-2-10] | IEC 61000-2-10 (1998), <i>Electromagnetic compatibility (EMC) – Part 2-10: Environment – Description of HEMP environment – Conducted disturbance.</i> |
| [IEC 61000-2-11] | IEC 61000-2-11 (1999), <i>Electromagnetic compatibility (EMC) – Part 2-11: Environment – Classification of HEMP environments.</i> |
| [IEC 61000-4-2] | IEC 61000-4-2 (2008), <i>Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.</i> |

- [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 (2014), *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*.
- [IEC 61000-4-11] IEC 61000-4-11 (2004), *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*.
- [IEC 61000-4-13] IEC 61000-4-13 (2002), *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*.
- [IEC 61000-4-23] IEC 61000-4-23 (2000), *Electromagnetic compatibility (EMC) – Part 4-23: Testing and measurement techniques – Test methods for protective devices for HEMP and other radiated disturbances*.
- [IEC 61000-4-25] IEC 61000-4-25 (2001), *Electromagnetic compatibility (EMC) – Part 4-25: Testing and measurement techniques – HEMP immunity test methods for equipment and systems*.
- [IECTR 61000-4-32] IECTR 61000-4-32 (2002), *Electromagnetic compatibility (EMC) – Part 4-32: Testing and measurement techniques – High-altitude electromagnetic pulse (HEMP) simulator compendium*.
- [IEC 61000-6-6] IEC 61000-6-6 (2003), *Electromagnetic compatibility (EMC) – Part 6-6: Generic standards – HEMP immunity for indoor equipment*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 antenna port [IEC 61000-6-6]: A port that is connected to an antenna, either directly or by a cable. The antenna may be external or internal to the building.

NOTE – Antenna ports connected to antennas internal to the building are covered by signal ports.

3.1.2 cable port [IEC 61000-6-6]: A port at which a conductor or cable is connected to the apparatus [IEC 61000-6-6].

3.1.3 electrical fast transient/burst (EFT/B) [IEC 61000-4-4]: The 5/50 ns pulse defined in [IEC 61000-4-4].

3.1.4 enclosure port [IEC 61000-6-6]: A physical boundary of the apparatus which electromagnetic fields may radiate through or impinge upon. The equipment case is normally considered the enclosure port (see Figure 1).

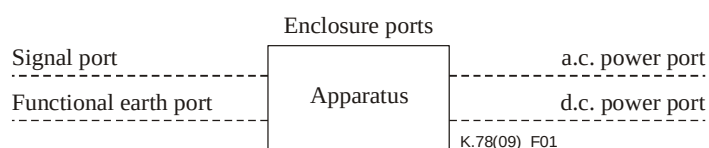


Figure 1 – Example of ports