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G.783

Amendment 4

(08/2013)

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

Digital terminal equipments – Principal characteristics of multiplexing equipment for the synchronous digital hierarchy

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Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

Amendment 4: Text additions to add the required OSM256.4/RSn_A adaptation function for OSM256.4 interface support

Recommendation ITU-T G.783 (2006) – Amendment 4

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Recommendation ITU-T G.783

Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

Amendment 4

Text additions to add the required OSM256.4/RSn_A adaptation function for OSM256.4 interface support

Summary

Amendment 4 to Recommendation ITU-T G.783 (2006) contains text additions to add the required **OSM256.4/RSn_A** adaptation function for OSM256.4 interface support.

History

Edition	Recommendation	Approval	Study Group	Unique ID[1]
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5.2	ITU-T G.783 (2004) Amd. 1	2005-07-14	15	11.1002/1000/8540-en
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6.2	ITU-T G.783 (2006) Amd. 2	2010-03-09	15	11.1002/1000/10400-en
6.3	ITU-T G.783 (2006) Amd. 3	2012-02-13	15	11.1002/1000/11486-en
6.4	ITU-T G.783 (2006) Amd. 4	2013-08-29	15	11.1002/1000/11983-en

[1] To access the Recommendation, type into the address line on the web browser the URL http://handle.itu.int/ followed by the unique ID, for example http://handle.itu.int/11.1002/1000/11830-en.

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Recommendation ITU-T G.783

Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

Amendment 4

Text additions to add the required OSM256.4/RSn_A adaptation function for OSM256.4 interface support

1) Scope

Amendment 4 contains modified text to be added to complete this Recommendation in respect of STM256 multi-lane distribution interfaces.

2) References

Add the following reference to clause 2:

[ITU-T G.959.1] Recommendation ITU-T G.959.1 (2012), *Optical transport network physical layer interfaces.*

3) Abbreviations and acronyms

Add the following abbreviation to clause 4:

CID Consecutive Identical Digit

4) Text modifications in clause 9.2.3.2

a) Modify Table 9c in clause 9.2.3.2 and add the text concerning the clock generator process, as shown below:

Table 9c – OSM256.4_TT_Sk inputs and outputs

Input(s)	Output(s)
OSM256.4_TCP OSM256.4_CI	**OSM256.4_AP**: OSM256.4_AI_D OSM256.4_AI_CK OSM256.4_AI_TSF OSM256.4_TT_Sk_MP OSM256.4_TT_Sk_MI_cLOS OSM256.4_TT_Sk_MI_cLOL

Clock generator: The process shall generate the OSM256.4_AP clock from the incoming lane clock. One of the four recovered STL clocks signals can be selected and output as a single clock towards the OSM256.4_AP.

b) *Modify Figure 9f (as shown in red) in clause 9.2.3.2 to include the recovered clock as part of the STM256.4_AP access point signals.*

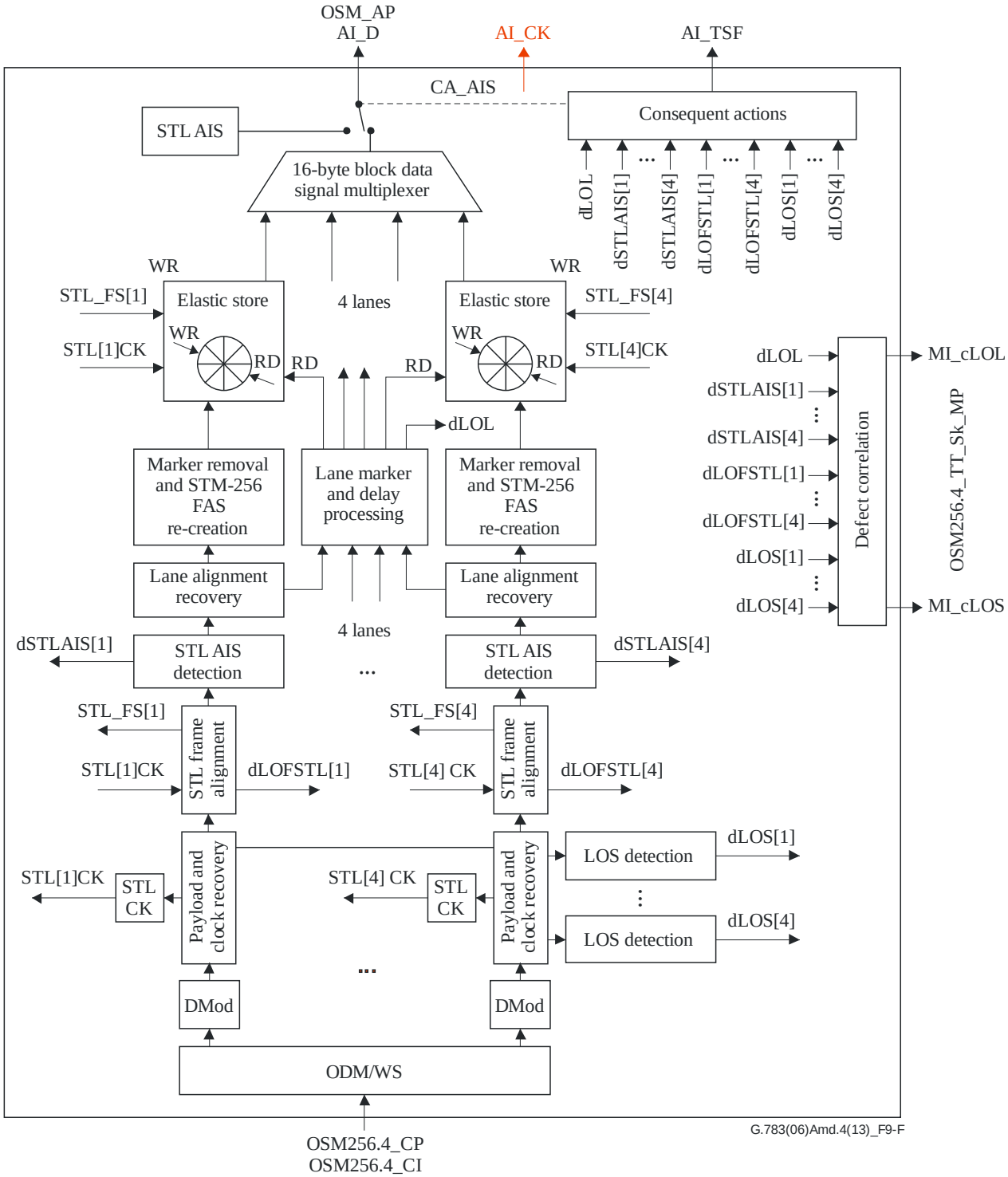

Figure 9f – OSM256.4_TT_Sk processes

5) New clause 9.3.3 and subclauses

Add the following new clauses containing additional new adaptations for multi-lane distribution:

9.3.3 STM- 256 multi-lane optical section to regenerator section adaptation OSM256.4/RSn_A

9.3.3.1 STM-256 optical section to regenerator section adaptation source OSM256.4/RSn_A _So

Symbol

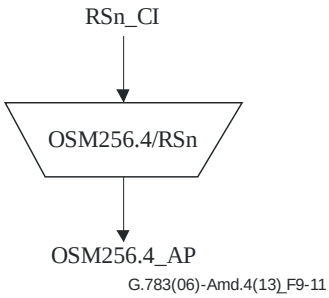

Figure 9-11 – OSM256.4/RSn_A_So symbol

Interfaces

Table 9-11 – OSM256.4/RSn_A_So input and output signals

Input	Output
RSn_CI_Data RSn_CI_Clock RSn_CI_FS	**OSM256.4_AP** OSM256.4_AI_Data OSM256.4_AI_CK OSM256.4_AI_FS

Processes

This function provides line coding for STM-N signals according to [ITU-T G.959.1].

This function limits the output jitter on the clock information in the OSM256.4_AI_Data signal as given in Tables 9-6 and 9-7, scaled as described below when measured over a 60-second interval.

Jitter generation for SDH regenerator: An SDH regenerator, shall, on its STM-N output, not generate jitter in excess of the values in Tables 9-6 and 9-7 for the serial STM256 structure. The frequencies of the related jitter limit values of the optical per lane signals are scaled down by the factor of 4 with respect to the STM256 values given in Tables 9-6 and 9-7.

Note that frequency downscaling leads to the fact that the UIp-p amplitude is also scaled up by the factor of 4 in terms of nanoseconds.

On this basis, a deployed regenerator shall not generate jitter on its OSM256.4 output in excess of those values, with the down-scaled frequencies and up-scaled amplitude as given above, in nanoseconds.

Defects

None.

Consequent actions

None.

Defect correlations

None.

Performance monitoring

None.

9.3.3.2 STM-N optical section to regenerator section adaptation sink OSM256.4/RSn_A_Sk

Symbol

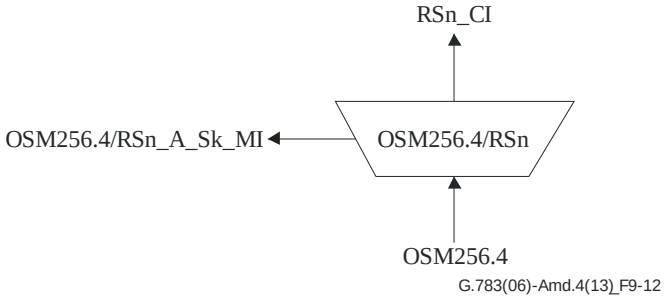

Figure 9-12 – OSM256.4/RSn_A_Sk symbol

Interfaces

Table 9-12 – OSM256.4/RSn_A_Sk input and output signals

Inputs	Outputs
OSM256.4_AI_Data OSM256.4_AI_CK OSM256.4_AI_TSF	RSn_CI_Data RSn_CI_Clock RSn_CI_FS RSn_CI_SSF OSM256.4/RSn_A_Sk_MI_cLOF OSM256.4/RSn_A_Sk_MI_pOFS

Processes

The OSM256.4_AI_Data signal, with its contained timing, is received by the OSM256.4_AP from the OSM256.4_TT_Sk function. The OSM256.4/RSn function processes this signal to form data and associated timing at the RSn_CP. The function also recovers frame alignment and identifies the frame start positions in the data of the RSn_CP. The framed STM-256 data and timing are presented at the RSn_CP.

Regeneration: The function shall operate with a maximum BER of 10^{-12} when any combination of the following signal conditions exists at the input:

– an input optical power level within the range specified in [ITU-T G.959.1];

– jitter modulation applied to the input signal as specified in [ITU-T G.825];

– the input signal bit rate has a value in the range $256 \times 155\,520$ kbit/s ± 20 ppm.

NOTE – The frequency and jitter/wander tolerance might be further constrained by the requirements of the client layers.

To ensure adequate immunity against the presence of consecutive identical digits (CID) in the STM-N signal, the function shall comply with the specification in clause 15.1.4.

The function shall process the signal so that in the absence of input jitter, the intrinsic jitter at the STM-N output interface (in a regenerative repeater) shall not exceed the values specified in clause 15.1.2. For the multi-lane case, the frequencies of the related jitter limit values of the optical per lane signals are scaled down by the factor of 4 in respect to the STM256 values. The frequency downscaling leads to the fact that the absolute UIp-p amplitude is also scaled up by the factor of 4 in terms of nanoseconds.

The function shall process the signal so that the jitter transfer (measured between an STM-N input and STM-N output in a regenerative repeater) shall be as specified in clause 15.1.3.

For the multi-lane case, the frequencies of the related jitter limit values of the optical per lane signals are scaled down by the factor of 4 in respect to the STM256 values. The frequency downscaling leads to the fact that the UIp-p amplitude is also scaled up by the factor of 4 in terms of nanoseconds.

The frame alignment process is described in clause 8.2.1.

Defects

dLOF: see clause 6.2.5.1.

Consequent actions

The function shall perform the following consequent actions:

aAIS ← dLOF or AI_TSF

aSSF ← dLOF or AI_TSF

On declaration of an aAIS, the function shall output an all-ONEs (AIS) signal – complying to the frequency limits for this interface – within 250 µs; on clearing of aAIS, the function shall output normal data within 250 µs.

Defect correlations

The function shall perform the following defect correlations to determine the most probable fault cause. This fault cause shall be reported to the SEMF.

cLOF ← dLOF and (not AI_TSF)

Performance monitoring

The function shall perform the following performance monitoring primitives processing:

Any second with at least one OOF event shall be reported as a pOFS (optional in [ITU-T G.784]).

6) Text modification in clause 10.2.1.1

Modify clause 10.2.1.1, adding the text indicated below to Table 10-1 and by adding the additional paragraph to the "Processes" section of the clause, as shown below:

Table 10-1 – RSn_TT_So function inputs and outputs

Inputs	Outputs
RSn_AI_Data RSn_AI_Clock RSn_AI_FrameStart RSn_TT_So_MI_TxTI	RSn_CI_Data RSn_CI_Clock RSn_CI_Fs (Note)
NOTE – The RSn_CI_Fs (RSn frame start signal) is optional for support of OSM256.4 interfaces for frame start forwarding to the OSM256.4_TT_So and not a generic requirement.	

Processes

Data at the RSn_AP is an STM-N signal as defined in [ITU-T G.707] having a valid multiplex section overhead (MSOH) and E1, D1-D3, F1 and NU bytes. However, the bytes A1, A2, B1, and J0 are indeterminate in this signal. A1, A2, B1, and J0 bytes are set in accordance with [ITU-T G.707] as part of the RSn_TT function to give a fully formatted STM-N data and associated timing at the RSn_CP. After these bytes have been set, the RSn_TT function scrambles the STM-N signal before it is presented to the RSn_CP. Scrambling is performed according to clause 8.1.1 and [ITU-T G.707].

A1, A2: Frame alignment bytes A1 and A2 are generated and inserted in the first row of the RSOH according to [ITU-T G.707].

J0: Regenerator Section trace information (RSn_TT_So_MI_TxTI) derived from reference point RSn_TT_MP is placed in J0 byte position. The RS trace format is described in [ITU-T G.707].

B1: The error monitoring byte B1 is allocated in the STM-N for a regenerator section bit error monitoring function. This function shall be a bit interleaved parity 8 (BIP-8) code using even parity as defined in [ITU-T G.707]. The BIP-8 is computed over all bits of the previous STM-N frame at the RSn_CP after scrambling. The result is placed in byte B1 position of the RSOH before scrambling.

FS forwarding: For the RSn_TT_So with n=256 towards OSM256.4 interfaces, this is an optional process supporting the forwarding of the frame start to the OSM256.4/RSn_A _So to be made available at the OSM256.4_TT_So.

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