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G.993.2

Amendment 1
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SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Digital sections and digital line system – Metallic access
networks

Very high speed digital subscriber line transceivers
2 (VDSL2)

Amendment 1

CAUTION !

PREPUBLISHED RECOMMENDATION

This prepublication is an unedited version of a recently approved Recommendation. It will be replaced by the published version after editing. Therefore, there will be differences between this prepublication and the published version.

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Amendment 1 to Recommendation ITU-T G.993.2 (2015)

Very high speed digital subscriber line transceivers 2 (VDSL2): Amendment 1

Summary

Amendment 1 to Recommendation ITU-T G.993.2 (2015) covers the following functionality:

1. Updates to Annex B (deletion and new functionality)
2. New Annex N: band plan for region D (China) (new functionality).
3. New Annex Q: Enhanced data rate 35 MHz VDSL2 with 4.3125kHz sub-carrier spacing (new functionality).

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Amendment 1 to Recommendation ITU-T G.993.2 (2015)

Very high speed digital subscriber line transceivers 2 (VDSL2): Amendment 1

1. Updates to Annex B (deletion and new functionality).

Revise Annex B per changes below (revision marks relative to approved text).

Annex B

Region B (Europe)

(This annex forms an integral part of this Recommendation.)

B.1 Band plans

This annex defines the various band plans required for European deployment of VDSL2 systems operating at a maximum frequency of [12](#), [17](#), [30](#) ~~or 35~~ MHz. These are based on [ITU-T G.993.1] band plans A and B (also referred to as plan 998 and plan 997, respectively). The various band plans are defined in Table B.1 below and can be summarized as follows:

Plan 997	The original plan 997 ($f_{max} = 12$ MHz).
Plan 997E17	Plan 997 directly extended to $f_{max} = 17.664$ MHz.
Plan 997E30	Plan 997 directly extended to $f_{max} = 30$ MHz. NOTE – Plan 997E17 and plan 997 are truncated versions of plan 997E30.
Plan 998	The original plan 998 ($f_{max} = 12$ MHz).
Plan 998E17	Plan 998 directly extended to $f_{max} = 17.664$ MHz.
Plan 998E30	Plan 998 directly extended to $f_{max} = 30$ MHz. NOTE – Plan 998E17 and plan 998 are truncated versions of plan 998E30.
<u>Plan 998E35</u>	<u>Plan 998 directly extended to $f_{max} = 35.328$ MHz (frequencies above 14 MHz are for downstream transmission only).</u> <u>NOTE – Plan 998E17 and plan 998 are truncated versions of plan 998E30 and plan 998E35.</u>
Plan 998ADE17	Plan 998 extended to $f_{max} = 17.664$ MHz (downstream transmission only above 12 MHz)
Plan 998ADE30	Plan 998 extended to $f_{max} = 30$ MHz.
<u>Plan 998ADE35</u>	<u>Plan 998 extended to $f_{max} = 35.328$ MHz (frequencies above 12 MHz are for downstream transmission only).</u> <u>NOTE – Plan 998ADE17 and plan 998 are truncated versions of plan 998ADE30 and plan 998ADE35.</u>
~~Plan HPE17~~	~~Band plan for operation between 7.05 MHz and 17.664 MHz.~~
~~Plan HPE30~~	~~Band plan for operation between 7.05 MHz and 30 MHz.~~ ~~NOTE – Plan HPE17 is a truncated version of plan HPE30.~~
~~Plan HPE1230~~	~~Band plan for operation between 12 MHz and 30 MHz.~~ ~~NOTE – Plan HPE1230 is a truncated version of plan HPE30.~~

~~**Plan HPE1730** — Band plan for operation between 17.664 MHz and 30 MHz.~~

~~NOTE — Plan HPE1730 is a truncated version of plan HPE30.~~

~~**Plan HPEADE1230** — Band plan for operation between 12 MHz and 30 MHz.~~

~~NOTE — Plan HPEADE1230 is a truncated version of plan 998ADE30.~~

~~**Plan HPEADE1730** — Band plan for operation between 17.664 MHz and 30 MHz.~~

~~NOTE — Plan HPEADE1730 is a truncated version of plan 998ADE30.~~

Different variants are defined for band plans 997, 998, 998E17, 998E30, [998E35](#), 998ADE17 ~~and~~, 998ADE30 ~~and~~ [998ADE35](#) to accommodate different underlying services (POTS and ISDN), and different US0 bandwidths.

Table B.1 – Band-edge frequencies for European VDSL2 band plans

Band plan	Band-edge frequencies (as defined in the generic band plan in clause 7.1.2)										
	f_{0L} kHz	f_{0H} kHz	f_1 kHz	f_2 kHz	f_3 kHz	f_4 kHz	f_5 kHz	f_6 kHz	f_7 kHz	f_8 kHz	f_9 kHz
	US0		DS1		US1	DS2	US2	DS3	US3	DS4	US4
997	25	138	138	3 000	5 100	7 050	12 000	N/A	N/A	N/A	N/A
	25	276	276								
997E17	25	138	138	3 000	5 100	7 050	12 000	14 000	17 664	N/A	N/A
997E30	N/A	N/A	138	3 000	5 100	7 050	12 000	14 000	19 500	27 000	30 000
	US0		DS1		US1	DS2	US2	US3	DS3	US4	DS4
998	25	138	138	3 750	5 200	8 500	12 000	N/A	N/A	N/A	N/A
	25	276	276								
	120	276	276								
	N/A	N/A	138								
998E17	N/A	N/A	138	3 750	5 200	8 500	12 000	14 000	17 664	N/A	N/A
	N/A	N/A	276								
	25	138	138								
998E30	N/A	N/A	138	3 750	5 200	8 500	12 000	14 000	21 450	24 890	30 000
	N/A	N/A	276								
998E35	25	138	138	3 750	5 200	8500	12 000	14 000	35 328	N/A	N/A
	US0		DS1		US1	DS2	US2	DS3	US3		
998ADE17	25	138	138	3 750	5 200	8 500	12 000	17 664	N/A		
	120	276	276								

Table B.1 – Band-edge frequencies for European VDSL2 band plans

Band plan	Band-edge frequencies (as defined in the generic band plan in clause 7.1.2)															
	f_{0L} kHz	f_{0H} kHz	f_1 kHz	f_2 kHz	f_3 kHz	f_4 kHz	f_5 kHz	f_6 kHz	f_7 kHz	f_8 kHz	f_9 kHz					
	25	276	276													
	N/A	N/A	276													
998ADE30	N/A	N/A	138	3 750	5 200	8 500	12 000	24 890		30 000						
	N/A	N/A	276													
998ADE35	25	138	138	3 750	5 200	8 500	12 000	35 328		N/A						
	120	276	276													
	25	276	276													
					DS2		US2		US3		DS3		US4		DS4	
HPE17	N/A	N/A	N/A	N/A	7 050	10 125	12 000	14 000		17 664		N/A		N/A		
HPE30	N/A	N/A	N/A	N/A	7 050	10 125	12 000	14 000		21 450		24 890		30 000		
HPE1230	N/A	N/A	N/A	N/A	N/A	N/A	12 000	14 000		21 450		24 890		30 000		
HPE1730	N/A	N/A	N/A	N/A	N/A	N/A	NA	17 664		21 450		24 890		30 000		
	US0		DS1		US1		DS2		US2		DS3		US3			
HPEADE1230	N/A	N/A	N/A	N/A	N/A		N/A	12 000	24 890		30 000					
HPEADE1730	N/A	N/A	N/A	N/A	N/A		N/A	17 664	24 890		30 000					
NOTE 1 – N/A in the columns f_{0L} and f_{0H} designates a band plan variant that does not use US0.																
NOTE 2 – The capability to support US0 together with profile 17a is required for European VDSL2.																
NOTE 3 – The capability to support US0 together with profile 35b is required for European VDSL2.																

The f_i in Table B.1 are defined as follows:

- f_{0L} and f_{0H} : define lower and upper frequency of US0;
- f_1 to f_5 are the boundary frequencies of the bands DS1, US1, DS2, US2 as defined for VDSL1 for 997 and 998;
- f_5 to f_9 are the boundary frequencies for the bands US3, DS3, US4 and DS4 (extended bands);
- The extension of an existing band is considered as a separate band (e.g., 998E17: US3 12 MHz-14 MHz).

B.2 Limit PSD mask options

The Limit PSD mask options defined in this annex are shown in Tables B.2, B.3 and B.4, for various band plans.

Table B.2 – European Limit PSD mask options for band plan 997 (and its extensions)

Short name	Limit PSD mask (Long name)	Frequency	
		US0 type A/M (Note)	Highest used upstream or downstream frequency (kHz)
B7-1	997-M1c-A-7	A	7 050
B7-3	997-M1x-M	M	12 000
B7-9	997E17-M2x-A	A	17 664
B7-10	997E30-M2x-NUS0	N/A	30 000
NOTE – The US0 types stand for: • US0 type A corresponds to Annex A of [ITU-T G.992.5]; • US0 type M corresponds to Annex M of [ITU-T G.992.3] or of [ITU-T G.992.5]; • US0 type N/A designates a band plan variant that does not use US0.			

Table B.3 – European limit PSD mask options for band plan 998 (and its extensions)

Short name	Limit PSD mask (Long name)	Frequency	
		US0 type A/B/M (Note)	Highest used upstream or downstream frequency (kHz)
B8-4	998-M2x-A	A	12 000
B8-5	998-M2x-M	M	12 000
B8-6	998-M2x-B	B	12 000
B8-7	998-M2x-NUS0	N/A	12 000
B8-8	998E17-M2x-NUS0	N/A	17 664
B8-9	998E17-M2x-NUS0-M	N/A	17 664
B8-10	998ADE17-M2x-NUS0-M	N/A	17 664
B8-11	998ADE17-M2x-A	A	17 664
B8-12	998ADE17-M2x-B	B	17 664
B8-13	998E30-M2x-NUS0	N/A	30 000
B8-14	998E30-M2x-NUS0-M	N/A	30 000
B8-15	998ADE30-M2x-NUS0-M	N/A	30 000
B8-16	998ADE30-M2x-NUS0-A	N/A	30 000

Table B.3 – European limit PSD mask options for band plan 998 (and its extensions)

Short name	Limit PSD mask (Long name)	Frequency	
		US0 type A/B/M (Note)	Highest used upstream or downstream frequency (kHz)
B8-17	998ADE17-M2x-M	M	17 664
B8-18	998E17-M2x-A	A	17 664
B8-19	998E35-M2x-A	A	35 328
B8-20	998ADE35-M2x-A	A	35 328
B8-21	998ADE35-M2x-B	B	35 328
B8-22	998ADE35-M2x-M	M	35 328
NOTE – The US0 types stand for: - US0 type A corresponds to Annex A of [ITU-T G.992.5]; - US0 type B corresponds to Annex B of [ITU-T G.992.5]; - US0 type M corresponds to Annex M of [ITU-T G.992.3] or of [ITU-T G.992.5]; - US0 type N/A designates a band plan variant that does not use US0; 998ADExx-M2x-NUS0-M designate the variants in which DS1 starts at 276 kHz instead of 138 kHz.			

Table B.4—European limit PSD mask options for HPE band plans

Short name	Limit PSD mask (Long name)	Frequency	
		US0 type A/B/M (Note)	Highest used upstream or downstream frequency (kHz)
BH-1	HPE17-M1-NUS0	N/A	17 664
BH-2	HPE30-M1-NUS0	N/A	30 000
BH-3	HPE1230-NUS0	N/A	30 000
BH-4	HPE1730-NUS0	N/A	30 000
BH-5	HPEADE1230-NUS0	N/A	30 000
BH-6	HPEADE1730-NUS0	N/A	30 000
NOTE 1—US0 type N/A designates a band plan variant that does not use US0. NOTE 2—Band plans BH-1 and BH-2 were referred to as band plans B7-7 and B7-8 respectively in previous versions of ITU-T G.993.2.			

B.2.1 General requirements in the band below 4 kHz

The noise in the voice band measured with psophometric weighting according to [ITU-T O.41] clause 3.3 shall not exceed –68 dBm. The psophometer shall be used in bridging mode and shall be calibrated for 600 ohm termination.

B.2.2 VTU-R Limit PSD masks for band plan 997 (and its extensions)

The VTU-R limit PSD masks for band plan 997 (and its extensions) are shown in Table B.45.

Table B.45 – VTU-R limit PSD masks for band plan 997 (and its extensions)

Name	B7-1	B7-3	B7-9	B7-10
Long name	997-M1-c-A-7	997-M1-x-M	997E17-M2x-A	997E30-M2x-NUS0
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
0	−97.5	−97.5	−97.5	−100
4	−97.5	−97.5	−97.5	−100
4	−92.5	−92.5	−97.5	−100
25.875	−34.5	−37.5	−34.5	−100
50	−34.5	−37.5	−34.5	−100
80	−34.5	−37.5	−34.5	−100
120	−34.5	−37.5	−34.5	−100
138	−34.5	−37.5	−34.5	−100
225	Interp	−37.5	Interp	−100
243	−93.2	−37.5	−93.2	−100
276	Interp	−37.5	Interp	−100
493.41	Interp	−97.9	Interp	−100
686	−100	−100	−100	−100
2 825	−100	−100	−100	−100
3 000	−80	−80	−80	−80
3 000	−56.5	−56.5	−50.3	−50.3
3 575	−56.5	−56.5	Interp	Interp
3 750	−56.5	−56.5	Interp	Interp
5 100	−56.5	−56.5	−52.6	−52.6
5 100	−80	−80	−80	−80
5 275	−100	−100	−100	−100
6 875	−100	−100	−100	−100
7 050	−100	−80	−80	−80
7 050	−100	−56.5	−54	−54
8 325	−100	−56.5	Interp	Interp
9 950	−100	−56.5	Interp	Interp
10 125	−100	−56.5	−55.5	−55.5
10 125	−100	−56.5	−55.5	−55.5
11 825	−100	−56.5	−55.5	−55.5
12 000	−100	−56.5	−55.5	−55.5
12 000	−100	−80	−80	−80
12 175	−100	−100	−100	−100
13 825	−100	−100	−100	−100

Table B.45 – VTU-R limit PSD masks for band plan 997 (and its extensions)

Name	B7-1	B7-3	B7-9	B7-10
Long name	997-M1-c-A-7	997-M1-x-M	997E17-M2x-A	997E30-M2x-NUS0
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
14 000	–100	–100	–80	–80
14 000	–100	–100	–56.5	–56.5
14 175	–100	–100	Interp	Interp
17 664	–100	–100	–56.5	–56.5
19 500	–100	–100	–80	–56.5
19 500	–100	–100	–80	–80
19 675	–100	–100	–100	–100
21 275	–100	–100	–100	–100
21 450	–100	–100	–100	–100
21 450	–100	–100	–100	–100
24 890	–100	–100	–100	–100
24 890	–100	–100	–100	–100
25 065	–100	–100	–100	–100
26 825	–100	–100	–100	–100
27 000	–100	–100	–100	–80
27 000	–100	–100	–100	–56.5
30 000	–100	–100	–100	–56.5
30 000	–110	–110	–110	–80
30 175	–110	–110	–110	–110
$\geq 30\ 175$	–110	–110	–110	–110

NOTE – The PSD values between breakpoints including the values marked by "Interp" shall be obtained by interpolation between adjacent breakpoints as follows:

- below 2 825 kHz on a dB/log(*f*) basis; and
- above 2 825 kHz on a dB/*f* basis.

B.2.3 VTU-O Limit PSD masks for band plans 997 (and its extensions), ~~HPE17 and HPE30~~

The VTU-O limit PSD masks for band plan 997 (and its extensions) are shown in Table B.56.

Table B.56 – VTU-O Limit PSD masks for band plan 997 (and its extensions)

Name	B7-1	B7-3	B7-9	B7-10
Long name	997-M1c-A-7	997-M1x-M	997E17-M2x-A	997E30-M2x-NUS0
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
0	–97.5	–97.5	–97.5	–97.5

Table B.56 – VTU-O Limit PSD masks for band plan 997 (and its extensions)

Name	B7-1	B7-3	B7-9	B7-10
Long name	997-M1c-A-7	997-M1x-M	997E17-M2x-A	997E30-M2x-NUS0
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
4	−97.5	−97.5	−97.5	−97.5
4	−92.5	−92.5	−92.5	−92.5
80	−72.5	−92.5	−72.5	−72.5
101.2	Interp	−92.5	Interp	Interp
138	−49.5	Interp	−44.2	−44.2
138	−49.5	Interp	−36.5	−36.5
227.11	−49.5	−62	−36.5	−36.5
276	−49.5	−48.5	−36.5	−36.5
276	−49.5	−36.5	−36.5	−36.5
1 104	−49.5	−36.5	−36.5	−36.5
1 622	−49.5	−46.5	−46.5	−46.5
2 208	−49.5	−48	Interp	Interp
2 236	−49.5	Interp	Interp	Interp
2 249	−49.5	−49.5	Interp	Interp
2 423	−56.5	Interp	Interp	Interp
2 500	−56.5	−56.5	Interp	Interp
3 000	−56.5	−56.5	−49.6	−49.6
3 000	−80	−80	−80	−80
3 175	−100	−100	−100	−100
4 925	−100	−100	−100	−100
5 100	−80	−80	−80	−80
5 100	−56.5	−56.5	−52.6	−52.6
5 200	−56.5	−56.5	Interp	Interp
6 875	−56.5	−56.5	Interp	Interp
7 050	−56.5	−56.5	−54	−54
7 050	−80	−80	−80	−80
7 225	−100	−100	−100	−100
10 125	−100	−100	−100	−100
10 125	−100	−100	−100	−100
10 300	−100	−100	−100	−100
11 825	−100	−100	−100	−100
12 000	−100	−100	−80	−80
12 000	−100	−100	−56.5	−56.5
13 825	−100	−100	−56.5	−56.5
14 000	−100	−100	−56.5	−56.5

Table B.56 – VTU-O Limit PSD masks for band plan 997 (and its extensions)

Name	B7-1	B7-3	B7-9	B7-10
Long name	997-M1c-A-7	997-M1x-M	997E17-M2x-A	997E30-M2x-NUS0
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
14 000	–100	–100	–80	–80
14 175	–100	–100	–100	–100
17 489	–100	–100	–100	–100
17 664	–100	–100	–100	–100
17 664	–100	–100	–100	–100
19 325	–100	–100	–100	–100
19 500	–100	–100	–100	–80
19 500	–100	–100	–100	–56.5
21 000	–100	–100	–100	–56.5
21 450	–100	–100	–100	–56.5
21 450	–100	–100	–100	–56.5
21 625	–100	–100	–100	–56.5
24 715	–100	–100	–100	–56.5
24 890	–100	–100	–100	–56.5
24 890	–100	–100	–100	–56.5
27 000	–100	–100	–100	–56.5
27 000	–100	–100	–100	–80
27 175	–100	–100	–100	–100
30 000	–100	–100	–100	–100
30 000	–110	–110	–110	–110
30 175	–110	–110	–110	–110
$\geq 30\ 175$	–110	–110	–110	–110

NOTE – The PSD values between breakpoints including the values marked by "Interp" shall be obtained by interpolation between adjacent breakpoints as follows:

- below f_1 on a dB/log(f) basis; and
- above f_1 on a dB/ f basis.

B.2.4 VTU-R limit PSD masks for band plan 998 (and its extensions)

The VTU-R limit PSD masks for band plan 998 (and its extensions) [with a highest used upstream or downstream frequency of 12 MHz or 17.664 MHz \(see Table B.3 for the band plan 998 PSD mask options\)](#) are shown in Table B.6A7.

**Table B.6A7 – VTU-R limit PSD masks for band plan 998 (and its extensions)
with a highest used frequency of 12 MHz or 17.664 MHz**

Name	B8-4	B8-5	B8-6	B8-7	B8-8	B8-9	B8-10	B8-11	B8-12	B8-17	B8-18
Long name	998-M2x-A	998-M2x-M	998-M2x-B	998-M2x-NUS0	998 E17-M2x-NUS0	998 E17-M2x-NUS0-M	998 ADE17-M2x-NUS0-M	998 ADE17-M2x-A	998 ADE17-M2x-B	998 ADE17-M2x-M	998 E17-M2x-A
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
0	−97.5	−97.5	−97.5	−100	−100	−100	−100	−97.5	−97.5	−97.5	−97.5
4	−97.5	−97.5	−97.5	−100	−100	−100	−100	−97.5	−97.5	−97.5	−97.5
4	−92.5	−92.5	−92.5	−100	−100	−100	−100	−92.5	−92.5	−92.5	−92.5
25.875	−34.5	−37.5	−92.5	−100	−100	−100	−100	−34.5	−92.5	−37.5	−34.5
50	−34.5	−37.5	−90	−100	−100	−100	−100	−34.5	−90	−37.5	−34.5
80	−34.5	−37.5	−81.8	−100	−100	−100	−100	−34.5	−81.8	−37.5	−34.5
120	−34.5	−37.5	−34.5	−100	−100	−100	−100	−34.5	−34.5	−37.5	−34.5
138	−34.5	−37.5	−34.5	−100	−100	−100	−100	−34.5	−34.5	−37.5	−34.5
225	Interp	−37.5	−34.5	−100	−100	−100	−100	Interp	−34.5	−37.5	Interp
243	−93.2	−37.5	−34.5	−100	−100	−100	−100	−93.2	−34.5	−37.5	−93.2
276	Interp	−37.5	−34.5	−100	−100	−100	−100	Interp	−34.5	−37.5	Interp
~~307~~	~~Interp~~	~~Interp~~	~~Interp~~	~~−100~~	~~−100~~	~~−100~~	~~−100~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~
493.41	Interp	−97.9	Interp	−100	−100	−100	−100	Interp	Interp	−97.9	Interp
508.8	Interp	Interp	−98	−100	−100	−100	−100	Interp	−98	Interp	Interp

Table B.6A7 – VTU-R limit PSD masks for band plan 998 (and its extensions)
with a highest used frequency of 12 MHz or 17.664 MHz

Name	B8-4	B8-5	B8-6	B8-7	B8-8	B8-9	B8-10	B8-11	B8-12	B8-17	B8-18
Long name	998-M2x-A	998-M2x-M	998-M2x-B	998-M2x-NUS0	998 E17-M2x-NUS0	998 E17-M2x-NUS0-M	998 ADE17-M2x-NUS0-M	998 ADE17-M2x-A	998 ADE17-M2x-B	998 ADE17-M2x-M	998 E17-M2x-A
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
686	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
3 575	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
3 750	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80
3 750	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2	-51.2
~~5 100~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~	~~Interp~~
5 200	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7	-52.7
5 200	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80
5 375	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
8 325	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
8 500	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80
8 500	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8	-54.8
10 000	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5
12 000	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5	-55.5
12 000	-80	-80	-80	-80	-56.5	-56.5	-80	-80	-80	-80	-56.5
12 175	-100	-100	-100	-100	-56.5	-56.5	-100	-100	-100	-100	-56.5
14 000	-100	-100	-100	-100	-56.5	-56.5	-100	-100	-100	-100	-56.5
14 000	-100	-100	-100	-100	-80	-80	-100	-100	-100	-100	-80
14 175	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
21 275	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
~~21 450~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~	~~-100~~

**Table B.6A7 – VTU-R limit PSD masks for band plan 998 (and its extensions)
with a highest used frequency of 12 MHz or 17.664 MHz**

Name	B8-4	B8-5	B8-6	B8-7	B8-8	B8-9	B8-10	B8-11	B8-12	B8-17	B8-18
Long name	998-M2x-A	998-M2x-M	998-M2x-B	998-M2x-NUS0	998 E17-M2x-NUS0	998 E17-M2x-NUS0-M	998 ADE17-M2x-NUS0-M	998 ADE17-M2x-A	998 ADE17-M2x-B	998 ADE17-M2x-M	998 E17-M2x-A
kHz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz	dBm/Hz
21 450	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
24 715	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
24 890	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
24 890	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
25 065	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
30 000	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
30 000	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110
30 175	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110
≥ 30 175	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110	-110
NOTE – The PSD values between breakpoints including the values marked by "Interp" shall be obtained by interpolation between adjacent breakpoints as follows: – below 3 575 kHz on a dB/log(<i>f</i>) basis; and – above 3 575 kHz on a dB/<i>f</i> basis.											

The VTU-R limit PSD masks for band plan 998 (and its extensions) with a highest used upstream or downstream frequency of 30 MHz or 35.328 MHz (see Table B.3 for the band plan 998 PSD mask options) are shown in Table B.6B.