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Dynamic modules –
Part 6-3: Round robin measurement results for group delay ripple of tunable dispersion compensators

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 62343-6-3, which is a technical report, has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
86C/917/DTR	86C/952/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62343 series, published under the general title *Dynamic modules,* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

The most important means of enhancing the technology for communication systems are networking, faster speed, and longer distance. In long-distance, high-speed communication systems operating at 40 Gbps or more, dispersion is known to limit transmission distance. Various tunable dispersion compensators (TDCs) have been commercialized in order to minimize the degradation of signals caused by chromatic dispersion. However, the group delay (GD) in TDCs is known to have ripples dependent on the principles of TDC operation, and such GD affects signal degradation.

IEC TC86 (*Fibre optics*) describes several methods of measuring chromatic dispersion (CD). One example is IEC 61300-3-38, but it does not specify a measurement method for group delay ripple (GDR). The representative passive component for compensating for chromatic dispersion is dispersion compensation fibre (DCF), but given its principles, the GD has no ripples. Conversely, many TDCs use the interference effect, which explains why there are ripples.

Under these circumstances, round robin testing has been conducted by using various TDCs and diverse GD measurement methods. This technical report, based on the findings from round robin testing, examines the direction of standardization for GDR measurement methods.

This technical report is based on and translated from OITDA document- TP06/SP DM-2008 (Group Delay Ripple Measurement Method for Tunable Dispersion Compensators—Technical Paper).

DYNAMIC MODULES –

Part 6-3: Round robin measurement results for group delay ripple of tunable dispersion compensators

1 Scope

This technical report describes the round robin measurement results for the group delay ripple (GDR) of tunable dispersion compensators (TDCs). It briefly explains the four typical TDCs measured and four typical methods of measuring group delay (GD), as well as the GDR round robin measurement results of TDCs, and an analysis of repeatability and differences among these measurement methods. This technical report also proposes suitable measurement parameters and a new parameter of phase ripple instead of GDR.

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/PAS 61300-3-38, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-38: Group delay and chromatic dispersion*

IEC 62343-1-2, *Dynamic modules – Part 1-2: Performance standards – Dynamic chromatic dispersion compensator with pigtails for use in controlled environments (Category C)*