

Recommendation

ITU-T L.109.1 (11/2022)

SERIES L: Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant

Optical fibre cables – Cable structure and characteristics

Type II optical/electrical hybrid cables for access points and other terminal equipment

ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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Recommendation ITU-T L.109.1

Type II optical/electrical hybrid cables for access points and other terminal equipment

Summary

Recommendation ITU-T L.109.1 explains the type II optical/electrical hybrid cable (OEHC) in which a copper pair is used for power delivery (not for telecommunications) and an optical fibre can support data transmission up to and beyond 1 Gbit/s. The current application scenarios for remote powering and data transmission of access points and other equipment require a type of hybrid cable that has a small footprint, is lightweight, and is convenient for installation.

History

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Access point/terminals, type II optical/electrical hybrid cables.

* 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.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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.

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Recommendation ITU-T L.109.1

Type II optical/electrical hybrid cables for access points and other terminal equipment

1 Scope

This Recommendation explains the requirements for type II optical/electrical hybrid cables (OEHC) for access points (APs) and other terminal equipment that can support data transmission up to and beyond 1 Gbit/s that require remote powering. As classified in [ITU-T L.109], a copper pair in the type II OEHC is not used for telecommunication but for power delivery.

This Recommendation:

- explains the cables that may be installed outdoors, indoors and indoors/outdoors;
- describes the characteristics of type II OEHC;
- provides suggestions for cable construction with optical fibres that comply with [ITU-T G.652], [ITU-T G.657] and [IEC 60793-2-10];
- suggests acceptance criteria and requirements in test methods for type II OEHC; and
- suggests installation requirements for type II OEHC.

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.

- [ITU-T G.650.1] Recommendation ITU-T G.650.1 (2020), *Definitions and test methods for linear, deterministic attributes of single-mode fibre and cable*.
- [ITU-T G.650.2] Recommendation ITU-T G.650.2 (2015), *Definitions and test methods for statistical and non-linear related attributes of single-mode fibre and cable*.
- [ITU-T G.650.3] Recommendation ITU-T G.650.3 (2017), *Test methods for installed single-mode optical fibre cable links*.
- [ITU-T G.652] Recommendation ITU-T G.652 (2016), *Characteristics of a single-mode optical fibre cable*.
- [ITU-T G.657] Recommendation ITU-T G.657 (2016), *Characteristics of a bending loss insensitive single-mode optical fibre and cable*.
- [ITU-T L.100] Recommendation ITU-T L.100/L.10 (2021), *Optical fibre cables for duct and tunnel application*.
- [ITU-T L.102] Recommendation ITU-T L.102/L.26 (2015), *Optical fibre cables for aerial application*.
- [ITU-T L.103] Recommendation ITU-T L.103 (2016), *Optical fibre cables for indoor applications*.
- [ITU-T L.109] Recommendation ITU-T L.109 (2018), *Construction of optical/metallic hybrid cables*.

- [IEC 60227-1] IEC 60227-1:2007, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements.*
- [IEC 60228] IEC 60228:2004, *Conductors of insulated cables.*
- [IEC 60502-1] IEC 60502-1:2021, *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) – Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV).*
- [IEC 60793-2-10] IEC 60793-2-10:2019, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres.*
- [IEC 60794-1-1] IEC 60794-1-1 (2015), *Optical fibre cables – Part 1-1: Generic specification – General.*
- [IEC 60794-1-21] IEC 60794-1-21:2015, *Optical fibre cables – Part 1-21: Generic specification – Basic optical cable test procedures – Mechanical tests methods.*
- [IEC 60794-2] IEC 60794-2:2017, *Optical fibre cables – Part 2: Indoor cables – Sectional specification.*
- [IEC 60794-2-20] IEC 60794-2-20:2013, *Optical fibre cables – Part 2-20: Indoor cables – Family specification for multi-fibre optical cables.*
- [IEC 60794-3] IEC 60794-3:2022, *Optical fibre cables – Part 3: Outdoor cables – Sectional specification.*
- [IEC 60794-3-11] IEC 60794-3-11:2010, *Optical fibre cables – Part 3-11: Outdoor cables – Product specification for duct, directly buried, and lashed aerial single-mode optical fibre telecommunication cables.*
- [IEC 60794-6] IEC 60794-6:2020, *Optical fibre cables – Part 6: Indoor-outdoor cables – Sectional specification for indoor-outdoor cables.*
- [IEC 60794-6-10] IEC 60794-6-10:2020, *Optical fibre cables – Part 6-10: Indoor-outdoor cables – Family specification for universal indoor-outdoor cables.*
- [IEC 60811-202] IEC 60811-202:2012/AMD1:2017, *Amendment 1 – Electric and optical fibre cables – Test methods for non-metallic materials – Part 202: General tests – Measurement of thickness of non-metallic sheath.*
- [IEC 60811-203] IEC 60811-203:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 203: General tests – Measurement of overall dimensions.*
- [IEC 60811-607] IEC 60811-607:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 607: Physical tests – Test for the assessment of carbon black dispersion in polyethylene and polypropylene.*
- [IEC 61156-1] IEC 61156-1:2007, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification.*
- [IEC 61156-1-4] IEC 61156-1-4:2018, *Multicore and symmetrical pair/quad cables for digital communications – Part 1-4: Assessment of conductor heating in bundled cables due to the deployment of remote powering.*
- [IEC 61196-1-10x] IEC 61196-1-10x-series, *Coaxial communication cables – Parts 1-100 to 1-109: Electrical test methods series.*
- [IEC 62807-1] IEC 62807-1:2017, *Hybrid telecommunication cables – Part 1: Generic specification.*