International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.994.1
Amendment 4
(01/2006)

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 4

ITU-T Recommendation G.994.1 (2003) – Amendment 4

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ITU-T Recommendation G.994.1

Handshake procedures for digital subscriber line (DSL) transceivers

Amendment 4

Summary

This Amendment 4 to ITU-T Rec. G.994.1 was developed to support:
- new G.993.2 (VDSL2);
- deployment of G.992.5 from the exchange with either G.992.5 or G.993.1/2 from a cabinet:
  – G.992.5 Annex B from a cabinet;
- G.992.5 Annexes J/M:
  – tone set and code points;
- the new proposed PTM TPS-TC based on 64/65-octet encapsulation for G.991.2, G.992.3 and G.992.5;
- G.992.3 and G.992.5 amendments:
  – optional INP_min values,
  – optional S&D values,
  – time domain filtering,
  – Annex C,
  – Corrigendum for G.992.3 Annexes J/M Submode PSD shape.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. 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.

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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, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

ITU-T Recommendation G.994.1

Handshake procedures for digital subscriber line (DSL) transceivers

Amendment 4

1)   *To support deployment of ADSL2plus from the exchange with either ADSL2plus or VDSL from a cabinet, and ADSL2plus Annex B from a cabinet, amend Table 1 as follows:*

Table 1/G.994.1 – 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
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	−1.65	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 tones 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 tones in order to be compliant with PSD masks enforced by regulation.

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

2)	*For support of G.993.2, G.992.3/5 Annex C, G.992.5 Annex B, and G.992.5 Annexes J/M, amend Table 2 as follows:*

Table 2/G.994.1 – Mandatory carrier sets

xDSL Recommendation(s)	Carrier set designation
G.992.1 – Annex A, G.992.2 – Annexes A/B, G.992.3 – Annexes A/I/L, G.992.4 – Annexes A/I G.992.5 – Annexes A/I G.993.2 where support of a profile requiring US0 (Note 4)	A43
G.992.5 – Annexes A/I (Note 1) G.992.5 – Annexes J/M (Note 2) G.993.2 where support of a profile requiring US0 (Notes 1 and 4)	A43c
G.992.1 – Annex B, G.992.3 – Annex B G.992.5 – Annex B G.993.2 where support of a profile requiring US0 (Note 4)	B43
G.992.5 – Annex B (Note 3)	B43c
G.992.1 – Annexes C/H/I, G.992.2 – Annex C G.992.3 – Annex C, G.992.5 – Annex C	C43
G.992.3 – Annexes J/M, G.992.5 – Annexes J/M	J43
G.993.1 – Using multi-carrier modulation (except Annex C) G.993.2 where support of a profile not requiring US0	V43
G.993.1 – Annex C using multi-carrier modulation, over POTS	V43P
G.993.1 – Annex C using multi-carrier modulation, over ISDN-BA	V43I
G.993.1 – Using single-carrier modulation, over POTS	V43P-S
G.993.1 – Using single-carrier modulation, over ISDN-BA	V43I-S
G.993.1 – Using single-carrier modulation, over TCM-ISDN	V43-S
NOTE 1 – To be used where spectrum management forbids use of the downstream carrier set A43, typically where G.992.5 or G.993.2 is deployed from a cabinet. NOTE 2 – To be used where spectrum management forbids use of the downstream carrier set J43, typically where G.992.5 is deployed from a cabinet. NOTE 3 – To be used where spectrum management forbids use of the downstream carrier set B43, typically where G.992.5 is deployed from a cabinet. NOTE 4 – At least one of the tone sets A43 and B43 shall be transmitted, depending on the US0 band supported.	

3) *For support of the G.992.3 Annex C, amend Table 11.0.2 as follows:*

Table 11.0.2/G.994.1 – Standard information field – SPar(1) coding – Octet 3

Bits 8	7	6	5	4	3	2	1	SPar(1)s – Octet 3
x	x	x	x	x	x	x	1	G.992.3 – Annexes A/L
x	x	x	x	x	x	1	x	G.992.3 – Annex B
x	x	x	x	x	1	x	x	G.992.3 – Annex I
x	x	x	x	1	x	x	x	G.992.3 – Annex J
x	x	x	1	x	x	x	x	G.992.4 – Annex A
x	x	1	x	x	x	x	x	G.992.4 – Annex I
x	1	x	x	x	x	x	x	G.992.3 – Annex C~~Reserved for allocation by the ITU-T~~
x	0	0	0	0	0	0	0	No parameters in this octet

4) *For support of G.993.2 and G.992.5 Annex C, amend Table 11.0.4 as follows:*

Table 11.0.4/G.994.1 – Standard information field – SPar(1) coding – Octet 5

Bits 8	7	6	5	4	3	2	1	SPar(1)s – Octet 5
x	x	x	x	x	x	x	1	G.992.5 – Annex M
x	x	x	x	x	x	1	x	G.993.1/ANSI T1.424
x	x	x	x	x	1	x	x	G.993.1 – Annex I/T1E1 TRQ 12
x	x	x	x	1	x	x	x	Variable Silence Period (Note)
x	x	x	1	x	x	x	x	G.992.5 Annex C~~Reserved for allocation by the ITU-T~~
x	x	1	x	x	x	x	x	G.993.2~~Reserved for allocation by the ITU-T~~
x	1	x	x	x	x	x	x	Reserved for allocation by ~~the~~ ITU-T
x	0	0	0	0	0	0	0	No parameters in this octet

5) *For support of G.993.2, add the following new tables in 9.4:*

Table 11.67/G.994.1 – Standard information field – G.993.2 NPar(2) coding – Octet 1

Bits 8	7	6	5	4	3	2	1	G.993.2 NPar(2)s
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	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 11.68/G.994.1 – Standard information field – G.993.2 SPar(2) coding – Octet 1

Bits								**G.993.2 SPar(2)s**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Profiles
x	x	x	x	x	x	1	x	Bands Upstream (Note)
x	x	x	x	x	1	x	x	Bands Downstream (Note)
x	x	x	x	1	x	x	x	RFI bands (Note)
x	x	x	1	x	x	x	x	Initial IDFT size (2N)
x	x	1	x	x	x	x	x	CE Lengths
x	x	0	0	0	0	0	0	No parameters in this octet

NOTE – The length of the corresponding NPar(3) field is variable and is a multiple of 6 octets. The length depends on the total number of bands "j" to be specified. "j" is the band index (starting from 1).

Table 11.68.0.1/G.994.1 – Standard information field – G.993.2 SPar(2) coding – Octet 2

Bits								**G.993.2 SPar(2)s**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Annex A US0
x	x	x	x	x	x	1	x	Annex B US0
x	x	x	x	x	1	x	x	Annex C US0
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 11.68.1/G.994.1 – Standard information field – G.993.2 Profiles NPar(3) coding – Octet 1

Bits								**G.993.2 Profiles – NPar(3)s – Octet 1**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Profile 8a
x	x	x	x	x	x	1	x	Profile 8b
x	x	x	x	x	1	x	x	Profile 8c
x	x	x	x	1	x	x	x	Profile 8d
x	x	x	1	x	x	x	x	Profile 12a
x	x	1	x	x	x	x	x	Profile 12b
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.68.1.1/G.994.1 – Standard information field – G.993.2
Profiles NPar(3) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	G.993.2 Profiles – NPar(3)s – Octet 2
x x	x x x x x 1	Profile 17a
x x	x x x x 1 x	Profile 30a
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 11.68.2.6j-6/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j – 5 (j = 1, 2, 3, 4)

Bits 8 7	6 5 4 3 2 1	G.993.2 Bands Upstream – NPar(3)s – Octet 6j – 5 (j = 1, 2, 3, 4)
x x	0 0 0 0 0 x	End sub-carrier index of band j (bit 13)

Table 11.68.2.6j-5/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j – 4 (j = 1, 2, 3, 4)

Bits 8 7	6 5 4 3 2 1	G.993.2 Bands Upstream – NPar(3)s – Octet 6j – 4 (j = 1, 2, 3, 4)
x x	x x x x x x	End sub-carrier index of band j (bits 12 to 7)

Table 11.68.2.6j-4/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j – 3 (j = 1, 2, 3, 4)

Bits 8 7	6 5 4 3 2 1	G.993.2 Bands Upstream – NPar(3)s – Octet 6j – 3 (j = 1, 2, 3, 4)
x x	x x x x x x	End sub-carrier index of band j (bits 6 to 1)

Table 11.68.2.6j-3/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j – 2 (j = 1, 2, 3, 4)

Bits 8 7	6 5 4 3 2 1	G.993.2 Bands Upstream – NPar(3)s – Octet 6j – 2 (j = 1, 2, 3, 4)
x x	0 0 0 0 0 x	Start sub-carrier index of band j (bit 13)

Table 11.68.2.6j-2/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j – 1 (j = 1, 2, 3, 4)

Bits 8 7	6 5 4 3 2 1	G.993.2 Bands Upstream – NPar(3)s – Octet 6j – 1 (j = 1, 2, 3, 4)
x x	x x x x x x	Start sub-carrier index of band j (bits 12 to 7)

Table 11.68.2.6j-1/G.994.1 – Standard information field – G.993.2
Bands Upstream NPar(3) coding – Octet 6j (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Upstream – NPar(3)s – Octet 6j (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | x x x x x x	Start sub-carrier index of band j (bits 6 to 1)

Table 11.68.3.6j-6/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j – 5 (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j – 5 (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | 0 0 0 0 0 x	End sub-carrier index of band j (bit 13)

Table 11.68.3.6j-5/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j – 4 (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j – 4 (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | x x x x x x	End sub-carrier index of band j (bits 12 to 7)

Table 11.68.3.6j-4/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j – 3 (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j – 3 (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | x x x x x x	End sub-carrier index of band j (bits 6 to 1)

Table 11.68.3.6j-3/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j – 2 (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j – 2 (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | 0 0 0 0 0 x	Start sub-carrier index of band j (bit 13)

Table 11.68.3.6j-2/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j – 1 (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j – 1 (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | x x x x x x	Start sub-carrier index of band j (bits 12 to 7)

Table 11.68.3.6j-1/G.994.1 – Standard information field – G.993.2
Bands Downstream NPar(3) coding – Octet 6j (j = 1, 2, 3, 4)

Bits	**G.993.2 Bands Downstream – NPar(3)s – Octet 6j (j = 1, 2, 3, 4)**
8 7 | **6 5 4 3 2 1**	
x x | x x x x x x	Start sub-carrier index of band j (bits 6 to 1)

Table 11.68.4.6j-6/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j – 5 (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j – 5 (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	0	0	0	0	0	x	End sub-carrier index of band j (bit 13)

Table 11.68.4.6j-5/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j – 4 (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j – 4 (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	End sub-carrier index of band j (bits 12 to 7)

Table 11.68.4.6j-4/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j – 3 (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j – 3 (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	End sub-carrier index of band j (bits 6 to 1)

Table 11.68.4.6j-3/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j – 2 (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j – 2 (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	0	0	0	0	0	x	Start sub-carrier index of band j (bit 13)

Table 11.68.4.6j-2/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j – 1 (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j – 1 (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	Start sub-carrier index of band j (bits 12 to 7)

Table 11.68.4.6j-1/G.994.1 – Standard information field – G.993.2
RFI bands NPar(3) coding – Octet 6j (j = 1 to 16)

Bits								G.993.2 RFI bands – NPar(3)s – Octet 6j (j = 1 to 16)
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	Start sub-carrier index of band j (bits 6 to 1)

Table 11.68.5/G.994.1 – Standard information field – G.993.2
Initial IDFT size NPar(3) coding

Bits 8	7	6	5	4	3	2	1	G.993.2 Initial IDFT size NPar(3)s
x	x			x	x	x	x	IDFT size $2N = 2^n$ (n=6 to 13, bits 4 to 1)
x	x		1					Reserved for allocation by ITU-T
x	x	1						Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.68.6/G.994.1 – Standard information field – G.993.2
CE Length NPar(3) coding – Octet 1

Bits 8	7	6	5	4	3	2	1	G.993.2 CE Length – NPar(3)s – Octet 1
x	x	x	x	x	x	x	1	Length of CE (m = 2)
x	x	x	x	x	x	1	x	Length of CE (m = 3)
x	x	x	x	x	1	x	x	Length of CE (m = 4)
x	x	x	x	1	x	x	x	Length of CE (m = 5)
x	x	x	1	x	x	x	x	Length of CE (m = 6)
x	x	1	x	x	x	x	x	Length of CE (m = 7)
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.68.6.1/G.994.1 – Standard information field – G.993.2
CE Length NPar(3) coding – Octet 2

Bits 8	7	6	5	4	3	2	1	G.993.2 CE Length – NPar(3)s – Octet 2
x	x	x	x	x	x	x	1	Length of CE (m = 8)
x	x	x	x	x	x	1	x	Length of CE (m = 9)
x	x	x	x	x	1	x	x	Length of CE (m = 10)
x	x	x	x	1	x	x	x	Length of CE (m = 11)
x	x	x	1	x	x	x	x	Length of CE (m = 12)
x	x	1	x	x	x	x	x	Length of CE (m = 13)
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.68.6.2/G.994.1 – Standard information field – G.993.2
CE Length NPar(3) coding – Octet 3

Bits 8	7	6	5	4	3	2	1	G.993.2 CE Length – NPar(3)s – Octet 3
x	x	x	x	x	x	x	1	Length of CE (m = 14)
x	x	x	x	x	x	1	x	Length of CE (m = 15)
x	x	x	x	x	1	x	x	Length of CE (m = 16)
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 11.68.7/G.994.1 – Standard information field – G.993.2
Annex A US0 NPar(3) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	G.993.2 Annex A US0 – NPar(3)s – Octet 1
x x	x x x x x 1	EU-32
x x	x x x x 1 x	EU-36
x x	x x x 1 x x	EU-40
x x	x x 1 x x x	EU-44
x x	x 1 x x x x	EU-48
x x	1 x x x x x	EU-52
x x	0 0 0 0 0 0	No parameters in this octet

Table 11.68.7.1/G.994.1 – Standard information field – G.993.2
Annex A US0 NPar(3) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	G.993.2 Annex A US0 – NPar(3)s – Octet 2
x x	x x x x x 1	EU-56
x x	x x x x 1 x	EU-60
x x	x x x 1 x x	EU-64
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 11.68.7.2/G.994.1 – Standard information field – G.993.2
Annex A US0 NPar(3) coding – Octet 3

Bits 8 7	6 5 4 3 2 1	G.993.2 Annex A US0 – NPar(3)s – Octet 3
x x	x x x x x 1	ADLU-32
x x	x x x x 1 x	ADLU-36
x x	x x x 1 x x	ADLU-40
x x	x x 1 x x x	ADLU-44
x x	x 1 x x x x	ADLU-48
x x	1 x x x x x	ADLU-52
x x	0 0 0 0 0 0	No parameters in this octet

Table 11.68.7.3/G.994.1 – Standard information field – G.993.2
Annex A US0 NPar(3) coding – Octet 4

8	7	6	5	4	3	2	1	G.993.2 Annex A US0 – NPar(3)s – Octet 4
x	x	x	x	x	x	x	1	ADLU-56
x	x	x	x	x	x	1	x	ADLU-60
x	x	x	x	x	1	x	x	ADLU-64
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 11.68.7.4/G.994.1 – Standard information field – G.993.2
Annex A US0 NPar(3) coding – Octet 5

8	7	6	5	4	3	2	1	G.993.2 Annex A US0 – NPar(3)s – Octet 5
x	x	x	x	x	x	x	1	US0 supported in profile 12b
x	x	x	x	x	x	1	x	US0 supported in profile 17a
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 11.68.8/G.994.1 – Standard information field – G.993.2
Annex B US0 NPar(3) coding – Octet 1

8	7	6	5	4	3	2	1	G.993.2 Annex B US0 – NPar(3)s – Octet 1
x	x	x	x	x	x	x	1	25-138 kHz (A): B7-1, B7-5, B8-1, B8-4
x	x	x	x	x	x	1	x	25-276 kHz (M): B7-2, B7-3, B7-4, B7-6, B8-5
x	x	x	x	x	1	x	x	120-276 kHz (B): B8-2, B8-6
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 11.68.8.2/G.994.1 – Standard information field – G.993.2
Annex B US0 NPar(3) coding – Octet 2

Bits								G.993.2 Annex B US0 – NPar(3)s – Octet 2
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	US0 supported in profile 12b
x	x	x	x	x	x	1	x	US0 supported in profile 17a
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 11.68.9/G.994.1 – Standard information field – G.993.2
Annex C US0 NPar(3) coding – Octet 1

Bits								G.993.2 Annex C US0 – NPar(3)s – Octet 1
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Reserved for allocation by ITU-T
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	x	0	0	0	0	0	0	No parameters in this octet

6)   *For support of the new PTM TPS-TC (based on 64/65 octet encapsulation), add new tables and revise tables in 9.4 as follows:*

Table 11.16.5.3/G.994.1 – Standard information field – G.991.2 Annex A
TPS-TC parameters – NPar(3) coding – Octet 4

Bits								G.991.2 Annex A TPS-TC parameter NPar(3)s – Octet 4
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	PTM (HDLC-based)
x	x	x	x	x	x	1	x	STM with DSC
x	x	x	x	x	1	x	x	LAPV5 Enveloped POTS or ISDN
x	x	x	x	1	x	x	x	TU-12
x	x	x	1	x	x	x	x	PTM (64/65-octet-based)~~Reserved for allocation by the ITU-T~~
x	x	1	x	x	x	x	x	Reserved for allocation by ~~the~~ ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.16.5.4/G.994.1 – Standard information field – G.991.2 Annex A TPS-TC parameters – NPar(3) coding – Octet 5

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex A TPS-TC parameter NPar(3)s – Octet 5
x x	x x x x x 1	Pre-emption (64/65B-based PTM)
x x	x x x x 1 x	Short Packets (64/65-octet-based PTM)
x x	x x x 1 x x	CRC Type (64/65-octet-based PTM)
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 11.16.8.2/G.994.1 – Standard information field – G.991.2 Annex A Dual Mode TPS-TC parameters – NPar(3) coding – Octet 3

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex A Dual Mode TPS-TC parameter – Npar(3)s – Octet 3
x x	x x x x x 1	Type 1 – TPS-TC$_b$: Clear Channel
x x	x x x x 1 x	Type 1 – TPS-TC$_b$: Clear Channel Byte-Oriented
x x	x x x 1 x x	Type 1 – TPS-TC$_b$: Unaligned DS1
x x	x x 1 x x x	Type 1 – TPS-TC$_b$: Aligned DS1/Fractional DS1
x x	x 1 x x x x	Type 1 – TPS-TC$_b$: ATM
x x	1 x x x x x	Type 1 – TPS-TC$_b$: PTM (HDLC-based)
x x	0 0 0 0 0 0	No parameters in this octet

Table 11.16.8.4/G.994.1 – Standard information field – G.991.2 Annex A Dual Mode TPS-TC parameters – NPar(3) coding – Octet 5

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex A Dual Mode TPS-TC parameter – Npar(3)s – Octet 5
x x	x x x x x 1	Type 2 – TPS-TC$_a$: Unaligned DS1
x x	x x x x 1 x	Type 2 – TPS-TC$_a$: Aligned DS1/Fractional DS1
x x	x x x 1 x x	Type 2 – TPS-TC$_b$: ATM
x x	x x 1 x x x	Type 2 – TPS-TC$_b$: PTM (HDLC-based)
x x	x 1 x x x x	Type 2 – TPS-TC$_b$: PTM (64/65-octet-based)~~Reserved for allocation by the ITU-T~~
x x	1 x x x x x	Reserved for allocation by the ITU-T
x x	0 0 0 0 0 0	No parameters in this octet

**Table 11.16.8.6/G.994.1 – Standard information field – G.991.2 Annex A
Dual Mode TPS-TC parameters – NPar(3) coding – Octet 7**

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex A Dual Mode TPS-TC parameter Npar(3)s – Octet 7
x x	x x x x x 1	Type 1 – TPS-TC$_a$: ISDN BRA
x x	x x x x 1 x	Type 1 – TPS-TC$_a$: STM with DSC
x x	x x x 1 x x	Type 1 – TPS-TC$_a$: LAPV5 Enveloped POTS or ISDN
x x	x x 1 x x x	Type 1 – TPS-TC$_a$: TU-12
x x	x 1 x x x x	<u>Type 1 – TPS-TC$_b$: PTM (64/65-octet-based)</u>~~Reserved for allocation by the ITU-T~~
x x	1 x x x x x	Reserved for allocation by the ITU-T
x x	0 0 0 0 0 0	No parameters in this octet

**<u>Table 11.16.8.8/G.994.1 – Standard information field – G.991.2 Annex A
Dual Mode TPS-TC parameters – NPar(3) coding – Octet 9</u>**

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex A Dual Mode TPS-TC parameter NPar(3)s – Octet 9
x x	x x x x x 1	<u>Pre-emption (64/65-octet-based PTM)</u>
x x	x x x x 1 x	<u>Short Packets (64/65-octet-based PTM)</u>
x x	x x x 1 x x	<u>CRC Type (64/65-octet-based PTM)</u>
x x	x x 1 x x x	<u>Reserved for allocation by ITU-T</u>
x x	x 1 x x x x	<u>Reserved for allocation by ITU-T</u>
x x	1 x x x x x	<u>Reserved for allocation by ITU-T</u>
x x	0 0 0 0 0 0	<u>No parameters in this octet</u>

**Table 11.18.5.2/G.994.1 – Standard information field – G.991.2 Annex B
TPS-TC parameters – NPar(3) coding – Octet 3**

Bits 8 7	6 5 4 3 2 1	G.991.2 Annex B TPS-TC parameter NPar(3)s – Octet 3
x x	x x x x x 1	Synchronous ISDN-BRA
x x	x x x x 1 x	PTM <u>(HDLC-based)</u>
x x	x x x 1 x x	STM with DSC
x x	x x 1 x x x	LAPV5 Enveloped POTS or ISDN
x x	x 1 x x x x	TU-12
x x	1 x x x x x	<u>PTM (64/65-octet-based)</u>~~Reserved for allocation by the ITU-T~~
x x	0 0 0 0 0 0	No parameters in this octet

Table 11.18.5.4/G.994.1 – Standard information field – G.991.2 Annex B TPS-TC parameters – NPar(3) coding – Octet 5

Bits								G.991.2 Annex B TPS-TC parameter NPar(3)s – Octet 5
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Pre-emption (64/65-octet-based PTM)
x	x	x	x	x	x	1	x	Short Packets (64/65-octet-based PTM)
x	x	x	x	x	1	x	x	CRC Type (64/65-octet-based PTM)
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 11.18.8.4/G.994.1 – Standard information field – G.991.2 Annex B Dual Mode TPS-TC parameters – NPar(3) coding – Octet 5

Bits								G.991.2 Annex B Dual Mode TPS-TC parameter NPar(3)s – Octet 5
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Type 2 – TPS-TC$_a$: Unaligned D2048U
x	x	x	x	x	x	1	x	Type 2 – TPS-TC$_a$: Unaligned D2048S
x	x	x	x	x	1	x	x	Type 2 – TPS-TC$_a$: Aligned D2048S/Fractional D2048S
x	x	x	x	1	x	x	x	Type 2 – TPS-TC$_a$: Synchronous ISDN BRA
x	x	x	1	x	x	x	x	Type 2 – TPS-TC$_b$: ATM
x	x	1	x	x	x	x	x	Type 2 – TPS-TC$_b$: PTM (HDLC-based)
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.18.8.6/G.994.1 – Standard information field – G.991.2 Annex B Dual Mode TPS-TC parameters – NPar(3) coding – Octet 7

Bits								G.991.2 Annex B Dual Mode TPS-TC parameter NPar(3)s – Octet 7
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Type 1 – TPS-TC$_b$: PTM (HDLC-based)
x	x	x	x	x	x	1	x	Type 1 – TPS-TC$_a$: STM with DSC
x	x	x	x	x	1	x	x	Type 1 – TPS-TC$_a$: LAPV5 Enveloped POTS or ISDN
x	x	x	x	1	x	x	x	Type 1 – TPS-TC$_a$: TU-12
x	x	x	1	x	x	x	x	Type 1 – TPS-TC$_b$: PTM (64/65-octet-based)~~Reserved for allocation by the ITU-T~~
x	x	1	x	x	x	x	x	Type 2 – TPS-TC$_b$: PTM (64/65-octet-based)~~Reserved for allocation by the ITU-T~~
x	x	0	0	0	0	0	0	No parameters in this octet

**Table 11.18.8.8/G.994.1 – Standard information field – G.991.2 Annex B
Dual Mode TPS-TC parameters – NPar(3) coding – Octet 9**

Bits								**G.991.2 Annex B Dual Mode TPS-TC parameter NPar(3)s – Octet 9**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Pre-emption (64/65-octet-based PTM)
x	x	x	x	x	x	1	x	Short Packets (64/65-octet-based PTM)
x	x	x	x	x	1	x	x	CRC Type (64/65-octet-based PTM)
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

7) *For support of the optional values of INP_min in G.992.3 (The changes/additions also apply to G.992.5 by reference in G.994.1), modify or add the following tables in 9.4:*

**Table 11.30.13.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream STM TPS-TC #0 NPar(3) coding – Octet 9**

Bits								**G.992.3 Annex A downstream STM 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~~

**Table 11.30.14.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream STM TPS-TC #0 NPar(3) coding – Octet 9**

Bits								**G.992.3 Annex A upstream STM 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~~

**Table 11.30.15.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream ATM TPS-TC #0 NPar(3) coding – Octet 9**

Bits								**G.992.3 Annex A 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~~

**Table 11.30.16.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream ATM TPS-TC #0 NPar(3) coding – Octet 9**

Bits								**G.992.3 Annex A upstream 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~~

Table 11.30.17.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #0 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A downstream PTM TPS-TC #0 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.18.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream PTM TPS-TC #0 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A upstream PTM TPS-TC #0 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.21.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream STM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A downstream STM TPS-TC #1 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.22.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream STM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A upstream STM TPS-TC #1 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.23.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A downstream ATM TPS-TC #1 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.24.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream ATM TPS-TC #1 NPar(3) coding – Octet 9

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex A upstream ATM TPS-TC #1 NPar(3)s – Octet 9
x x	x̲ x̲ x̲ x̲ x x	INP_min (Minimum Impulse Noise Protection) (bits ~~4 &~~8̲ ̲t̲o̲ 3)
~~⁂ ⁂~~	~~⁂ ⁂ ⁂ ⁂~~	~~Reserved for allocation by the ITU-T~~

Table 11.30.25.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #1 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A downstream PTM TPS-TC #1 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 11.30.26.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream PTM TPS-TC #1 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A upstream PTM TPS-TC #1 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 11.30.29.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream STM TPS-TC #2 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A downstream STM TPS-TC #2 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 11.30.30.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream STM TPS-TC #2 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A upstream STM TPS-TC #2 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 11.30.31.8/G.994.1 – Standard information field – G.992.3 Annex A Downstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A downstream ATM TPS-TC #2 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 11.30.32.8/G.994.1 – Standard information field – G.992.3 Annex A Upstream ATM TPS-TC #2 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A upstream ATM TPS-TC #2 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 11.30.33.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream PTM TPS-TC #2 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A downstream PTM 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)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

**Table 11.30.34.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream PTM TPS-TC #2 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A upstream PTM 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)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

**Table 11.30.37.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream STM TPS-TC #3 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A downstream STM TPS-TC #3 NPar(3)s – Octet 9
x x x x x x x x	INP_min (Minimum Impulse Noise Protection) (bits 4 &8 to 3)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

**Table 11.30.38.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream STM TPS-TC #3 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A upstream STM TPS-TC #3 NPar(3)s – Octet 9
x x x x x x x x	INP_min (Minimum Impulse Noise Protection) (bits 4 &8 to 3)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

**Table 11.30.39.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream ATM TPS-TC #3 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A downstream ATM TPS-TC #3 NPar(3)s – Octet 9
x x x x x x x x	INP_min (Minimum Impulse Noise Protection) (bits 4 &8 to 3)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

**Table 11.30.40.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream ATM TPS-TC #3 NPar(3) coding – Octet 9**

Bits 8 7 6 5 4 3 2 1	G.992.3 Annex A upstream ATM TPS-TC #3 NPar(3)s – Octet 9
x x x x x x x x	INP_min (Minimum Impulse Noise Protection) (bits 4 &8 to 3)
✱ ✱ ✱ ✱ ✱ ✱	Reserved for allocation by the ITU-T

Table 11.30.41.8/G.994.1 – Standard information field – G.992.3 Annex A
Downstream PTM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A downstream PTM 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)
~~✶~~	~~✶~~	~~✶~~	~~✶~~	~~✶~~	~~✶~~			~~Reserved for allocation by the ITU-T~~

Table 11.30.42.8/G.994.1 – Standard information field – G.992.3 Annex A
Upstream PTM TPS-TC #3 NPar(3) coding – Octet 9

Bits								G.992.3 Annex A upstream PTM 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)
~~✶~~	~~✶~~	~~✶~~	~~✶~~	~~✶~~	~~✶~~			~~Reserved for allocation by the ITU-T~~

8)   *To support the Submode PSD shape for G.992.5 Annex J and G.992.5 Annex M, add the following new tables in 9.4:*

Table 11.52.0.1/G.994.1 – Standard information field – G.992.5 Annex J
SPar(2) coding – Octet 2

Bits								G.992.5 Annex J SPar(2)s – Octet 2
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	Downstream overhead data rate
x	x	x	x	x	x	1	x	Upstream overhead data rate
x	x	x	x	x	1	x	x	Maximum number of downstream TPS-TC functions of each type
x	x	x	x	1	x	x	x	Maximum number of upstream TPS-TC functions of each type
x	x	x	1	x	x	x	x	Submode PSD shape
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 11.52.11/G.994.1 – Standard information field – G.992.5 Annex J
Submode PSD shape NPar(3) coding – Octet 1

Bits								G.992.5 Annex J Submode PSD shape NPar(3)s – Octet 1
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	Tone index n (bits 6 to 1, coded as n – 1)

Table 11.52.11.1/G.994.1 – Standard information field – G.992.5 Annex J
Submode PSD shape NPar(3) coding – Octet 2

Bits								G.992.5 Annex J Submode PSD shape NPar(3)s – Octet 2
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	x	PSD at this Tone index n (bits 6 to 1, coded as n)

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Table 11.52.11.2*(j – 1)/G.994.1 – Standard information field – G.992.5 Annex J Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 1

Bits 8 7 6 5 4 3 2 1	**G.992.5 Annex J Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 1**
x x x x x x x x	Tone index n (bits 6 to 1, coded as n – 1)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.	

Table 11.52.11.2*(j – 1) + 1/G.994.1 – Standard information field – G.992.5 Annex J Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 2

Bits 8 7 6 5 4 3 2 1	**G.992.5 Annex J Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 2**
x x x x x x x x	PSD at this Tone index n (bits 6 to 1, coded as n)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.	

Table 11.58.0.1/G.994.1 – Standard information field – G.992.5 Annex M SPar(2) coding – Octet 2

Bits 8 7 6 5 4 3 2 1	**G.992.5 Annex M SPar(2)s – Octet 2**
x x x x x x x 1	Downstream overhead data rate
x x x x x x 1 x	Upstream overhead data rate
x x x x x 1 x x	Maximum number of downstream TPS-TC functions of each type
x x x x 1 x x x	Maximum number of upstream TPS-TC functions of each type
x x x 1 x x x x	Submode PSD shape
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 11.58.11/G.994.1 – Standard information field – G.992.5 Annex M Submode PSD shape NPar(3) coding – Octet 1

Bits 8 7 6 5 4 3 2 1	**G.992.5 Annex M Submode PSD shape NPar(3)s – Octet 1**
x x x x x x x x	Tone index n (bits 6 to 1, coded as n – 1)

Table 11.58.11.1/G.994.1 – Standard information field – G.992.5 Annex M Submode PSD shape NPar(3) coding – Octet 2

Bits 8 7 6 5 4 3 2 1	**G.992.5 Annex M Submode PSD shape NPar(3)s – Octet 2**
x x x x x x x x	PSD at this Tone index n (bits 6 to 1, coded as n)

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Table 11.58.11.2*(j – 1)/G.994.1 – Standard information field – G.992.5 Annex M Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 1

Bits 8 7 6 5 4 3 2 1	G.992.5 Annex M Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 1
x x x x x x x x	Tone index n (bits 6 to 1, coded as n – 1)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.	

Table 11.58.11.2*(j – 1) + 1/G.994.1 – Standard information field – G.992.5 Annex M Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 2

Bits 8 7 6 5 4 3 2 1	G.992.5 Annex M Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 2
x x x x x x x x	PSD at this Tone index n (bits 6 to 1, coded as n)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.	

9)	*For support of the optional values of S&D in G.992.3 (The changes/additions also apply to G.992.5 by reference in G.994.1), add the following new tables in 9.4:*

Table 11.30.19.2/G.994.1 – Standard information field – G.992.3 Annex A Downstream PMS-TC latency path #0 NPar(3) coding – Octet 3

Bits 8 7 6 5 4 3 2 1	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 11.30.19.3/G.994.1 – Standard information field – G.992.3 Annex A Downstream PMS-TC latency path #0 NPar(3) coding – Octet 4

Bits 8 7 6 5 4 3 2 1	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 11.30.19.4/G.994.1 – Standard information field – G.992.3 Annex A Downstream PMS-TC latency path #0 NPar(3) coding – Octet 5

Bits								**Downstream PMS-TC latency path #0 NPar(3)s – Octet 5**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
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 11.30.19.5/G.994.1 – Standard information field – G.992.3 Annex A Downstream PMS-TC latency path #0 NPar(3) coding – Octet 6

Bits								**Downstream PMS-TC latency path #0 NPar(3)s – Octet 6**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
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

10)   *For support of the PTM 64/65 in G.992.3 (The changes/additions also apply to G.992.5 by reference in G.994.1), add the following new tables to 9.4:*

Table 11.30.17.9/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #0 NPar(3) coding – Octet 10

Bits								**G.992.3 Annex A downstream PTM TPS-TC #0 NPar(3)s – Octet 10**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.18.9/G.994.1 – Standard information field – G.992.3 Annex A Upstream PTM TPS-TC #0 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex A upstream PTM TPS-TC #0 NPar(3)s – Octet 10
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.25.9/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #1 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex A downstream PTM TPS-TC #1 NPar(3)s – Octet 10
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.26.9/G.994.1 – Standard information field – G.992.3 Annex A Upstream PTM TPS-TC #1 NPar(3) coding – Octet 10

Bits 8	7	6	5	4	3	2	1	G.992.3 Annex A upstream PTM TPS-TC #1 NPar(3)s – Octet 10
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.33.9/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #2 NPar(3) coding – Octet 10

Bits								**G.992.3 Annex A downstream PTM TPS-TC #2 NPar(3)s – Octet 10**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.34.9/G.994.1 – Standard information field – G.992.3 Annex A Upstream PTM TPS-TC #2 NPar(3) coding – Octet 10

Bits								**G.992.3 Annex A upstream PTM TPS-TC #2 NPar(3)s – Octet 10**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.41.9/G.994.1 – Standard information field – G.992.3 Annex A Downstream PTM TPS-TC #3 NPar(3) coding – Octet 10

Bits								**G.992.3 Annex A downstream PTM TPS-TC #3 NPar(3)s – Octet 10**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.30.42.9/G.994.1 – Standard information field – G.992.3 Annex A
Upstream PTM TPS-TC #3 NPar(3) coding – Octet 10

			Bits					**G.992.3 Annex A upstream PTM TPS-TC #3 NPar(3)s – Octet 10**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	HDLC encapsulation
x	x	x	x	x	x	1	x	Reserved by ITU-T
x	x	x	x	x	1	x	x	Reserved by ITU-T
x	x	x	x	1	x	x	x	64/65-octet encapsulation with short packets
x	x	x	1	x	x	x	x	64/65-octet encapsulation with Pre-emption
x	x	1	x	x	x	x	x	64/65-octet encapsulation supported
x	x	0	0	0	0	0	0	No parameters in this octet

11)   *For support of the additional G.992.5 Annex A code point on Time Domain Filtering, change the following table in 9.4:*

Table 11.43/G.994.1 – Standard information field – G.992.5 Annex A NPar(2) coding

			Bits					**G.992.5 Annex A NPar(2)s**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	NTR
x	x	x	x	x	x	1	x	Short initialization
x	x	x	x	x	1	x	x	Diagnostics mode
x	x	x	x	1	x	x	x	Reserved for allocation by the ITU-T
x	x	x	1	x	x	x	x	Reserved for allocation by the ITU-T
x	x	1	x	x	x	x	x	Downstream Spectrum Shaping using Time Domain Filtering only~~Reserved for allocation by the ITU-T~~
x	x	0	0	0	0	0	0	No parameters in this octet

12)   *For support of the G.992.5 Annex C, add the following table and text to 9.4:*

Table 11.65/G.994.1 – Standard information field – G.992.5 Annex C NPar(2) coding

			Bits					**G.992.5 Annex C NPar(2)s**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
x	x	x	x	x	x	x	1	NTR
x	x	x	x	x	x	1	x	Reserved for allocation by ITU-T
x	x	x	x	x	1	x	x	Diagnostics mode
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

The SPar(2) and NPar(3) parameters for G.992.5 Annex C are identical to those of G.992.3 Annex C. Therefore, Tables 11.42 through 11.42.56.3/G.994.1 shall be used for G.992.5 Annex C. Transmission of SPar(2) and NPar(3) octets for G.992.5 Annex C shall follow transmission of Table 11.65/G.994.1. Effectively, Tables 11.42 through 11.42.56.3/G.994.1 become renumbered to Tables 11.66 through 11.66.56.3 for G.992.5 Annex C.

13) *To correct an error in G.994.1 Amendment 3 dealing with the code point assignment for the Submode PSD shape for G.992.3 Annex J and G.992.3 Annex M, revise the following tables in 9.4:*

Table 11.36.0.1/G.994.1 – Standard information field – G.992.3 Annex J SPar(2) coding – Octet 2

Bits								G.992.3 Annex J SPar(2)s – Octet 2
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Downstream overhead data rate~~Submode PSD shape~~
x	x	x	x	x	x	1	x	Upstream overhead data rate~~Reserved for allocation by the ITU-T~~
x	x	x	x	x	1	x	x	Maximum number of downstream TPS-TC functions of each type~~Reserved for allocation by the ITU-T~~
x	x	x	x	1	x	x	x	Maximum number of upstream TPS-TC functions of each type~~Reserved for allocation by the ITU-T~~
x	x	x	1	x	x	x	x	Submode PSD shape~~Reserved for allocation by the ITU-T~~
x	x	1	x	x	x	x	x	Reserved for allocation by the ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

Table 11.36.~~7~~11/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 1

Bits								G.992.3 Annex J Submode PSD shape NPar(3)s – Octet 1
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Tone index n (bits 6 to 1, coded as n – 1)

Table 11.36.~~7~~11.1/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 2

Bits								G.992.3 Annex J Submode PSD shape NPar(3)s – Octet 2
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	PSD at this Tone index n (bits 6 to 1, coded as n)

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Table 11.36.~~7~~11.2*(j – 1)/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 1

Bits								G.992.3 Annex J Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 1
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Tone index n (bits 6 to 1, coded as n – 1)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.								

Table 11.36.~~7~~11.2*(j – 1) + 1/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 2

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex J Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 2
x x	x x x x x x	PSD at this Tone index n (bits 6 to 1, coded as n)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.		

Table 11.50.0.1/G.994.1 – Standard information field – G.992.3 Annex M SPar(2) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex M SPar(2)s – Octet 2
x x	x x x x x 1	Downstream overhead data rate~~Submode PSD shape~~
x x	x x x x 1 x	Upstream overhead data rate~~Reserved for allocation by the ITU-T~~
x x	x x x 1 x x	Maximum number of downstream TPS-TC functions of each type~~Reserved for allocation by the ITU-T~~
x x	x x 1 x x x	Maximum number of upstream TPS-TC functions of each type~~Reserved for allocation by the ITU-T~~
x x	x 1 x x x x	Submode PSD shape~~Reserved for allocation by the ITU-T~~
x x	1 x x x x x	Reserved for allocation by the ITU-T
x x	0 0 0 0 0 0	No parameters in this octet

Table 11.50.~~7~~11/G.994.1 – Standard information field – G.992.3 Annex M Submode PSD shape NPar(3) coding – Octet 1

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 1
x x	x x x x x x	Tone index n (bits 6 to 1, coded as n – 1)

Table 11.50.~~7~~11.1/G.994.1 – Standard information field – G.992.3 Annex M Submode PSD shape NPar(3) coding – Octet 2

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 2
x x	x x x x x x	PSD at this Tone index n (bits 6 to 1, coded as n)

Table 11.50.~~7~~11.2*(j – 1)/G.994.1 – Standard information field – G.992.3 Annex M Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 1

Bits 8 7	6 5 4 3 2 1	G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 1
x x	x x x x x x	Tone index n (bits 6 to 1, coded as n – 1)
NOTE – j is the number of subcarrier indices used to specify the spectral shape.		

Table 11.50.7̶11.2*(j – 1) + 1/G.994.1 – Standard information field – G.992.3 Annex M Submode PSD shape NPar(3) coding – Octet 2*(j – 1) + 2

		Bits						G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 2*(j – 1) + 2
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	PSD at this Tone index n (bits 6 to 1, coded as n)

NOTE – j is the number of subcarrier indices used to specify the spectral shape.

14)   *Add code points to support relative power level for tone set B43c, and V43 as in the following new tables:*

Table 9.0.3/G.994.1 – 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)
x	x	x	x	x	x	1	x	Relative power level/carrier for downstream carrier set B43c (Note)
x	x	x	x	x	1	x	x	Relative power level/carrier for upstream carrier set V43 (Note)
x	x	x	x	1	x	x	x	Relative power level/carrier for downstream carrier set V43 (Note)
x	x	x	1	x	x	x	x	Reserved for allocation by the ITU-T
x	x	1	x	x	x	x	x	Reserved for allocation by the ITU-T
x	1	x	x	x	x	x	x	Reserved for allocation by the ITU-T
x	0	0	0	0	0	0	0	No parameters in this octet

NOTE – The relative 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.

Table 9.43/G.994.1 – Identification field – Relative power level/carrier for upstream carrier set B43c – NPar(2) coding

		Bits						Relative power level/carrier for upstream 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 upstream carrier set B43c (Note).

NOTE – All carriers in the carrier set shall be transmitted at the same power level.

Table 9.45/G.994.1 – 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 – All carriers in the carrier set shall be transmitted at the same power level.

Table 9.47/G.994.1 – Identification field – Relative power level/carrier
for upstream carrier set V43 – NPar(2) coding – Octet 1

Bits								**Relative power level/carrier for upstream carrier set V43 Npar(2)s – Octet 1**
8	**7**	**6**	**5**	**4**	**3**	**2**	**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 upstream carrier set V43 (Note) – (bit 7)
NOTE – All carriers in the carrier set shall be transmitted at the same power level.								
Valid values are 0 to 45.5 dB.								

Table 9.47.1/G.994.1 – Identification field – Relative power level/carrier
for upstream carrier set V43 – NPar(2) coding – Octet 2

Bits								**Relative power level/carrier for upstream carrier set V43 Npar(2)s – Octet 2**
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 (in steps of 0.5 dB) for upstream carrier set V43 (Note) – (bits 6-1)
NOTE – All carriers in the carrier set shall be transmitted at the same power level.								
Valid values are 0 to 45.5 dB.								

Table 9.49/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 1

Bits								**Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 1**
8	**7**	**6**	**5**	**4**	**3**	**2**	**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 the different power level.								
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.								

Table 9.49.1/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 2

Bits								**Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 2**
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 (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 the different power level.								
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.								

Table 9.49.2/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 3

Bits								**Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 3**
8	**7**	**6**	**5**	**4**	**3**	**2**	**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 383 of set V43 (Note) – (bit 7)
NOTE – Carriers in the carrier set may be transmitted at the different power level.								
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.								

**Table 9.49.3/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 4**

Bits		Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 4
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 (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 the different power level.		
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.		

**Table 9.49.4/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 5**

Bits		Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 5
8 7 | **6 5 4 3 2 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 511 of set V43 (Note) – (bit 7)
NOTE – Carriers in the carrier set may be transmitted at the different power level.		
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.		

**Table 9.49.5/G.994.1 – Identification field – Relative power level/carrier
for downstream carrier set V43 – NPar(2) coding – Octet 6**

Bits		Relative power level/carrier for downstream carrier set V43 Npar(2)s – Octet 6
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 (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 the different power level.		
Valid values are 0 to 58.5 dB, and 59 to 63.5 dB as special values corresponding to tone not transmitted.		

15)   *For extension of the existing MIB element GHS_A43c_MAXPSDds to include tone set
B43c, replace 13.1.2 with the following:*

13.1.2   GHS A43c & B43c Tone 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 tone of the A43c and B43c tone set in the downstream direction. The PSD level
(in dBm/Hz) is calculated as the tone 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 tone set.

If the tone 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 9.17 shall comply with
the following constraint:

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

If the tone set is not transmitted by the HSTU-C, the NPar(2) shall not be included.

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

If the tone 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:

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

If the tone set is not transmitted by the HSTU-C, the NPar(2) shall not be included.

16)   *Add a new clause 13.1.4 for MIB elements to control relative power level/carrier for tone set V43:*

13.1.4 GHS V43 Tone 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 tone of the V43 tone set in the downstream direction. The PSD level (in dBm/Hz) is calculated as the tone 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.

If at least one carrier of the tone 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 9.47.

If the tone set is not transmitted by the HSTU-C, the NPar(2) shall not be included.

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