



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.994.1

Amendment 3

(01/2005)

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 3

CAUTION !

PREPUBLISHED RECOMMENDATION

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Amendment 3 to ITU-T Recommendation G.994.1

Handshake procedures for digital subscriber line (DSL) transceivers

Summary

This amendment adds the following functionality:

- Parameters to support the revision of G.991.2
 - Annex A PBO (power back-off)
 - new Annex G
- Parameters to support the revision to G.992.3 Annex J and M for upstream spectrum shaping
- Parameters to support G.992.3 Annex CB

1. To support G.991.2 Annex A/B power back-off, modify the following tables as shown with revision marks:

**Table 11.16.1/G.994.1 – Standard information field – G.991.2 Annex A
Downstream training parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex A downstream training NPar(3)s – Octet 1
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u>
								Downstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.16.2/G.994.1 – Standard information field – G.991.2 Annex A
Upstream training parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex A upstream training NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u>
								Upstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.16.3/G.994.1 – Standard information field – G.991.2 Annex A
Downstream PMMS parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex A downstream PMMS NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u>
								Downstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.16.4/G.994.1 – Standard information field – G.991.2 Annex A
Upstream PMMS parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex A upstream PMMS NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u>
								Upstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.18.1/G.994.1 – Standard information field – G.991.2 Annex B
Downstream training parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex B downstream training NPar(3)s – Octet 1
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u> Downstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.18.2/G.994.1 – Standard information field – G.991.2 Annex B
Upstream training parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex B upstream training NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u> Upstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.18.3/G.994.1 – Standard information field – G.991.2 Annex B
Downstream PMMS parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex B downstream PMMS NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u> Downstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

**Table 11.18.4/G.994.1 – Standard information field – G.991.2 Annex B
Upstream PMMS parameters - NPar(3) coding – Octet 1**

Bits								G.991.2 Annex B upstream PMMS NPar(3)s
8	7	6	5	4	3	2	1	
x	x	0	x	x	x	x	x	<u>PBO-1</u> Upstream PBO (dB) (bits 5-1 x 1.0 dB)
x	x	1	x	x	x	x	x	Reserved for allocation by ITU-T

2. To support G.991.2 Annex A/B power back-off, add the following new tables:

**Table 11.16.1.10/G.994.1 – Standard information field – G.991.2 Annex A
Downstream training parameters - NPar(3) coding – Octet 11**

Bits								<u>G.991.2 Annex A downstream training NPar(3)s – Octet 11</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	PBO-2 (4-wire/m-pair)
								Downstream PBO (dB) (bits 5-1 x 1.0 dB)
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Reserved for allocation by ITU-T

**Table 11.16.2.10/G.994.1 – Standard information field – G.991.2 Annex A
Upstream training parameters - NPar(3) coding – Octet 11**

Bits								<u>G.991.2 Annex A upstream training NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	PBO-2 (4-wire/m-pair)
								Upstream PBO (dB) (bits 5-1 x 1.0 dB)
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Reserved for allocation by ITU-T

**Table 11.16.3.14/G.994.1 – Standard information field – G.991.2 Annex A
Downstream PMMS parameters - NPar(3) coding – Octet 15**

Bits								<u>G.991.2 Annex A downstream PMMS NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	PBO-2 (4-wire/m-pair)
								Downstream PBO (dB) (bits 5-1 x 1.0 dB)
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Reserved for allocation by ITU-T

**Table 11.16.4.14/G.994.1 – Standard information field – G.991.2 Annex A
Upstream PMMS parameters - NPar(3) coding – Octet 15**

Bits								<u>G.991.2 Annex A upstream PMMS NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	PBO-2 (4-wire/m-pair)
								Upstream PBO (dB) (bits 5-1 x 1.0 dB)
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Reserved for allocation by ITU-T

Table 11.18.1.10/G.994.1 – Standard information field – G.991.2 Annex B
Downstream training parameters - NPar(3) coding – Octet 11

<u>Bits</u>								<u>G.991.2 Annex B downstream training NPar(3)s – Octet 11</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>PBO-2 (4-wire/m-pair)</u>
								<u>Downstream PBO (dB) (bits 5-1 x 1.0 dB)</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>

Table 11.18.2.10/G.994.1 – Standard information field – G.991.2 Annex B
Upstream training parameters - NPar(3) coding – Octet 11

<u>Bits</u>								<u>G.991.2 Annex B upstream training NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>PBO-2 (4-wire/m-pair)</u>
								<u>Upstream PBO (dB) (bits 5-1 x 1.0 dB)</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>

Table 11.18.3.14/G.994.1 – Standard information field – G.991.2 Annex B
Downstream PMMS parameters - NPar(3) coding – Octet 15

<u>Bits</u>								<u>G.991.2 Annex B downstream PMMS NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>PBO-2 (4-wire/m-pair)</u>
								<u>Downstream PBO (dB) (bits 5-1 x 1.0 dB)</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>

Table 11.18.4.14/G.994.1 – Standard information field – G.991.2 Annex B
Upstream PMMS parameters - NPar(3) coding – Octet 15

<u>Bits</u>								<u>G.991.2 Annex B upstream PMMS NPar(3)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>0</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>PBO-2 (4-wire/m-pair)</u>
								<u>Upstream PBO (dB) (bits 5-1 x 1.0 dB)</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>

3. To support G.991.2 Annex G, modify the following tables as shown with revision marks:

Table 11.0.1/G.994.1 – Standard information 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	G.991.2 - Annex A/F
x	x	x	x	x	x	1	x	G.991.2 - Annex B/G
x	x	x	x	x	1	x	x	Committee T1 MCM VDSL (Note 1)
x	x	x	x	1	x	x	x	Committee T1 SCM VDSL (Note 2)
x	x	x	1	x	x	x	x	ETSI MCM VDSL (Note 3)
x	x	1	x	x	x	x	x	ETSI SCM VDSL (Note 3)
x	1	x	x	x	x	x	x	Committee T1 enhanced SHDSL
x	0	0	0	0	0	0	0	No parameters in this octet

NOTE 1 – Use of this bit is defined in "Draft Trial-Use Standard For Telecommunication - Interface Between Networks and Customer Installation - Very High Bit-rate Digital Subscriber Line (VDSL) Metallic Interface - Part 3: Technical Specification for Multi-Carrier Modulation (MCM) Transceivers".

NOTE 2 – Use of this bit is defined in "Draft Trial-Use Standard For Telecommunication - Interface Between Networks and Customer Installation - Very High Bit-rate Digital Subscriber Line (VDSL) Metallic Interface - Part 2: Technical Specification for Single-Carrier Modulation (SCM) Transceivers".

NOTE 3 – Use of this bit is defined in ETSI TS 101270-2.

Table 11.18.0.1/G.994.1 – Standard information field – G.991.2 Annex B - SPar(2) coding – Octet 2

Bits								G.991.2 Annex B SPar(2)s
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	1	Upstream framing parameters
x	x	x	x	x	x	1	x	Dual-Mode TPS-TC Parameters
x	x	x	x	x	1	x	x	Multiple-Pair Operation parameters
x	x	x	x	1	x	x	x	<u>Downstream extended training rates - 16-TCPAM symmetric (Annex G)</u> Reserved for allocation by ITU-T
x	x	x	1	x	x	x	x	<u>Downstream extended training rates - 32-TCPAM symmetric (Annex G)</u> Reserved for allocation by ITU-T
x	x	1	x	x	x	x	x	<u>Upstream extended training rates - 16-TCPAM symmetric (Annex G)</u> Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

4. To support G.991.2 Annex G, add the following new tables:

Table 11.18.0.2/G.994.1 – Standard information field – G.991.2 Annex B - SPar(2) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex B SPar(2)s</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>Upstream extended training rates - 32-TCPAM symmetric (Annex G)</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>Downstream extended PMMS rates (Annex G)</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>Upstream extended PMMS rates (Annex G)</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>No parameters in this octet</u>

Table 11.18.10 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 1

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G downstream extended training rate - 16-TCPAM symmetric NPar(3)s – Octet 1</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>						<u>x</u>	<u>Downstream base data rate – Minimum 1 (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Downstream base data rate – Maximum 1 (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Downstream base data rate – Step 1 (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.10.1 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 2

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G downstream extended training rate - 16-TCPAM symmetric NPar(3)s – Octet 2</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Minimum 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.10.2 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 3</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Maximum 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.10.3 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 4

Bits								<u>G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Step 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

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Table 11.18.10.j₁*4-4 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₁*4-3

Bits								<u>G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₁*4-3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	<u>Downstream base data rate extension – Minimum j₁ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Downstream base data rate extension – Maximum j₁ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Downstream base data rate extension – Step j₁ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.10.j₁*4-3 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₁*4-2

Bits								<u>G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₁*4-2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Minimum j₁ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.10.j₁*4-2 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₁*4-1

Bits								<u>G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₁*4-1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Maximum j₁ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.10.j₁*4-1 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₁*4

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₁*4
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Step j₁ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.11 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 1

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 1
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>						<u>x</u>	<u>Downstream base data rate – Minimum 1 (bit 7) , 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Downstream base data rate – Maximum 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Downstream base data rate – Step 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.11.1 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 2

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 2
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Minimum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.11.2 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 4
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Maximum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.11.3 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 4

Bits								<u>G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 5</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Step 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

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Table 11.18.11.j₂*4-4 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₂*4-3

Bits								<u>G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₂*4-3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	<u>Downstream base data rate extension – Minimum j₂ (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Downstream base data rate extension – Maximum j₂ (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Downstream base data rate extension – Step j₂ (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.11.j₂*4-3 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₂*4-2

Bits								<u>G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₂*4-2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Minimum j₂ (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.11.j₂*4-2 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₂*4-1

Bits								<u>G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₂*4-1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Maximum j₂ (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.11.j₂*4-1 – Standard information field – G.991.2 Annex G
Downstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₂*4

<u>Bits</u>								<u>G.991.2 Annex G downstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₂*4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Step j₂ (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.12 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 1

<u>Bits</u>								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	<u>Upstream base data rate – Minimum 1 (bit 7) , 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Upstream base data rate – Maximum 1 (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Upstream base data rate – Step 1 (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.12.1 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 2

<u>Bits</u>								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Minimum 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.12.2 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 3

<u>Bits</u>								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Maximum 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.12.3 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet 4

Bits								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet 4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Step 1 (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

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Table 11.18.12.j₃*4-4 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₃*4-3

Bits								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₃*4-3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	<u>Upstream base data rate extension – Minimum j₃ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Upstream base data rate extension – Maximum j₃ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Upstream base data rate extension – Step j₃ (bit 7), 16-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.12.j₃*4-3 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₃*4-2

Bits								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₃*4-2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Minimum j₃ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.12.j₃*4-2 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₃*4-1

Bits								<u>G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₃*4-1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Maximum j₃ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.12.j₃*4-1 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 16-TCPAM symmetric - NPar(3) coding – Octet j₃*4

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G upstream training rate - 16-TCPAM symmetric NPar(3)s – Octet j₃*4
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Step j₃ (bits 6-1), 16-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.13 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 1

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 1
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>						<u>x</u>	<u>Upstream base data rate – Minimum 1 (bit 7) , 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Upstream base data rate – Maximum 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Upstream base data rate – Step 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.13.1 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 2

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 2
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Minimum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.13.2 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 3
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Maximum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.13.3 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet 4

Bits								G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet 4
8	7	6	5	4	3	2	1	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Upstream base data rate – Step 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

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Table 11.18.13.j₄*4-4 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₄*4-3

Bits								G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₄*4-3
8	7	6	5	4	3	2	1	
<u>x</u>	<u>x</u>						<u>x</u>	Upstream base data rate extension – Minimum j ₄ (bit 7), 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>					<u>x</u>		Upstream base data rate extension – Maximum j ₄ (bit 7), 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>				<u>x</u>			Upstream base data rate extension – Step j ₄ (bit 7), 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				Reserved for allocation by ITU-T

Table 11.18.13.j₄*4-3 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₄*4-2

Bits								G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₄*4-2
8	7	6	5	4	3	2	1	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Upstream base data rate extension – Minimum j ₄ (bits 6-1), 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.13.j₄*4-2 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₄*4-1

Bits								G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₄*4-1
8	7	6	5	4	3	2	1	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Upstream base data rate extension – Maximum j ₄ (bits 6-1), 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.13.j₄*4-1 – Standard information field – G.991.2 Annex G
Upstream extended training rates - 32-TCPAM symmetric - NPar(3) coding – Octet j₄*4

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G upstream training rate - 32-TCPAM symmetric NPar(3)s – Octet j₄*4
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Step j₄ (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.14 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet 1

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet 1
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>						<u>x</u>	<u>Downstream base data rate – Minimum 1 (bit 7) , 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Downstream base data rate – Maximum 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Downstream base data rate – Step 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for use by ITU-T</u>

Table 11.18.14.1 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet 2

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet 2
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Minimum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.14.2 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet 3
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate – Maximum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.14.3 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet 4

<u>Bits</u>								<u>G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet 4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Downstream base data rate – Step 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

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Table 11.18.14.j₅*4-4 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet j₅*4-3

<u>Bits</u>								<u>G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet j₅*4-3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	Downstream base data rate extension – Minimum j ₅ (bit 7) 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>					<u>x</u>		Downstream base data rate extension – Maximum j ₅ (bit 7) 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>				<u>x</u>			Downstream base data rate extension – Step j ₅ (bit 7) 32-TCPAM symmetric PSD
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				Reserved for allocation by ITU-T

Table 11.18.14.j₅*4-3 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet j₅*4-2

<u>Bits</u>								<u>G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet j₅*4-2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Downstream base data rate extension – Minimum j ₅ (bits 6-1) 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.14.j₅*4-2 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet j₅*4-1

<u>Bits</u>								<u>G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet j₅*4-1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	Downstream base data rate extension – Maximum j ₅ (bits 6-1) 32-TCPAM symmetric PSD (Note)
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.14.j₅*4-1 – Standard information field – G.991.2 Annex G
Downstream Extended PMMS rates - NPar(3) coding – Octet j₅*4

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G downstream PMMS rate NPar(3)s – Octet j₅*4</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Downstream base data rate extension – Step j₅ (bits 6-1) 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.15 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet 1

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet 1</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>						<u>x</u>	<u>Upstream base data rate – Minimum 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Upstream base data rate – Maximum 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Upstream base data rate – Step 1 (bit 7), 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for use by ITU-T</u>

Table 11.18.15.1 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet 2

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet 2</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Minimum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.15.2 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet 3

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet 3</u>
<u>8</u>	<u>7</u>							
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Maximum 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

Table 11.18.15.3 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet 4

<u>Bits</u>								<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet 4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate – Step 1 (bits 6-1), 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

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Table 11.18.15.j₆*4-4 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet j₆*4-3

<u>Bits</u>								<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet j₆*4-3</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>						<u>x</u>	<u>Upstream base data rate extension – Minimum j₆ (bit 7) 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>					<u>x</u>		<u>Upstream base data rate extension – Maximum j₆ (bit 7) 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>				<u>x</u>			<u>Upstream base data rate extension – Step j₆ (bit 7) 32-TCPAM symmetric PSD</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>				<u>Reserved for allocation by ITU-T</u>

Table 11.18.15.j₆*4-3 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet j₆*4-2

<u>Bits</u>								<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet j₆*4-2</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Minimum j₆ (bits 6-1) 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

Table 11.18.15.j₆*4-2 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet j₆*4-1

<u>Bits</u>								<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet j₆*4-1</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Maximum j₆ (bits 6-1) 32-TCPAM symmetric PSD (Note)</u>
<u>NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.</u>								

**Table 11.18.15.j₆*4-1 – Standard information field – G.991.2 Annex G
Upstream Extended PMMS rates - NPar(3) coding – Octet j₆*4**

<u>Bits</u>								<u>G.991.2 Annex G upstream PMMS rate NPar(3)s – Octet j₆*4</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Upstream base data rate extension – Step j₆ (bits 6-1) 32-TCPAM symmetric PSD (Note)</u>
NOTE - The rates are determined by combining (bit 7) and the 6-bits in this octet to create a 7-bit number.								

5. To support upstream spectral shaping in G.992.3 Annexes J and M, modify the following tables:

Table 11.35/G.994.1 – Standard information field – G.992.3 Annex J NPar(2) coding

<u>Bits</u>								<u>G.992.3 Annex J NPar(2)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>NTR</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>Short initialization</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>Diagnostics mode</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-TPSD shape support</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>No parameters in this octet</u>

Table 11.49/G.994.1 – Standard information field – G.992.3 Annex M NPar(2) coding

<u>Bits</u>								<u>G.992.3 Annex M NPar(2)s</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>NTR</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>Short initialization</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>Diagnostics mode</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-TPSD shape support</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>No parameters in this octet</u>

6. To support upstream spectral shaping in G.992.3 Annexes J and M, add the following new tables:

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

<u>Bits</u>		<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.992.3 Annex J SPar(2)s – Octet 2</u>
<u>8</u>	<u>7</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>Submode PSD shape</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>No parameters in this octet</u>

Table 11.36.7/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 1

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

Table 11.36.7.1/G.994.1 – Standard information field – G.992.3 Annex J Submode PSD shape NPar(3) coding – Octet 2

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

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Table 11.36.7.2*(j-1)/G.994.1 – Standard information field – G.992.3 Annex J
Submode PSD shape NPar(3) coding – Octet 2*(j-1)+1

<u>Bits</u>								<u>G.992.3 Annex J Submode PSD shape NPar(3)s – Octet</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>2*(j-1)+1</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Tone index n (bit 6 to 1, coded as n-1)</u>

Note: j is the number of subcarrier indices used to specify the spectral shape

Table 11.36.7.2*(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

<u>Bits</u>								<u>G.992.3 Annex J Submode PSD shape NPar(3)s – Octet</u>
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>2*(j-1)+2</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>PSD at this Tone index n (bit 6 to 1, coded as n)</u>

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

<u>Bits</u>								
<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>G.992.3 Annex M SPar(2)s – Octet 2</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>Submode PSD shape</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>1</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>Reserved for allocation by ITU-T</u>
<u>x</u>	<u>x</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>No parameters in this octet</u>

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

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

Table 11.50.7.1/G.994.1 – Standard information field – G.992.3 Annex M
Submode PSD shape NPar(3) coding – Octet 2

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

:

:

:

**Table 11.50.7.2*(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		6	5	4	3	2	1	G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 2*(j-1)+1
8	7							
x	x	x	x	x	x	x	x	Tone index n (bit 6 to 1, coded as n-1)

Note: j is the number of subcarrier indices used to specify the spectral shape

**Table 11.50.7.2*(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		6	5	4	3	2	1	G.992.3 Annex M Submode PSD shape NPar(3)s – Octet 2*(j-1)+2
8	7							
x	x	x	x	x	x	x	x	PSD at this Tone index n (bit 6 to 1, coded as n)

Note: j is the number of subcarrier indices used to specify the spectral shape

7. To support new Annex CB to G.992.3, modify Table 11.42 as shown with revision control and add new Table 11.42.6:

Table 11.42/G.994.1 – Standard information field – G.992.3 Annex C SPar(2) coding – Octet 1

Bits		6	5	4	3	2	1	G.992.3 Annex C SPar(2)s – Octet 1
8	7							
x	x	x	x	x	x	x	1	Spectrum bounds upstream
x	x	x	x	x	x	1	x	Spectrum shaping upstream
x	x	x	x	x	1	x	x	Spectrum bounds downstream
x	x	x	x	1	x	x	x	Spectrum shaping downstream
x	x	x	1	x	x	x	x	Transmit signal images above the Nyquist frequency
x	x	1	x	x	x	x	x	Sub-annex Reserved for allocation by ITU-T
x	x	0	0	0	0	0	0	No parameters in this octet

**Table 11.42.6/G.994.1 – Standard information field – G.992.3 Annex C Sub-annex NPar(3)
coding – Octet 1**

Bits		6	5	4	3	2	1	G.992.3 Annex C Sub-annex NPar(3)s – Octet 1
8	7							
x	x	x	x	x	x	x	1	CA
x	x	x	x	x	x	1	x	CB
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