broadband forum

TECHNICAL REPORT

TR-105
ADSL2/2plus Functionality Test Plan

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Executive Summary

The document contains corrections to TR-105 Issue 1.

1 Purpose

The corrections specified in the following sections apply to *TR-105 Issue 1*.

Note: This corrigendum assumes all previous corrigenda on *TR-105 Issue 1* have been previously applied.

2 Correction to Section 5.5.2/TR-105, *Seamless Rate Adaptation Test*

Modify Table 5-11 and Table 5-12 in Section 5.5.2/TR-105 as follows.

Table 5-11 Functional SRA test - Downstream

Test Configuration	(1) See Section 4.1 for the test configuration. (2) Configure the SUT with the Annex relevant test profile A2P_SRA_F_30000k or B2P_SRA_F_30000k, and SRA parameter set 1 from Table 5-10. (3) Set up the line simulator to 5 kft 26AWG for Annex A NA or 1500m PE04 for Annex A EU and Annex B. (4) Set the noise generator to -120dBm/Hz AWGN at ~~both ends of the loop~~the ATU-R side and to -100dBm/Hz at the ATU-C side.
Method of Procedure	(1) Force a new initialization and wait for modems to sync. (2) Wait for 1 minute for bitswaps to settle. (3) Check the reported margin. Document DS net data rate as rate_ds. ***Downshift functionality sub-test*** (4) Increase the noise power level by 1 dB at ATU-R side only. (5) Wait for 1 minute, then check reported margin. (6) Repeat step (4) and (5) until: ~~RA-DSNRM + 0.5dB < reported margin at the side under test < RA-DSNRM + 1.5dB~~RA-DSNRM < reported margin at the side under test ≤ RA-DSNRM + 1.5dB. (7) Increase the noise power level by 3 dB at ATU-R side only. (8) Wait for (RA-DTIME + 30) s for SRA to settle. (9) Check reported DS margin, and document as SRA_reported_margin _downshift_ds. Document DS net data rate as SRA_downshift_rate_ds. (10) Execute a BER test for 7 minutes. Record the CRC and SES counts at the start and the end of the BER test. Actual number of CRCs and SESs is the difference between these two counts. Document the estimated BER. ***Upshift functionality sub-test*** (11) Decrease the noise power level by 1 dB at ATU-R side only. (12) Wait for 1 minute, then check the reported margin. (13) Repeat step (11) and step (12) until: ~~RA-USNRM - 1.5dB < reported margin at the side under test < RA-USNRM - 0.5dB~~RA-USNRM - 1.5dB ≤ reported margin at the side under test < RA-USNRM. (14) Decrease the noise power level by 3 dB at ATU-R side only. (15) Wait for (RA-UTIME + 30) s for SRA to settle. (16) Check reported DS margin, and document as SRA_reported_ margin_upshift_ds. Document DS net data rate as SRA_upshift_rate_ds. (17) Execute a BER test for 7 minutes. Record the CRC and SES counts

	at the start and the end of the BER test. Actual number of CRCs and SESs is the difference between these two counts. Document the estimated BER. (18) Repeat the test steps (1) to (17) for SRA parameter set 2.
Expected Result	(1) No retrain SHALL occur during the test. (2) SRA_reported_margin_downshift_ds ≥ RA-DSNRM. SRA_reported_margin_upshift_ds ≤ RA-USNRM. (3) SRA_downshift_rate_ds < rate_ds. SRA_upshift_rate_ds > ~~rate_ds~~SRA_downshift_rate_ds. (4) Estimated BER SHALL NOT exceed 1e-7, and no SES SHALL be reported.

Table 5-12 Functional SRA test - Upstream

Test Configuration	(1) See Section 4.1 for the test configuration. (2) Configure the SUT with the Annex relevant test profile. A2P_SRA_F_30000k or B2P_SRA_F_30000k, and SRA parameter set 1 from Table 5-10. (3) Set up the line simulator to 5 kft 26AWG for Annex A NA or 1500m PE04 for Annex A EU and Annex B. (4) Set the noise generator to -120dBm/Hz AWGN at ~~both ends of the loop~~the ATU-R side and to -100dBm/Hz at the ATU-C side.
Method of Procedure	(1) Force a new initialization and wait for modems to sync. (2) Wait for 1 minute for bitswaps to settle. (3) Check the reported margin. Document US net data rate as rate_us. ***Downshift functionality sub-test*** (4) Increase the noise power level by 1 dB at ATU-C side only. (5) Wait for 1 minute, then check reported margin. (6) Repeat step (4) and (5) until: ~~RA-DSNRM + 0.5dB < reported margin at the side under test < RA-DSNRM + 1.5dB~~RA-DSNRM < reported margin at the side under test ≤ RA-DSNRM + 1.5dB. (7) Increase the noise power level by 3 dB at ATU-C side only. (8) Wait for (RA-DTIME + 30) s for SRA to settle. (9) Check reported US margin, and document as SRA_reported_margin _downshift_us. Document US net data rate as SRA_downshift_rate_us. (10) Execute a BER test for 7 minutes. Record the CRC and SES counts at the start and the end of the BER test. Actual number of CRCs and SESs is the difference between these two counts. Document the estimated BER. ***Upshift functionality sub-test*** (11) Decrease the noise power level by 1 dB at ATU-C side only. (12) Wait for 1 minute, then check reported margin. (13) Repeat step (11) and (12) until: ~~RA-USNRM - 1.5dB < reported~~

	~~margin at the side under test < RA-USNRM - 0.5dB~~RA-USNRM - 1.5dB ≤ reported margin at the side under test < RA-USNRM. (14) Decrease the noise power level by 3 dB at ATU-C side only. (15) Wait for (RA-UTIME + 30) s for SRA to settle. (16) Check reported US margin, and document as SRA_reported_margin _upshift_us. Document US net data rate as SRA_upshift_rate_us. (17) Execute a BER test for 7 minutes. Record the CRC and SES counts at the start and the end of the BER test. Actual number of CRCs and SESs is the difference between these two counts. Document the estimated BER. (18) Repeat the test steps (1) to (17) for SRA parameter set 2.
Expected Result	(1) No retrain SHALL occur during the test. (2) SRA_reported_margin_downshift_us ≥ RA-DSNRM. SRA_reported_margin_upshift_us ≤ RA-USNRM. (3) SRA_downshift_rate_us < rate_us. SRA_upshift_rate_us > ~~rate_us~~SRA_downshift_rate_us. (4) Estimated BER SHALL NOT exceed 1e-7, and no SES SHALL be reported.

3 Correction to Section 6.2/TR-105, *Configuration Parameter MINSNRM*

Modify Table 6-2 in Section 6.2/TR-105 as follows

Table 6-2 MINSNRM control test

Test Configuration	(1) See Section 4.1 for the test configuration. (2) According to the Annex to be tested, configure the SUT in one of the rate adaptive specific test profiles. (3) ~~Additionally, set MINSNRM to 1dB~~ SNRM test conditions: 1. MINSNRM = 5dB and TARSNRM=9dB, 2. MINSNRM=8dB and TARSNRM=12dB~~.~~ ~~(3)~~(4) Connect ATU-R and ATU-C through the 2250 m PE04 or 7kft 26AWG loop.
Method of Procedure	~~(1) Connect ATU-R and ATU-C through the shortest loop length defined for the chosen specific test profile in the regional annex of TR-100 [8].~~ ~~(2)~~(1) Inject -120dBm/Hz AWGN noise added at both the ATU-R and ATU-C ends. This power level is considered the 0dB noise power. ~~(3)~~(2) ~~Force a new initialization and wait for modems to sync.~~ Let the modems train. Wait for 1 minute after initialization. ~~(4) Record the reported SNR margin (SNRMds and SNRMus).~~ ~~(5)~~(3) Increase the noise power level by ~~1~~6dB at the ATU side under test. ~~Wait for 1 minute for bitswaps to settle.~~ ~~(6)~~(4) ~~Record the reported SNR margin~~Wait not more than 90 seconds for modem to retrain. ~~(7) Repeat steps (5) and (6) until the reported SNR margin becomes lower than MINSNRM.~~ ~~(8)~~(5) Repeat ~~steps (3) - (7) with MINSNRM value set to 2 and 3dB~~the test for all SNRM test conditions.
Expected Result	~~For each MINSNRM value modems SHALL retrain if the reported SNR margin is lower than MINSNRM~~For all SNRM test conditions modems SHALL retrain.

4 Correction to Section 7.2/TR-105, *Performance Monitoring Counters for SES*

Modify Section 7.2/TR-105 as follows

7.2 Performance Monitoring Counters for SES

The purpose of these tests is to verify that the line performance management counter for Severely Errored Seconds (SES) in the ATU-C/ATU-R is implemented correctly according to G.992.5 [3], section 9.4.1.6.

The test SHALL be performed for the G.992.5 Annex A and Annex B specific test profiles:

1. A2P_RA_F_30000k and A2P_RA_I_30000k with general line settings:
   a. DS: I-16/2
   b. US: I-16/0.5
2. B2P_RA_F_30000k and B2P_RA_I_30000k with general line settings:
   a. DS: I-16/2
   b. US: I-16/0.5

The test SHALL be done with bursts of the repetitive impulse noise (REIN) in addition to the background noise. The REIN noise duration is 690ms (T_{Burst}). The REIN pulse consists of a "Burst of pseudo random AWGN" at a level of –90dBm/Hz differential mode from 138 kHz up to 2.2 MHz, where the out-of-band noise shall not be higher than -140dBm/Hz. The pulse duration Δ_{REIN} depends on the specific test profile. The pulse SHALL be repeated every 10 ms (T_{REIN}).

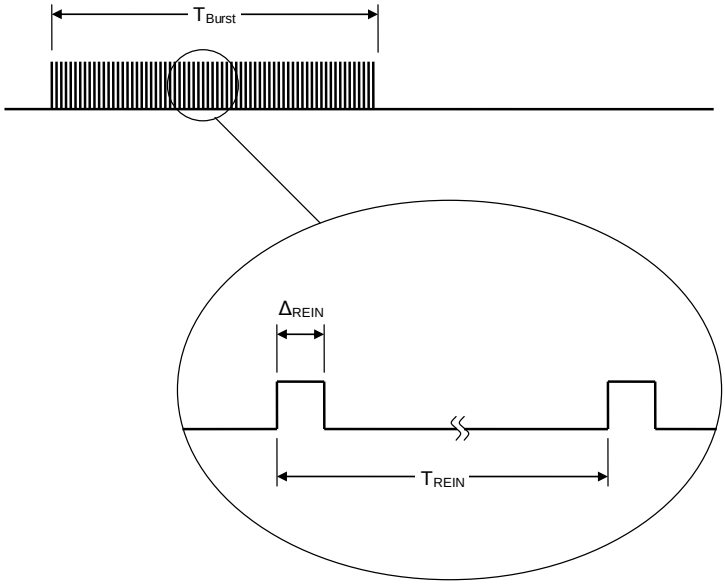

Figure 7-1 REIN Noise for SES test

Table 7-3 Severely Errored Second Test

Test Configuration	(1) See Section 4.1 for the test configuration. (2) ~~Configure the SUT with A2P_Fix_I_600k or B2P_Fix_I_864k profile depending on the G.992.5 Annex under test.~~Configure the SUT with one of the specific test profiles relevant for the G.992.5 Annex under test: • A2P_RA_F_30000k and A2P_RA_I_30000k i. DS: I-16/2 ii. US: I-16/0.5 • B2P_RA_F_30000k and B2P_RA_I_30000k i. DS: I-16/2 ii. US: I-16/0.5 ~~(2)~~(3) Additional test conditions: OPTIONAL OLR (SRA, DRR) SHALL not be used.
Method of Procedure	(1) ~~Connect ATU-R and ATU-C through NULL loop and no noise injected~~Connect ATU-R and ATU-C through the 7.0 kft 26AWG for Annex A NA or 2250m PE04 for Annex A EU and Annex B EU. ~~(1)~~(2) Set the noise generator to -120dBm/Hz AWGN at the ATU-R side and to -110dBm/Hz AWGN at the ATU-C side of the loop. ~~(2)~~(3) Force an initialization and wait for modem to sync. Wait 1 minute following synchronization. ~~(3)~~(4) Note down the initial value of the SES-L, SES-LFE, UAS-L and UAS-LFE performance monitoring counters at the ATU-C and the initial value of the SES-L and UAS-L counters at the ATU-R. (5) ~~Force one 330ms "micro-interruption" every 1s for 2 seconds (a total of 2 micro-interruptions).~~Inject the REIN noise of duration T_{Burst} (Figure 7-1) at the ATU-R side of the loop with a pulse duration Δ_{REIN} depending on the specific test profile: • X2P_RA_F_30000k: Δ_{REIN} =100µs • X2P_RA_I_30000k: calculate Δ_{REIN} as [(max(ACTINPus, ACTINPds) +1) x 0.25ms] x 2, rounded up to the nearest ms ~~(4)~~(6) Repeat ~~previous event 14 times (14 x 2 micro-interruptions)~~ step (5) 14 times with 10s between each event. ~~(5)~~(7) Force performance monitoring counters update and wait 30 seconds for the counters to be read out. ~~(6)~~(8) Note down the value of the counter SES-L and UAS-L at the ATU-R Note down the value of the counters SES-L and SES-LFE, and UAS-L and UAS-LFE at the ATU-C. (9) Calculate the increase of these counters between the values from step (~~7~~8) and step (~~3~~4). ~~(7)~~(10) Repeat step (5) to (9), but inject the REIN noise at the ATU-C side of the loop.

Expected Result	(1) No loss of synchronization SHALL occur during the test. (2) No increase of UAS-L and UAS-LFE at the ATU-C SHALL be reported during the test time. (3) If available, no increase of UAS-L at the ATU-R SHALL be reported. (4) The increase of SES-L counter at the ATU-R SHALL be equal to the increase of SES-LFE counter at the ATU-C. (5) The increase of SES-L counter at the ATU-R, as well as the increase of both SES-LFE and SES-L counters at the ATU-C, SHALL be at least equal to ~~30~~15 and ≤ ~~45~~30.

End of Broadband Forum Technical Report TR-105