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ITU-T

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G.998.4

Corrigendum 4

(06/2012)

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

Digital sections and digital line system – Access networks

Improved impulse noise protection for DSL transceivers

Corrigendum 4

Recommendation ITU-T G.998.4 (2010) – Corrigendum 4

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Recommendation ITU-T G.998.4

Improved impulse noise protection for DSL transceivers

Corrigendum 4

Summary

Corrigendum 4 to Recommendation ITU-T G.998.4 (2010) covers the following functionalities:

- error-free throughput (*EFTR*) (corrigendum)
- near-end defects *leftr* and *seftr* (corrigendum)
- SID counter and TS at OLR transition (corrigendum)
- inconsistency between Recommendation ITU-T G.998.4 and its Amendment 1 (corrigendum).

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.998.4	2010-06-11	15
1.1	ITU-T G.998.4 (2010) Cor. 1	2010-11-29	15
1.2	ITU-T G.998.4 (2010) Cor. 2	2011-04-13	15
1.3	ITU-T G.998.4 (2010) Amd. 1	2011-06-22	15
1.4	ITU-T G.998.4 (2010) Cor. 3	2011-12-16	15
1.5	ITU-T G.998.4 (2010) Amd. 2	2012-04-06	15
1.6	ITU-T G.998.4 (2010) Cor. 4	2012-06-13	15

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.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

Recommendation ITU-T G.998.4

Improved impulse noise protection for DSL transceivers

Corrigendum 4

1) Error-free throughput (*EFTR*)

Change clause 11.2.2 as follows:

11.2.2 Error-free throughput (*EFTR*)

The error-free throughput (*EFTR*) is defined as the average bit-rate, calculated during a 1 second time window, at the β1-reference point, of bits originating from DTU's that have been detected to contain no error at the moment of crossing the β1-reference point. The 1 second time windows that are consecutive and non-overlapping. As a result of this definition, *EFTR* ≤ *NDR*.

The *EFTR* shall be ~~measured~~ calculated in Showtime by the receiver.

~~The *EFTR* shall be calculated every second.~~

The *EFTR* shall be calculated for every complete second the xTU is in the Showtime state. Only for these seconds, the *EFTR* is defined.

The *EFTR* is not a test parameter directly reported to the ME, but is indirectly used in the definition of related parameter *EFTRmin* and *leftr* defects.

2) Minimum error-free throughput (*EFTR_min*) parameter

Change clause 11.4.3 as follows:

11.4.3 Minimum error-free throughput (*EFTR_min*) parameter

The performance monitoring parameter minimum error-free throughput (*EFTR_min*) is defined as the minimum of the *EFTR* observed in the seconds since the last reading of the *EFTR_min* ~~via an EOC command over the U-interface.~~, excluding the following seconds:

- seconds in which the values of *EFTR* are less than *ETR*/2;
- seconds in which *EFTR* is not defined;
- the single second preceding a second with *seftr* defect;
- the single second following a second with *seftr* defect.

The *EFTR_min* shall be measured in Showtime by the receiver. Reading by the xTU-C management entity (i.e., VME for ITU-T G.993.2) of the far-end *EFTR_min* shall be via an eoc command over the U-interface. Reading by the xTU-C management entity of the near-end *EFTR_min* shall be from the near-end receive PMS-TC over the MPS-TC (i.e., over the γ_O-interface for ITU-T G.993.2).

The valid values are all integers from ~~0~~*ETR*/2 to the maximum of the valid values of the maximum ~~net data rate~~ NDR specified in the associated Recommendations ~~values~~.

The performance monitoring parameter *EFTR_min* shall be represented as a 32-bit unsigned integer expressing the value of *EFTR_min* in kbit/s. This data format supports a granularity of 1 kbit/s. For the observation periods in which *EFTR* is either not defined or always less than *ETR*/2, or both, over the complete observation period, the value of *EFTR_min* shall be set to a special 32-bit value of $0xFFFFFFFF_{16}$.

The previous value of *EFTR_min* shall be reported ~~in the EOC~~ if no *EFTR* measurement has been done since the last reading of *EFTR_min*.

NOTE – The above requirement covers the case ~~that~~ where two retrievals of *EFTR_min* over the ~~EOC~~eoc take place in less than 1 second, and in which no new *EFTR* measurement is available, since the *EFTR* is only updated on 1 second interval.

Although this parameter *EFTR_min* is reported via the management counter read eoc command, this performance monitoring parameter is not a counter. Therefore, the requirements of ITU-T G.992.3, ITU-T G.993.2 and ITU-T G.997.1 applicable to counters in general do not apply to this parameter.

The parameter reported to the CO-MIB over the Q-interface, MINEFTR, is defined as the minimum of the ~~EFTR~~ retrieved *EFTR_min* values observed over the 15 min or 24 hour accumulation periods.

The XTU-C management entity shall retrieve the far-end *EFTR_min* ~~over the U interface~~, to calculate the far-end MINEFTR as defined on the Q interface. The xTU-C management entity shall retrieve the near-end *EFTR_min* to calculate the near-end MINEFTR, as defined on the Q interface.

NOTE – The frequency of retrieval for both near-end and far-end ~~over the U-interface~~ is left to the implementation, as necessary for accurate monitoring.

The upstream MINEFTR value shall be reported ~~in~~to the CO-MIB as a near-end value.

The downstream MINEFTR value shall be reported ~~in~~to the CO-MIB as a far-end value.

3) Near-end defects *leftr* and *seftr*

Change clause 11.3.3 as follows:

11.3.3 Near-end defects

The low error-free throughput rate (*leftr*) defect is defined as follows:

For seconds in which the *EFTR* is defined:

- When *leftr_thresh* is set to the value different from 0

  A *leftr* defect occurs when $EFTR < \max(leftr\_thresh * NDR, ETR/2)$

  A *leftr* defect terminates when $EFTR \geq \max(leftr\_thresh * NDR, ETR/2)$

- When *leftr_thresh* is set to the special value of 0:

  A *leftr* defect occurs when $EFTR < 0.998 \times ETR$

  A *leftr* defect terminates when $EFTR \geq 0.998 \times ETR$

For seconds in which the *EFTR* is not defined, *leftr* defect shall terminate or remain in the off state.

The severe loss of error-free throughput rate (*seftr*) defect is defined as follows:

For seconds in which the *EFTR* is defined, *seftr* defect occurs when $EFTR<ETR/2$ and terminates when $EFTR \geq ETR/2$.

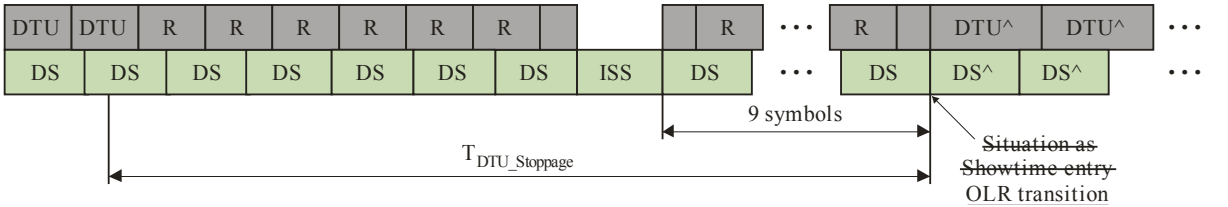
For seconds in which the *EFTR* is not defined, *seftr* defect shall terminate or remain in the off state.

4) SID counter and TS at OLR transition

Change clause 13.4 (ITU-T G.998.4 Amendment 1) as follows:

13.4 Transition mechanism for Type 5 and Type 6 modified OLR commands

When the retransmission transmitter has received an SRA request via a type 5 OLR or an SOS request via type 6 OLR overhead channel message from the retransmission receiver, the procedure shall be as depicted in Figure 13-1 and further defined in this clause.



DS Data Symbol before SRA/SOS transition execution
ISS Inverted sync symbol at regular location of a sync symbol with respect to sync symbol period
DS^ Data symbol after SRA/SOS transition execution with applied new framing
DTU DTU before SRA/SOS transition
R DTU before SRA/SOS transition, transmitted from retransmission buffer
DTU^ DTU after SRA/SOS transition

Figure 13-1 – Transition mechanism to new OLR configuration parameters

The DTU framer shall stop for a period of time, T_{dtu}DTU-stoppage, prior to ending the transmission of the transition primitive.

$T_{DTU-Sstoppage}$ shall be the greatest of the following durations:

– the minimum stoppage time required to satisfy the *INP_min* and *INP_min_rein* configurations; and

– the minimal delay as configured by *delay_min*.

NOTE – In case one uses the reference state machine in the transmitter, the minimum stoppage time required to satisfy the *INP_min* and *INP_min_rein* configuration is equal to $Nret*Q_{tx}*T_{DTU}$, where *Nret* is the smallest integer that meets the constraints specified in clause 9.5.

When the DTU framer is stopped, DTUs from the retransmission buffer shall be transferred to the retransmission multiplexer. In case a transmitter uses a transmit state machine other than the reference state machine, the transmitted DTUs during the stoppage time may include positively acknowledged DTUs.

Transition primitive is comprised of the inverted sync symbol, ISS marker, as defined within ITU-T G.992.3, ITU-T G.992.5, ITU-T G.993.2, followed by 9 transitory DMT symbols before transmission of data symbols with the new framing parameters is commenced.

The first DMT symbol after the transition primitive carries shall carry the first DTU with the changed framing. The alignment between start of DTU and start of DMT data symbol is shall be identical to the alignment at Sshow Ttime entry.

The absoluteDTUcounts shall be reset to 0 for the first DTU with the changed framing. The RRC in the reverse direction relative to the direction associated with the framing change shall be reset with the conditions specified in clause 8.4.1 when the first DTU with the changed framing is acknowledged.

The SID octet shall be reset to 0 for the first DTU with the changed framing, as it is the case at Showtime entry.

The TS octet shall not be reset upon application of the new framing, but shall keep its significance across the framing change, such that it can still be used to reduce the delay jitter between the transmitter and receiver γ interfaces after the OLR transition period.

5) Inconsistency between ITU-T G.998.4 and ITU-T G.998.4 Amendment 1

Change clause C.2.1.3 (O-PMS) as follows:

C.2.1.3 O-PMS

• • •

If retransmission is not enabled in the upstream direction (as indicated in the ITU-T G.998.4 parameter field of O-TPS) and OLR is not supported in any direction by the VTU-O, the ITU-T G.998.4 parameter field of O-PMS may be left empty by the VTU-O (i.e., consist of a single byte with value 0) ~~and shall be ignored at the VTU-R~~.

• • •

6) R-PMS

Change clause C.2.2.2 (R-PMS) as follows:

C.2.2.2 R-PMS

• • •

If retransmission is not enabled in the downstream direction (as indicated in O-TPS) and OLR is not supported in any direction by the VTU-R, the ITU-T G.998.4 parameter field of R-PMS may be left empty by the VTU-R transmitter (i.e., consist of a single byte with value 0) ~~and shall be ignored at the receiver~~.

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