

I n t e r n a t i o n a l T e l e c o m m u n i c a t i o n U n i o n

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.8201

(04/2011)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Packet over Transport aspects – Quality and availability
targets

Error performance parameters and objectives for multi-operator international paths within optical transport networks

Recommendation ITU-T G.8201

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For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T G.8201

Error performance parameters and objectives for multi-operator international paths within optical transport networks

Summary

Recommendation ITU-T G.8201 defines error performance parameters and objectives for international ODUk paths transported by the optical transport network (OTN), as described in Recommendation ITU-T G.709/Y.1331. While this Recommendation specifically addresses objectives for international ODUk paths, the allocation principles can be applied to the design of error performance for national or private ODUk paths. This Recommendation is based upon a block-based measurement concept using error detection code (EDC) and EDC usage inherent to the path under test; the block repetition rate being in accordance with OTN technology in accordance with Recommendation ITU-T G.709/Y.1331. This simplifies in-service measurements. The events, parameters and objectives are defined accordingly. In addition to path performance assessment, tandem connection monitoring is covered.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.8201	2003-09-13	13
2.0	ITU-T G.8201	2011-04-13	15

Keywords

Background block error (BBE), block-based concept, error detection code (EDC), EDC usage, error performance objectives, error performance parameters, hypothetical reference optical path (HROP), in-service monitoring (ISM), optical channel data unit-k (ODUk) path, severely errored second (SES), tandem connection monitoring (TCM).

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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Document ID: 123456789

Recommendation ITU-T G.8201

Error performance parameters and objectives for multi-operator international paths within optical transport networks

1 Scope

This Recommendation specifies error performance events, parameters and objectives for ODUk paths¹ of the optical transport network (OTN), as specified in [ITU-T G.709]. Clauses 1.1 to 1.3 give further details.

1.1 Application of this Recommendation

This Recommendation is applicable to international paths of the optical transport network as described in [ITU-T G.709]. These paths are at the ODUk layer of the OTN, and are digital paths (see [ITU-T G.709] for a description of the ODUk layer). While this Recommendation specifically addresses objectives for international ODUk paths, the allocation principles can be applied to the design of error performance for national or private paths.

The quality of client services, as well as the performance of the network elements belonging to the service layer, is outside of the scope of this Recommendation. However, ITU-T G.8201-based paths can carry various clients (e.g., SDH, ATM, GFP (i.e., IP, Ethernet, etc., encapsulated in GFP), etc.; see [ITU-T G.709]). ODUk paths meeting the objectives of this Recommendation will enable client layer traffic to meet its respective performance objectives.

The error performance objectives are applicable to each direction of the ODUk path independently. The values apply end-to-end over a 27 500 km hypothetical reference path (see Figure 3). The performance of multiplex and cross-connect functions of client layers of the OTN (i.e., higher layers, above the OPUk, e.g., SDH, ATM, etc.; see [ITU-T G.709] for a description of the OPUk) are not included in these values.

The parameter definitions are block-based with the block repetition rate in accordance with OTN technology, making in-service measurement convenient. In addition to in-service measurements, compliance with this Recommendation can be assessed using out-of-service measurements or estimated by measures compatible with this Recommendation as those specified in clause 7.

The objectives given in this Recommendation are long-term objectives to be met over an evaluation period of typically 30 consecutive days (one month). Shorter measurement periods required for maintenance and bringing-into-service are covered in [ITU-T M.2401].

1.2 Transport network layers

This Recommendation specifies the error performance of ODUk paths in a given transport network layer. In the context of this Recommendation, an ODUk digital path is a trail carrying an OPUk payload and associated OPUk and ODUk overhead through the layered transport network between the path terminating equipment (see Figure 1).

¹ In this Recommendation, unless otherwise specified, the term *path* means *ODUk path* ($k = 1, 2, \text{ or } 3$). The nominal ODUk rates are approximately 2.5 Gbit/s for ODU1, 10 Gbit/s for ODU2, and 40 Gbit/s for ODU3.

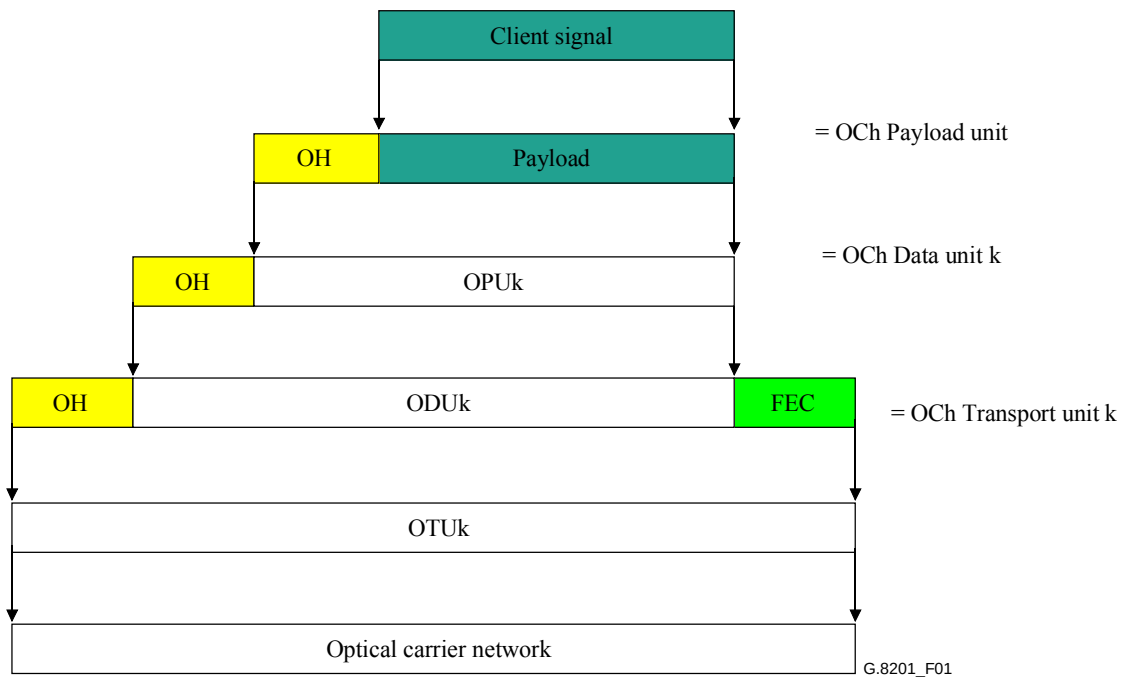
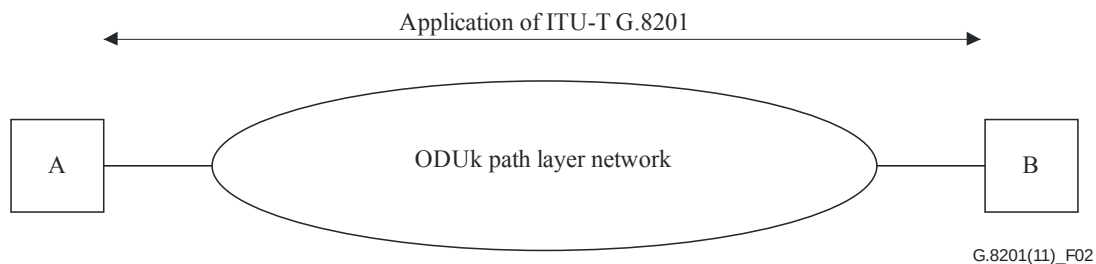


Figure 1 – OTN signal structure

The scope of application of this Recommendation is from path-end-point to path-end-point as illustrated in Figure 2.



NOTE – A and B are path end points located at the path terminations as defined in [ITU-T G.798].

Figure 2 – Application of ITU-T G.8201 for an end-to-end ODUk path

1.3 Allocation of end-to-end performance

Allocations of end-to-end performance of ODUk paths are derived using the rules laid out in clause 8.3, which are length and complexity based. Detailed allocations of ITU-T G.8201 performance to the individual components (sections, multiplexers and cross-connects, etc.) are outside the scope of this Recommendation but, when such allocations are performed, the requirements of clause 8.3 should be met.

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.