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INTERNATIONAL STANDARD

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Fibre optic active components and devices – Test and measurement procedures – Part 6: Universal mezzanine boards for test and measurement of photonic devices

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CONTENTS

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FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – TEST AND MEASUREMENT PROCEDURES –

Part 6: Universal mezzanine boards for test and measurement of photonic devices

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IEC 62150-6 has been prepared by subcommittee SC 86C: Fibre optic systems and active devices of IEC technical committee 86: Fibre optics. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
86C/1721/CDV	86C/1752/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 62150 series, published under the general title *Fibre optic active components and devices – Test and measurement procedures*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This document defines a generic electro-optic mezzanine board for the test and measurement of micro-optical and micro-photonic devices, including a wide diversity of photonic integrated circuit (PIC) technologies including, but not limited to, transceivers, switches, sensors, neuromorphic networks, LiDAR and quantum integrated circuits. The board size and shape would allow two mezzanine boards to be mounted, side-by-side, on a larger Eurocard form factor daughtercard, which itself can be docked into and powered from a backplane system. Alternatively, each mezzanine board can be operated alone, for example on a lab bench powered from a bench supply.

The purpose of this generic mezzanine board concept is to allow like-for-like comparative characterisation of devices under test (DUTs) with respect to one another and to measure the performance of DUTs within larger test environments, relevant to their targeted application, such as data centre systems, high performance computers, automotive or 5G cabinets. The mezzanine board PCB will be designed to accommodate very high-speed electronic signals and a high-speed electronic signal interface to allow external test equipment such as test pattern generators, bit error rate testers and communication signal analysers to drive the device under test (DUT).

This approach will be instrumental in accelerating commercial adoption of micro-photonic devices as they will provide a common benchmark, against which to evaluate the true performance of a DUT. For example, power consumption is an increasingly important figure of merit for optical micro-transceivers in ICT systems; however the declared values of power consumption as interpreted by the developer often do not reflect the true power consumption of a device under test in operation. The mezzanine board will therefore include provision for a smaller detachable power distribution and sensor mezzanine board allowing multiple tuneable voltages to be provided to the device under test and real-time current or power measurement for each voltage.

Variants of these mezzanine boards have been successfully developed and adopted within the European research and development projects European FP7 project PhoxTrot [1][1], European H2020 Nephele [2] and European H2020 COSMICC [3]. Annex A provides an introduction to these projects.

[1] Numbers in square brackets refer to the Bibliography.

FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – TEST AND MEASUREMENT PROCEDURES –

Part 6: Universal mezzanine boards for test and measurement of photonic devices

1 Scope

This part of IEC 62150 specifies a generic mezzanine board system to support test and measurement of devices based on micro-optical and micro-photonic technologies, including but not limited to photonic integrated circuit (PIC) devices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-731, *International Electrotechnical Vocabulary – Part 731: Optical fibre communication* (available at www.electropedia.org)

IEC 62150-1, *Fibre optic active components and devices – Test and measurement procedures – Part 1: General and guidance*

IEC TR 63072-1, *Photonic integrated circuits – Part 1: Introduction and roadmap for standardization*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-731, IEC 62150-1, IEC TR 63072-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
mezzanine board
electronic, optical, or electro-optical printed circuit board designed to be docked onto a larger board such that the surfaces of the mezzanine board and larger board are parallel

3.2
photonic integrated circuit
PIC
integrated circuit that contains optical structures to guide and process optical signals

Note 1 to entry: See IEC TR 63072-1.