International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.994.1

Amendment 1

(11/2007)

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

Digital sections and digital line system – Access networks

Handshake procedures for digital subscriber line (DSL) transceivers

Amendment 1

ITU-T Recommendation G.994.1 (2007) – Amendment 1

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ITU-T Recommendation G.994.1

Handshake procedures for digital subscriber line (DSL) transceivers

Amendment 1

Summary

This Recommendation provides a flexible mechanism for digital subscriber line (DSL) transceivers to exchange capabilities and to select a common mode of operation. It includes parameters relating to service and application requirements as well as parameters pertinent to various DSL transceivers. This Recommendation is currently an integral part of the start-up procedure for ITU-T Recommendations G.991.2, G.992.1, G.992.2, G.992.3, G.992.4, G.992.5, G.993.1 and G.993.2. It is anticipated that future DSL Recommendations will also be able to make use of this Recommendation. Provisions are also included for exchanging non-standard information.

This version also includes the following:

- G.994.1 new Amendment 1 for consent 06/2007, which includes:
  - Support for Amendment 2 to Recommendation G.998.2
  - Support for exchange of transmit and receive levels of individual carriers
  - Support for Amendment 4 to Recommendation G.992.3 (new Annex C parameters)
  - Support for Amendment 4 to Recommendation G.992.5 (new Annex C parameters)

Source

Amendment 1 to ITU-T Recommendation G.994.1 (2007) was approved on 22 November 2007 by ITU-T Study Group 15 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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.

INTELLECTUAL PROPERTY RIGHTS

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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/.

ITU-T Recommendation G.994.1

Handshake procedures for digital subscriber line (DSL) transceivers

Amendment 1

Modifications introduced by this amendment are shown in revision marks. Unchanged text is replaced by ellipsis (…). Some parts of unchanged texts (clause numbers, etc.) may be kept to indicate the correct insertion points.

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1 Scope

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i) support for a re-transmission mechanism (new in version 3 of the Recommendation through the use of new message type REQ-RTX)~~.~~;

j) support for exchanging the relative transmit and receive level of individual carriers in order to estimate loop characteristics.

2 References

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[ITU-T G.992.5] ITU-T Recommendation G.992.5 (2005), *Asymmetric digital subscriber line (ADSL) transceivers – Extended bandwidth ADSL2 (ADSL2plus)*.

[ITU-T G.993.1] ITU-T Recommendation G.993.1 (2004), *Very high speed digital subscriber line transceivers (VDSL).*

[ITU-T G.993.2] ITU-T Recommendation G.993.2 (2006), *Very high speed digital subscriber line transceivers 2 (VDSL2).*

[ITU-T G.997.1] ITU-T Recommendation G.997.1 (2006) (except Amd.2), *Physical layer management for digital subscriber line (DSL) transceivers*.

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3.12 session: A G.994.1 session comprises a start-up procedure, one or more transactions, and a cleardown procedure (except as noted in clause 12).

3.13 shaping: Application of different gain scaling (B_i, see clauses 6.1.1 and 6.2) and therefore different transmit power to individual carriers within a carrier set.

3.1~~4~~3 signalling family: A group of carrier sets which are integral multiples of a given carrier spacing frequency.

3.15~~4~~ subcarrier: Refer to the associated xDSL Recommendation for the definition of this term.

3.16~~5~~ transaction: A sequence of G.994.1 messages, ending with either a positive acknowledgement [ACK(1) (except as noted in clause 7.6)], a negative acknowledgement (NAK), or a time-out (see clause 12).

3.17~~6~~ upstream: The direction of transmission from the xTU-R to the xTU-C.

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6.1.1 4.3125 kHz signalling family

Carrier frequencies within this signalling family are given by N × 4.3125 kHz, where N is a positive integer. The symbol rate shall be 4312.5/8 ≡ 539.0625 symbols per second.

Within this family, there are ~~three~~ twelve upstream carrier sets, designated A43, A43c, B43, B43c, ~~and~~ C43, J43, V43, V43P, V43I, V43-S, V43P-S and V43I-S. Each upstream carrier set has an associated downstream carrier set that carries the same designation. The carrier set frequencies and the maximum transmit power level per carrier for each carrier set are defined in Table 1 where frequency = N × 4.3125 kHz.

The carrier sets in this family are mandatory for the xDSL modes listed in Table 2. One or more carriers listed in Tables 1 or 3 may be transmitted in addition to the mandatory carrier set listed in Table 2. Carriers not listed in Tables 1 or 3 shall not be transmitted.

In some jurisdictions it may be necessary to shape the power of the downstream carriers in order to be compliant with PSD masks enforced by regulation. However, if shaping is applied, the transmit powers of individual downstream carriers within the carrier set shall be explicitly indicated in the identification field using the "relative power level for downstream carrier with frequency index N" parameter for each transmitted carrier (see Spar(1) bits defined in Tables 9.0.3 to 9.0.5, and their underlying NPar(2) bits starting at Table 9.51). Shaping of upstream carriers within a carrier set is not supported and shall not be applied.

If, in addition to the mandatory carrier set, one or more carriers are transmitted, the transmit power of these additional carriers should also be indicated. This applies to both upstream and downstream.

When all downstream carriers within a carrier set are transmitted at the same power level, the transmit power should be indicated in the identification field using the "relative power level/carrier for downstream carrier set" parameter for that carrier set (see Spar(1) bits defined in Tables 9.0.1 to 9.0.3, and their underlying NPar(2) bits starting at Table 9.15). The transmit power for the upstream carrier sets should also be indicated.

NOTE – Modem receivers complying with older versions of this Recommendation expect all the downstream carriers in a carrier set to be transmitted at the same power level. The use of shaping may not be compatible with this equipment (see Table 8).

The "relative power level for downstream carrier with frequency index N" parameter is also used to indicate the relative receive level of carrier N. For a downstream carrier, this parameter indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. For an upstream carrier, it indicates the transmit level for an HSTU-R and the receive level for an HSTU-C.

Table 1 – Carrier sets for the 4.3125 kHz signalling family

Carrier set designation	Upstream carrier sets		Downstream carrier sets		Transmission mode
	Frequency indices (N)	Maximum power level/carrier (dBm)	Frequency indices (N)	Maximum power level/carrier (dBm)	
A43 (Notes 1, 3~~, 4~~)	9 17 25	–1.65	40 56 64	–3.65	Duplex only
A43c (Notes 1, 3~~, 4~~)	9 17 25	–1.65	257 293 337	–3.65	Duplex only
B43	37 45 53	–1.65	72 88 96	–3.65	Duplex only

Table 1 – Carrier sets for the 4.3125 kHz signalling family

Carrier set designation	Upstream carrier sets		Downstream carrier sets		Transmission mode
	Frequency indices (N)	Maximum power level/carrier (dBm)	Frequency indices (N)	Maximum power level/carrier (dBm)	
B43c (Note 1)	37 45 53	–1.65	257 293 337	–3.65	Duplex only
C43	7 9	–1.65	12 14 64	–3.65	Duplex only
J43	9 17 25	–1.65	72 88 96	–3.65	Duplex only
V43 (Notes 1, 2)	944 972 999	–16.65	257 383 511	–3.65	Duplex only
V43P (Note 1)	9 17 25	–1.65	257 383 511	–3.65	Duplex only
V43I (Note 1)	37 45 53	–1.65	257 383 511	–3.65	Duplex only
V43-S (Notes 1, 2)	944 999	–16.65	257 383	–3.65	Duplex only
V43P-S (Note 1)	17 25	–1.65	257 383	–3.65	Duplex only
V43I-S (Note 1)	45 53	–1.65	257 383	–3.65	Duplex only

NOTE 1 – In some jurisdictions, it may be necessary to limit the maximum downstream power level, for example –23.65 dBm/carrier where the PSD is limited to –60 dBm/Hz.

NOTE 2 – It is expected that sufficient power back-off is applied to the upstream carriers of short lines to avoid excessive crosstalk into adjacent pairs during G.994.1.

~~NOTE 3 – In some jurisdictions it may be necessary to shape the power of the downstream carriers in order to be compliant with PSD masks enforced by regulation.~~

NOTE 3~~4~~ – In some jurisdictions it may be necessary to send either A43 or A43C carrier sets, or both simultaneously, with appropriate shaping, leaving the receiver to select which carrier set to use.

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6.2 Modulation

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For each signal transmitted, the transmit signal shall have a rectangular pulse shaping, defined as:

$$s(t) = \left[\left(\sum_i B_i \times \cos(2\pi f_i t + \varphi_i)\right) \times \left(\sum_n A_n \times rect(t - nT)\right)\right] \otimes h_{tx}(t)$$

~~$$s(t) = \left[\left(\sum_i \cos(2\pi f_i t + \varphi_i)\right) \times \left(\sum_n A_n \times rect(t - nT)\right)\right] \otimes h_{tx}(t)$$~~

where:

$\times$ means signal multiplication

$\otimes$ means signal convolution

f_i are the G.994.1 carrier frequencies (defined in clause 6.1)

φ_i are the G.994.1 carrier phases (discretionary constants)

B_i are the G.994.1 carrier gain scalings

T is the symbol period

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Table 8 – Identification field – NPar(1) coding

Bits								NPar(1)s
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	~~Reserved for allocation by the ITU-T~~Downstream shaping (Note)
x	x	x	x	x	x	1	x	Reserved for allocation by ITU-T
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	1	x	x	x	x	x	x	Non-standard field
x	0	0	0	0	0	0	0	No parameters set in this octet

NOTE – If set to ONE by an HSTU-R, indicates that the HSTU-R supports shaping of the downstream carriers within a carrier set (see clause 6.1.1). If set to ZERO by an HSTU-R, no indication is given about support of shaping by the HSTU-R. This bit shall be set to ZERO by an HSTU-C.

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Table 9.0.1 – Identification field – SPar(1) coding – Octet 2

Bits								SPar(1)s – Octet 2
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level/carrier for upstream carrier set A43 (Note 1)
x	x	x	x	x	x	1	x	Relative power level/carrier for downstream carrier set A43 (Notes 1, 2)
x	x	x	x	x	1	x	x	Relative power level/carrier for upstream carrier set B43 (Note 1)
x	x	x	x	1	x	x	x	Relative power level/carrier for downstream carrier set B43 (Notes 1, 2)
x	x	x	1	x	x	x	x	Relative power level/carrier for upstream carrier set C43 (Note 1)
x	x	1	x	x	x	x	x	Relative power level/carrier for downstream carrier set C43 (Notes 1, 2)
x	1	x	x	x	x	x	x	Reserved for allocation by ITU-T
x	0	0	0	0	0	0	0	No parameters in this octet

NOTE 1 – The relative power level/carrier ~~reported~~ provided in a CLR, CL, MP or MS message indicates the transmit level used during the current G.994.1 session, including the start-up and cleardown procedures. It does not imply any requirements on the transmit power in this or future sessions.

NOTE 2 – If this bit is set to ONE, all downstream carriers in the carrier set shall be transmitted at the same (indicated) power level.

Table 9.0.2 – Identification field – SPar(1) coding – Octet 3

Bits								SPar(1)s – Octet 3
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level/carrier for upstream carrier set A4 (Note 1)
x	x	x	x	x	x	1	x	Relative power level/carrier for downstream carrier set A4 (Notes 1, 2)
x	x	x	x	x	1	x	x	Relative power level/carrier for upstream carrier set A43c (Note 1)
x	x	x	x	1	x	x	x	Relative power level/carrier for downstream carrier set A43c (Notes 1, 2)
x	x	x	1	x	x	x	x	Bonding
x	x	1	x	x	x	x	x	Relative power level/carrier for upstream carrier set J43 (Note 1)
x	1	x	x	x	x	x	x	Relative power level/carrier for downstream carrier set J43 (Notes 1, 2)
x	0	0	0	0	0	0	0	No parameters in this octet

NOTE 1 – The relative power level/carrier ~~reported~~ provided in a CLR, CL, MP or MS message indicates the transmit level used during the current G.994.1 session, including the start-up and cleardown procedures. It does not imply any requirements on the transmit power in this or future sessions.

NOTE 2 – If this bit is set to ONE, all downstream carriers in the carrier set shall be transmitted at the same (indicated) power level.

Table 9.0.3 – Identification field – SPar(1) coding – Octet 4

Bits								SPar(1)s – Octet 4
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level/carrier for upstream carrier set B43c (Note 1)
x	x	x	x	x	x	1	x	Relative power level/carrier for downstream carrier set B43c (Notes 1, 2)
x	x	x	x	x	1	x	x	Relative power level/carrier for upstream carrier set V43 (Note 1)
x	x	x	x	1	x	x	x	Relative power level/carrier for downstream carrier set V43 (Note 1)
x	x	x	1	x	x	x	x	Relative power level for downstream carrier with frequency index N = 12~~Reserved for allocation by the ITU-T~~
x	x	1	x	x	x	x	x	Relative power level for downstream carrier with frequency index N = 14~~Reserved for allocation by the ITU-T~~
x	1	x	x	x	x	x	x	Relative power level for downstream carrier with frequency index N = 40~~Reserved for allocation by the ITU-T~~
x	0	0	0	0	0	0	0	No parameters in this octet

NOTE 1 – The relative transmit power level/carrier reported in a CLR, CL, MP or MS message indicates the level used during the current G.994.1 session, including the start-up and clear-down procedures. It does not imply any requirements on the transmit power in this or future sessions.

NOTE 2 – If this bit is set to ONE, all downstream carriers in the carrier set shall be transmitted at the same (indicated) power level.

Table 9.0.4 – Identification field – SPar(1) coding – Octet 5

Bits								SPar(1)s – Octet 5
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level for downstream carrier with frequency index N = 56
x	x	x	x	x	x	1	x	Relative power level for downstream carrier with frequency index N = 64
x	x	x	x	x	1	x	x	Relative power level for downstream carrier with frequency index N = 72
x	x	x	x	1	x	x	x	Relative power level for downstream carrier with frequency index N = 88
x	x	x	1	x	x	x	x	Relative power level for downstream carrier with frequency index N = 96
x	x	1	x	x	x	x	x	Relative power level for downstream carrier with frequency index N = 257
x	1	x	x	x	x	x	x	Relative power level for downstream carrier with frequency index N = 293
x	0	0	0	0	0	0	0	No parameters in this octet

Table 9.0.5 – Identification field – SPar(1) coding – Octet 6

Bits								SPar(1)s – Octet 6
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level for downstream carrier with frequency index N = 337
x	x	x	x	x	x	1	x	Relative power level for downstream carrier with frequency index N = 383
x	x	x	x	x	1	x	x	Relative power level for downstream carrier with frequency index N = 511
x	x	x	x	1	x	x	x	Relative power level for upstream carrier with frequency index N = 7
x	x	x	1	x	x	x	x	Relative power level for upstream carrier with frequency index N = 9
x	x	1	x	x	x	x	x	Relative power level for upstream carrier with frequency index N = 17
x	1	x	x	x	x	x	x	Relative power level for upstream carrier with frequency index N = 25
x	0	0	0	0	0	0	0	No parameters in this octet

Table 9.0.6 – Identification field – SPar(1) coding – Octet 7

Bits								SPar(1)s – Octet 7
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Relative power level for upstream carrier with frequency index N = 37
x	x	x	x	x	x	1	x	Relative power level for upstream carrier with frequency index N = 45
x	x	x	x	x	1	x	x	Relative power level for upstream carrier with frequency index N = 53
x	x	x	x	1	x	x	x	Relative power level for upstream carrier with frequency index N = 944
x	x	x	1	x	x	x	x	Relative power level for upstream carrier with frequency index N = 972
x	x	1	x	x	x	x	x	Relative power level for upstream carrier with frequency index N = 999
x	1	x	x	x	x	x	x	Reserved for allocation by ITU-T
x	0	0	0	0	0	0	0	No parameters in this octet

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Table 9.17 – Identification field – Relative power level/carrier for downstream carrier set A43 – NPar(2) coding

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set A43 Npar(2)s
x x	x x x x x x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set A43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.		

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Table 9.21 – Identification field – Relative power level/carrier for downstream carrier set B43 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set B43 Npar(2)s – Octet 1
x x	x x x x x x	Clipped attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set B43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.		

Table 9.21.1 – Identification field – Relative power level/carrier for downstream carrier set B43 – NPar(2) coding– Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set B43 Npar(2)s – Octet 2
x x	x x x x x x	Remainder of attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1× 0.5 dB) for downstream carrier set B43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.		

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Table 9.25 – Identification field – Relative power level/carrier for downstream carrier set C43 – NPar(2) coding

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set C43 Npar(2)s
x x	x x x x x x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set C43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.		

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Table 9.31 – Identification field – Relative power level/carrier for downstream carrier set A4 – NPar(2) coding

Bits 8	7	6	5	4	3	2	1	Relative power level/carrier for downstream carrier set A4 Npar(2)s
x	x	x	x	x	x	x	x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set A4 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.								

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Table 9.35 – Identification field – Relative power level/carrier for downstream carrier set A43c – NPar(2) coding

Bits 8	7	6	5	4	3	2	1	Relative power level/carrier for downstream carrier set A43c Npar(2)s
x	x	x	x	x	x	x	x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set A43c (Note)
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.								

Table 9.37 – Identification field –Bonding NPar(2) coding

Bits 8	7	6	5	4	3	2	1	Bonding NPar(2)s
x	x	x	x	x	x	x	1	Ethernet bonding
x	x	x	x	x	x	1	x	TDIM bonding
x	x	x	x	x	1	x	x	ATM bonding
x	x	x	x	1	x	x	x	BACP Support~~Reserved for allocation by ITU-T~~
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

Table 9.38 – Identification field – Bonding SPar(2) coding – Octet 1 – Ethernet/TDIM

Bits 8	7	6	5	4	3	2	1	Ethernet/TDIM Bonding SPar(2)s
x	x	x	x	x	x	x	1	PME aggregation discovery
x	x	x	x	x	x	1	x	PME aggregation
x	x	x	x	x	1	x	x	PME identification~~Reserved for allocation by ITU-T~~
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 9.38.3 – Identification field – Bonding – PME Identification – NPar(3) coding

Bits								Bonding PME Identification NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	PME_Identification (0 to 31), bits 4 to 0

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Table 9.41 – Identification field – Relative power level/carrier for downstream carrier set J43 – NPar(2) coding – Octet 1

Bits								Relative power level/carrier for downstream carrier set J43 Npar(2)s – Octet 1
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Clipped attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1× 0.5 dB) for downstream carrier set J43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.								

Table 9.41.1 – Identification field – Relative power level/carrier for downstream carrier set J43 – NPar(2) coding – Octet 2

Bits								Relative power level/carrier for downstream carrier set J43 Npar(2)s – Octet 2
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Remainder of attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1× 0.5 dB) for downstream carrier set J43 (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.								

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Table 9.45 – Identification field – Relative power level/carrier for downstream carrier set B43c – NPar(2) coding

Bits								Relative power level/carrier for downstream carrier set B43c Npar(2)s
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (bits 6-1 × 0.5 dB) for downstream carrier set B43c (Note).
NOTE – This octet shall only be sent when a~~A~~ll carriers in the carrier set ~~shall be~~are transmitted at the same power level.								

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Table 9.49 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 1
x x	0 0 0 0 0 x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 257 of set V43 (Note) – (bit 7)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.67, relative power level for downstream carrier with frequency index N = 257 (octet 1).

Valid values are 0 to 58.5 dB and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.49.1 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 257 of set V43 (Note) – (bits 6-1)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.67.1, relative power level for downstream carrier with frequency index N = 257 (Octet 2).

Valid values are 0 to 58.5 dB, and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.49.2 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 3

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 3
x x	0 0 0 0 0 x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 383 of set V43 (Note) – (bit 7)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.73, relative power level for downstream carrier with frequency index N = 383 (Octet 1).

Valid values are 0 to 58.5 dB, and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.49.3 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 4

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 4
x x	x x x x x x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 383 of set V43 (Note) – (bits 6-1)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.73.1, relative power level for downstream carrier with frequency index N = 383 (Octet 2).

Valid values are 0 to 58.5 dB, and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.49.4 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 5

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 5
x x	0 0 0 0 0 x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 511 of set V43 (Note) – (bit 7)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.75, relative power level for downstream carrier with frequency index N = 511 (Octet 1).

Valid values are 0 to 58.5 dB, and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.49.5 – Identification field – Relative power level/carrier for downstream carrier set V43 – NPar(2) coding – Octet 6

Bits 8 7	6 5 4 3 2 1	Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 6
x x	x x x x x x	Attenuation in G.994.1 transmit power per carrier relative to maximum power (in steps of 0.5 dB) for downstream carrier 511 of set V43 (Note) – (bits 6-1)

NOTE – Carriers in the carrier set may be transmitted at different power levels. If this octet is sent, its value shall be identical to the value contained in Table 9.75.1, relative power level for downstream carrier with frequency index N = 511 (Octet 2).

Valid values are 0 to 58.5 dB, and 59 to 63.5 as special values corresponding to carrier not transmitted.

Table 9.51 – Identification field – Relative power level for downstream carrier with frequency index N = 12 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 12 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 12 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.51.1 – Identification field – Relative power level for downstream carrier with frequency index N = 12 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 12 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 12 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.53 – Identification field – Relative power level for downstream carrier with frequency index N = 14 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 14 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 14 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.53.1 – Identification field – Relative power level for downstream carrier with frequency index N = 14 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 14 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 14 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.55 – Identification field – Relative power level for downstream carrier with frequency index N = 40 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 40 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 40 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.55.1 – Identification field – Relative power level for downstream carrier with frequency index N = 40 – NPar(2) coding – Octet 2

Bits 8 7	Bits 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 40 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 40 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.57 – Identification field – Relative power level for downstream carrier with frequency index N = 56 – NPar(2) coding – Octet 1

Bits 8 7	Bits 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 56 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 56 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.57.1 – Identification field – Relative power level for downstream carrier with frequency index N = 56 – NPar(2) coding – Octet 2

Bits 8 7	Bits 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 56 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 56 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.59 – Identification field – Relative power level for downstream carrier with frequency index N = 64 – NPar(2) coding – Octet 1

Bits 8 7	Bits 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 64 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 64 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.59.1 – Identification field – Relative power level for downstream carrier with frequency index N = 64 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 64 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 64 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.61 – Identification field – Relative power level for downstream carrier with frequency index N = 72 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 72 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 72 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.61.1 – Identification field – Relative power level for downstream carrier with frequency index N = 72 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 72 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 72 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.63 – Identification field – Relative power level for downstream carrier with frequency index N = 88 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 88 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 88 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.63.1 – Identification field – Relative power level for downstream carrier with frequency index N = 88 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 88 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 88 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.65 – Identification field – Relative power level for downstream carrier with frequency index N = 96 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 96 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 96 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.65.1 – Identification field – Relative power level for downstream carrier with frequency index N = 96 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 96 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 96 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.67 – Identification field – Relative power level for downstream carrier with frequency index N = 257 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 257 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 257 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.67.1 – Identification field – Relative power level for downstream carrier with frequency index N = 257 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 257 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 257 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.69 – Identification field – Relative power level for downstream carrier with frequency index N = 293 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 293 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 293 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.69.1 – Identification field – Relative power level for downstream carrier with frequency index N = 293 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 293 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 293 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.71 – Identification field – Relative power level for downstream carrier with frequency index N = 337 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 337 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 337 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.71.1 – Identification field – Relative power level for downstream carrier with frequency index N = 337 – NPar(2) coding – Octet 2

Bits 8 7 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 337 – Npar(2)s – Octet 2
x x x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 337 – (bits 6-1)
NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.	

Table 9.73 – Identification field – Relative power level for downstream carrier with frequency index N = 383 – NPar(2) coding – Octet 1

Bits 8 7 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 383 – Npar(2)s – Octet 1
x x 0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 383 – (bits 8 and 7)
NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.	

Table 9.73.1 – Identification field – Relative power level for downstream carrier with frequency index N = 383 – NPar(2) coding – Octet 2

Bits 8 7 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 383 – Npar(2)s – Octet 2
x x x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 383 – (bits 6-1)
NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.	

Table 9.75 – Identification field – Relative power level for downstream carrier with frequency index N = 511 – NPar(2) coding – Octet 1

Bits 8 7 6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 511 – Npar(2)s – Octet 1
x x 0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 511 – (bits 8 and 7)
NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.	

Table 9.75.1 – Identification field – Relative power level for downstream carrier with frequency index N = 511 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for downstream carrier with frequency index N = 511 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –3.65 dBm (in steps of 0.5 dB) for downstream carrier 511 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-C and the receive level for an HSTU-R. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –131.15 dBm.

Table 9.77 – Identification field – Relative power level for upstream carrier with frequency index N = 7 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 7 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 7 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.77.1 – Identification field – Relative power level for upstream carrier with frequency index N = 7 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 7 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 7 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.79 – Identification field – Relative power level for upstream carrier with frequency index N = 9 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 9 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 9 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.79.1 – Identification field – Relative power level for upstream carrier with frequency index N = 9 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 9 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 9 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.81 – Identification field – Relative power level for upstream carrier with frequency index N = 17 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 17 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 17 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.81.1 – Identification field – Relative power level for upstream carrier with frequency index N = 17 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 17 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 17 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.83 – Identification field – Relative power level for upstream carrier with frequency index N = 25 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 25 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 25 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.83.1 – Identification field – Relative power level for upstream carrier with frequency index N = 25 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 25 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 25 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.85 – Identification field – Relative power level for upstream carrier with frequency index N = 37 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 37 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 37 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.85.1 – Identification field – Relative power level for upstream carrier with frequency index N = 37 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 37 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 37 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.87 – Identification field – Relative power level for upstream carrier with frequency index N = 45 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 45 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 45 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.87.1 – Identification field – Relative power level for upstream carrier with frequency index N = 45 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 45 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 45 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.89 – Identification field – Relative power level for upstream carrier with frequency index N = 53 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 53 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 53 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.89.1 – Identification field – Relative power level for upstream carrier with frequency index N = 53 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 53 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –1.65 dBm (in steps of 0.5 dB) for upstream carrier 53 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –129.15 dBm.

Table 9.91 – Identification field – Relative power level for upstream carrier with frequency index N = 944 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 944 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 944 – (bits 8 and 7)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.

Table 9.91.1 – Identification field – Relative power level for upstream carrier with frequency index N = 944 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 944 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 944 – (bits 6-1)
NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.		

Table 9.93 – Identification field – Relative power level for upstream carrier with frequency index N = 972 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 972 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 972 – (bits 8 and 7)
NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.		

Table 9.93.1 – Identification field – Relative power level for upstream carrier with frequency index N = 972 – NPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 972 – Npar(2)s – Octet 2
x x	x x x x x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 972 – (bits 6-1)
NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.		

Table 9.95 – Identification field – Relative power level for upstream carrier with frequency index N = 999 – NPar(2) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	Relative power level for upstream carrier with frequency index N = 999 – Npar(2)s – Octet 1
x x	0 0 0 0 x x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 999 – (bits 8 and 7)
NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.		

Table 9.95.1 – Identification field – Relative power level for upstream carrier with frequency index N = 999 – NPar(2) coding – Octet 2

Bits 8	7	6	5	4	3	2	1	Relative power level for upstream carrier with frequency index N = 999 – Npar(2)s – Octet 2
x	x	x	x	x	x	x	x	Attenuation in G.994.1 transmit or receive power (Note) relative to –16.65 dBm (in steps of 0.5 dB) for upstream carrier 999 – (bits 6-1)

NOTE – Indicates the transmit level for an HSTU-R and the receive level for an HSTU-C. Valid values for transmit level are 0 to 58.5 dB. Valid values for receive level are 0 to 127 dB, with a value of 127.5 as a special value indicating a receive level ≤ –144.15 dBm.

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Table 11.42.15.8 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #0 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #0 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

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Table 11.42.15.10 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #0 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #0 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.16.8 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.42.16.9 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.42.16.10 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.19.2 – Standard information field – G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 3

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 3
x	x			x	x	x	x	$S_{0\,min}$ value
x	x	x	x					Reserved for allocation by ITU-T

Table 11.42.19.3 – Standard information field – G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 4

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 4
x	x	x	x	x	x	x	1	D_0 value of 96 is supported
x	x	x	x	x	x	1	x	D_0 value of 128 is supported
x	x	x	x	x	1	x	x	D_0 value of 160 is supported
x	x	x	x	1	x	x	x	D_0 value of 192 is supported
x	x	x	1	x	x	x	x	D_0 value of 224 is supported
x	x	1	x	x	x	x	x	D_0 value of 256 is supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.42.19.4 – Standard information field – G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 5

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 5
x	x	x	x	x	x	x	1	D_0 value of 288 is supported
x	x	x	x	x	x	1	x	D_0 value of 320 is supported
x	x	x	x	x	1	x	x	D_0 value of 352 is supported
x	x	x	x	1	x	x	x	D_0 value of 384 is supported
x	x	x	1	x	x	x	x	D_0 value of 416 is supported
x	x	1	x	x	x	x	x	D_0 value of 448 is supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.42.19.5 – Standard information field – G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 6

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 6
x	x	x	x	x	x	x	1	D_0 value of 480 is supported
x	x	x	x	x	x	1	x	D_0 value of 511 is supported
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.27.8 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #1 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

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Table 11.42.27.10 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #1 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #1 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.28.8 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.42.28.9 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.42.28.10 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.39.8 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #2 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

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Table 11.42.39.10 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #2 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C downstream ATM TPS-TC #2 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.40.8 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.42.40.9 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.42.40.10 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 11

Bits								G.992.3 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.51.8 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.3 Annex C downstream ATM TPS-TC #3 NPar(3)s – Octet 9
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

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Table 11.42.51.10 – Standard information field – G.992.3 Annex C downstream ATM TPS-TC #3 NPar(3) coding – Octet 11

Bits								G.992.3 Annex C downstream ATM TPS-TC #3 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.42.52.8 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 9
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.42.52.9 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 10

Bits								G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 10
8	7	6	5	4	3	2	1	
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.42.52.10 – Standard information field – G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 11

Bits								G.992.3 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.66.15.8 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #0 NPar(3) coding – Octet 9

Bits								G.992.5 Annex C downstream ATM TPS-TC #0 NPar(3)s – Octet 9
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

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Table 11.66.15.10 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #0 NPar(3) coding – Octet 11

Bits								G.992.5 Annex C downstream ATM TPS-TC #0 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.66.16.8 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.66.16.9 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.66.16.10 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #0 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.66.19.2 – Standard information field – G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 3

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 3
x	x			x	x	x	x	$S_{0\ min}$ value
x	x	x	x					Reserved for allocation by ITU-T

Table 11.66.19.3 – Standard information field – G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 4

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 4
x	x	x	x	x	x	x	1	D_0 value of 96 is supported
x	x	x	x	x	x	1	x	D_0 value of 128 is supported
x	x	x	x	x	1	x	x	D_0 value of 160 is supported
x	x	x	x	1	x	x	x	D_0 value of 192 is supported
x	x	x	1	x	x	x	x	D_0 value of 224 is supported
x	x	1	x	x	x	x	x	D_0 value of 256 is supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.66.19.4 – Standard information field – G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 5

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 5
x	x	x	x	x	x	x	1	D_0 value of 288 is supported
x	x	x	x	x	x	1	x	D_0 value of 320 is supported
x	x	x	x	x	1	x	x	D_0 value of 352 is supported
x	x	x	x	1	x	x	x	D_0 value of 384 is supported
x	x	x	1	x	x	x	x	D_0 value of 416 is supported
x	x	1	x	x	x	x	x	D_0 value of 448 is supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.66.19.5 – Standard information field – G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3) coding – Octet 6

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream PMS-TC latency path #0 NPar(3)s – Octet 6
x	x	x	x	x	x	x	1	D_0 value of 480 is supported
x	x	x	x	x	x	1	x	D_0 value of 511 is supported
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	24000 bytes interleaver size
x	x	0	0	0	0	0	0	No parameters in this octet

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Table 11.66.27.8 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream ATM TPS-TC #1 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

…

Table 11.66.27.10 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #1 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream ATM TPS-TC #1 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

…

Table 11.66.28.8 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.66.28.9 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.66.28.10 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #1 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

…

Table 11.66.39.8 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream ATM TPS-TC #2 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

• • •

Table 11.66.39.10 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #2 NPar(3) coding – Octet 11

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C downstream ATM TPS-TC #2 NPar(3)s – Octet 11
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

• • •

Table 11.66.40.8 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 9
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.66.40.9 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 10
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.66.40.10 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3) coding – Octet 11

Bits								G.992.5 Annex C upstream ATM TPS-TC #2 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

• • •

Table 11.66.51.8 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.5 Annex C downstream ATM TPS-TC #3 NPar(3)s – Octet 9
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

• • •

Table 11.66.51.10 – Standard information field – G.992.5 Annex C downstream ATM TPS-TC #3 NPar(3) coding – Octet 11

Bits								G.992.5 Annex C downstream ATM TPS-TC #3 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

• • •

Table 11.66.52.8 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 9
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	INP_min (minimum impulse noise protection) (bits ~~4 &~~8 to 3)
~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~			~~Reserved for allocation by the ITU-T~~

Table 11.66.52.9 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 10

Bits								G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 10
8	7	6	5	4	3	2	1	
x	x		x	x	x	x	x	Jitter_max (maximum jitter) (coded as 31)
x	x	x						Reserved for allocation by ITU-T

Table 11.66.52.10 – Standard information field – G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3) coding – Octet 11

Bits								G.992.5 Annex C upstream ATM TPS-TC #3 NPar(3)s – Octet 11
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	CIpolicy ZERO
x	x	x	x	x	x	1	x	CIpolicy ONE
x	x	x	x	x	1	x	x	Reserved for allocation by ITU-T
x	x	x	x	1	x	x	x	Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

• • •

Table 11.67 – Standard information field – G.993.2 NPar(2) coding

Bits								G.993.2 NPar(2)s
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	All-digital mode
x	x	x	x	x	x	1	x	Support of downstream virtual noise
x	x	x	x	x	1	x	x	Lineprobe
x	x	x	x	1	x	x	x	Loop diagnostic mode
x	x	x	1	x	x	x	x	Support of PSD shaping in US0
x	x	1	x	x	x	x	x	Support of equalized FEXT UPBO~~Reserved for allocation by ITU-T~~
x	x	0	0	0	0	0	0	No parameters in this octet

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13.1.1 GHS A43 carrier ~~Tone~~set maximum PSD level in downstream (GHS_A43_MAXPSDds)

The parameter[1] GHS_A43_MAXPSDds is defined as the maximum transmit PSD level for each individual G.hs ~~tone~~ carrier of the A43 carrier ~~tone~~set in the downstream direction for the case when all downstream carriers of the carrier set are transmitted at the same level. The PSD level (in dBm/Hz) is calculated as the ~~tone~~ carrier power averaged over a 4.3125 kHz bandwidth. The mandatory range to be supported by the HSTU-C is from –71.5 to –40 dBm/Hz, with 0.5 dB steps. If the value is set to the value –99, then the HSTU-C shall not transmit this carrier ~~tone~~set.

[1] It is expected that HSTU-Cs that are colocated will use the same parameter setting.

The value of the attenuation in G.994.1 transmit power per carrier for carrier set A43 as conveyed in the NPar(2) in Table 9.17 shall comply with the following constraint:

$$-3.65 - Attenuation - 36.35 \leq GHS\_A43\_MAXPSDds$$

13.1.2 GHS A43c and B43C carrier set maximum PSD level in downstream (GHS_AB43c_MAXPSDds)

The parameter[1] GHS_AB43c_MAXPSDds is defined as the maximum transmit PSD level for each individual G.hs carrier~~tone~~ of the A43c and B43C carrier set in the downstream direction for the case when all downstream carriers of the carrier set are transmitted at the same level. The PSD level (in dBm/Hz) is calculated as the ~~tone~~ carrier power averaged over a 4.3125 kHz bandwidth. The mandatory range to be supported by the HSTU-C is from –71.5 to –40 dBm/Hz, with 0.5 dB steps. If the value is set to the value –99, then the HSTU-C shall not transmit this carrier set.

If the carrier set is transmitted by the HSTU-C, the value of the attenuation in G.994.1 transmit power per carrier for carrier set A43c as conveyed in the NPar(2) in Table 9.35 shall comply with the following constraint:

$$-3.65 - Attenuation\_A43c - 36.35 \leq GHS\_AB43c\_MAXPSDds$$

If the carrier set is not transmitted by the HSTU-C, the Npar~~PAR~~(2) shall not be included.

If the carrier set is transmitted by the HSTU-C, the value of the attenuation in G.994.1 transmit power per carrier for carrier set B43c as conveyed in the NPar(2) in Table 9.45 shall comply with the following constraint:

$$-3.65 - Attenuation\_B43c - 36.35 \leq GHS\_AB43c\_MAXPSDds$$

If the carrier set is not transmitted by the HSTU-C, the Npar~~PAR~~(2) shall not be included.

13.1.3 GHS B43 and J43 carrier ~~Tone~~set maximum PSD level in downstream (GHS_BJ43_MAXPSDds)

The parameter[1] GHS_BJ43_MAXPSDds is defined as the maximum transmit PSD level for each individual G.hs ~~tone~~ carrier of the B43 and J43 carrier ~~tone~~set in the downstream direction for the case when all downstream carriers of the carrier set are transmitted at the same level. The PSD level (in dBm/Hz) is calculated as the ~~tone~~ carrier power averaged over a 4.3125 kHz bandwidth. The mandatory range to be supported by the HSTU-C is from –80 to –40 dBm/Hz, with 0.5 dB steps. If the value is set to the value –99, then the HSTU-C shall not transmit this carrier ~~tone~~set.

• • •

13.1.4 GHS V43 carrier set maximum PSD level in downstream

The three parameters[1] GHS_V43_257_MAXPSDds, GHS_V43_383_MAXPSDds and GHS_V43_511_MAXPSDds are defined as the maximum transmit PSD level for each individual G.hs carrier~~tone~~ of the V43 carrier set in the downstream direction. The PSD level (in dBm/Hz) is calculated as the ~~tone~~ carrier power averaged over a 4.3125 kHz bandwidth. The mandatory range to be supported by the HSTU-C is from –98.5 to –40 dBm/Hz, with 0.5 dB steps. If the value is set to the value –99, then the HSTU-C shall not transmit this ~~tone~~carrier.

If at least one carrier of the carrier set is transmitted by the HSTU-C, the value of the attenuation in G.994.1 transmit power per carrier for carrier set V43 shall be reported in the NPar(2) in Table 9.49.x as well as in the corresponding NPar(2) relative power level for downstream carrier with frequency index N (see clause 13.1.5).

[1] It is expected that HSTU-Cs that are co-located will use the same parameter setting.

If the carrier set is not transmitted by the HSTU-C, the Npar~~PAR~~(2) shall not be included.

13.1.5 GHS individual carrier maximum PSD level in downstream

The parameter GHS_CARRIER_N_MAXPSDds is defined as the maximum transmit PSD level for an individual G.hs carrier with frequency index N in the downstream direction. Valid values for N are 12, 14, 40, 56, 64, 72, 88, 96, 293, 337.

The PSD level (in dBm/Hz) is calculated as the carrier power averaged over a 4.3125 kHz bandwidth. The mandatory range to be supported by the HSTU-C is from –98.5 to –40 dBm/Hz, with 0.5 dB steps. If the value is set to the value –99, the HSTU-C shall not transmit this carrier.

If the carrier is transmitted by the HSTU-C, the value of the attenuation as conveyed in the NPar(2) relative power level for downstream carrier with frequency index N parameter shall comply with the following constraint:

$$-3.65 - Attenuation - 36.35 \leq GHS\_CARRIER\_N\_MAXPSDds$$

If the carrier is not transmitted by the HSTU-C, the Spar(1) bit shall be set to ZERO and the associated Npar(2) octets shall not be included.

Carriers with frequencies 257, 383 and 511 shall be configured through the parameters GHS_V43_257_MAXPSDds, GHS_V43_383_MAXPSDds and GHS_V43_511_MAXPSDds, respectively (see clause 13.1.4).

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Printed in Switzerland
Geneva, 2008