

# PUBLICLY AVAILABLE SPECIFICATION

## PRE-STANDARD

**Fibre optic interconnecting devices and passive components performance standard –  
Part 088-2: Non-connectorised single-mode fibre optic LAN WDM devices with  
channel spacing of 800 GHz for category C – Controlled environments**

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS PERFORMANCE STANDARD –

### Part 088-2: Non-connectorised single-mode fibre optic LAN WDM devices with channel spacing of 800 GHz for category C – Controlled environments

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IEC-PAS 61753-088-2 has been processed by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
86B/2968PAS	86B/2997/RVD

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# FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS PERFORMANCE STANDARD –

## Part 088-2: Non-connectorised single-mode fibre optic LAN WDM devices with channel spacing of 800 GHz for category C – Controlled environments

### 1 Scope

This Publicly Available Specification (PAS) contains the minimum initial test and measurement requirements and severities which a non-connectorised single-mode fibre optic Local Area Network Wavelength Division Multiplexing (LAN WDM) device with channel spacing of 800 GHz needs to satisfy in order to be categorised as meeting the requirements of category C – Controlled environments, as defined in Annex A of IEC 61753-1. The applications of LAN WDM devices are optical MUX and DEMUX for 100GBASE-LR4 (required operating range of 2 m to 10 km) and 100GBASE-ER4 (required operating range of 2 m to 30 km) defined in IEEE Draft P802.3ba, as shown in Annex D. The requirements cover both an integrated 1 × 4 LAN WDM device and an individual 1 × 2 LAN WDM device for cascaded module construction.

### 2 Normative references

The following referenced documents are indispensable for the application 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 61300 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*

IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*

IEC 61300-2-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention*

IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock*

IEC 61300-2-14, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-14: Tests – Optical power handling and damage threshold characterization*

IEC 61300-2-17, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-17: Tests – Cold*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat - High temperature endurance*

IEC 61300-2-19, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-19: Tests – Damp heat (steady state)*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*



IEC 61300-2-42, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-42: Tests – Static side load for connectors*

IEC 61300-3-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-2: Examination and measurements – Polarization dependent loss in a single-mode fibre optic device*

IEC 61300-3-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-4: Examinations and measurements – Attenuation*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

IEC 61300-3-20, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-20: Examinations and measurements – Directivity of fibre optic branching devices*

IEC 61300-3-29, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-29: Examinations and measurements – Measurement techniques for characterizing the amplitude of the spectral transfer function of DWDM components*

IEC 61753-1:2007, *Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standard*

IEC 61753-021-2, *Fibre optic interconnecting devices and passive components performance standard – Part 021-2: Grade C/3 single-mode fibre optic connectors for category C – Controlled environment*

IEC 62074-1, *Fibre optic interconnecting devices and passive components – Fibre optic WDM devices – Part 1: Generic specification*

ITU-T Recommendation G.692:1998, *Optical interfaces for multichannel systems with optical amplifiers*

ITU-T Recommendation G.694.1:2002, *Spectral grids for WDM applications: DWDM frequency grid*

ITU-T Recommendation G.959.1 version 10.4: June 2009, *Optical transport network physical layer interfaces*

IEEE P802.3ba D2.1: May 2009, Part 3: *Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications*

### **3 LAN WDM device types**

#### **3.1 LAN WDM device**

A LAN WDM device is a wavelength-selective branching device which performs the function both of wavelength multiplexing and demultiplexing with DWDM channel frequency that are 231,4 THz, 230,6 THz, 229,8 THz, and 229,0 THz, where the channel frequency spacing is 800 GHz.

### 3.2 Integrated 1 × 4 LAN WDM device

An integrated 1 × 4 LAN WDM device single-mode fibre-pigtailed wavelength-selective branching device is shown in Figure 1. There are 1 common port (P0) and 4 input/output ports (P1-P4) corresponding to the 4 frequency channels.

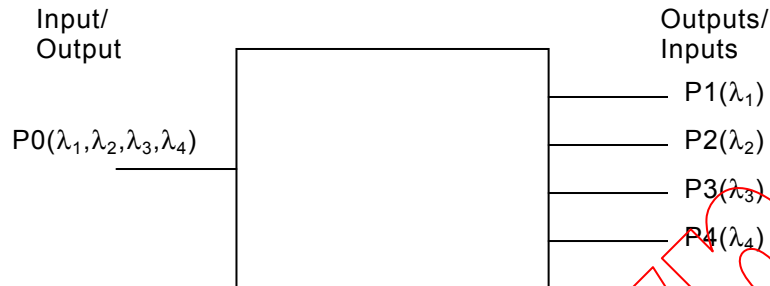


Figure 1 – Configuration of integrated 1 × 4 LAN WDM device

### 3.3 Individual 1 × 2 LAN WDM device

An individual 1 × 2 LAN WDM device single-mode fibre-pigtailed wavelength-selective branching device is shown in Figure 2. There are 4 types of individual 1 × 2 LAN WDM devices, corresponding to the 4 frequency channels. There are 1 common port (P0) and 2 input/output ports (P1, P2). The signal of corresponding channel frequency passes through between P0 and P1. The signal of not corresponding channel frequencies passes through between P0 and P2.

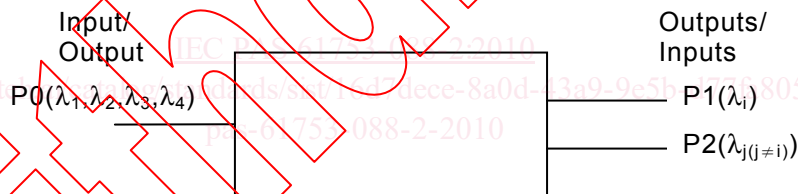


Figure 2 – Configuration of individual 1 × 2 LAN WDM device

## 4 Test conditions

Unless otherwise specified, all test methods are in accordance with the IEC 61300 series of standards. LAN WDM devices used for each test are intended to be previously unstressed new samples but may also be selected from previously used samples if desired. All measurements shall be carried out under standard atmospheric conditions, unless otherwise specified. If the device is provided with an active temperature control, this shall be set at the set-point specified by the manufacturer.

The requirements apply to every combination of input and output ports.

All tests are to be carried out to validate performance over the required operating channel frequency range. As a result, single or multiple spectral bands may be chosen for the qualification and differing target specifications may be assigned to each spectral band.

## 5 Test report

Fully documented test reports and supporting evidence shall be prepared and be available for inspection as evidence that the tests have been carried out and complied with.

## 6 Reference components

The test for these components does not require the use of reference components.

## 7 Performance requirements

### 7.1 Dimensions

Dimensions shall comply with either an appropriate IEC interface standard or with those given in appropriate manufacturers drawings, where the IEC interface standard does not exist or cannot be used.

### 7.2 Test details and requirements

The requirements are given only for pigtailed DWDM devices. For connectorised components the connector performance shall be in compliance with IEC 61753-021-2.

A minimum length of fibre or cable of 1,0 m per port shall be included in all climatic and environmental test chambers. The operating wavelengths, unless otherwise specified, shall be in accordance with ITU-T Recommendations G.692 and G.694.1 (Frequency Spacing).