Supporting Document NASMS

Contents

1 General Information

This document, which describes version V3.2 of the NASMS system, is geared towards service technicians (ST) working on behalf of an ISP. The system provides measurement values for BBCS connection lines. The system has been designed primarily for VDSL2 connection lines.

1.1 PIN Code

A PIN code is required in order to use the NASM system. Each ISP receives a specific PIN code, which may be given to the authorised service technician together with this document, in order to enable them to commission and troubleshoot xDSL connection lines. Service technicians are not allowed to pass these items on to third parties.

In the event of misuse, Swisscom reserves the right to block the PIN code.

If you have any questions, please contact the following e-mail address: wholesale.wecare@swisscom.com. Please enter the following text in the subject line: "**NASMS Passwort**".

1.2 Intended Use

The NASMS system can be used to trigger a network analyser measurement for an xDSL connection in real-time, the results of which are forwarded immediately via SMS.

These measurement values should help the ISP and/or service technician during commissioning and with troubleshooting processes.

The NASMS system operates independently of the network providers and their networks. The system may only be used by specialists during the installation or troubleshooting of xDSL lines.

NASMS also provides an additional function for triggering profile changes on active DSL ports.

1.3 Functionality

A "receipt" confirming that a job has been placed should be provided within a matter of seconds. The actual responses are however provided within the minute range [LQD!]). The response time is dependent on the number of SMS enquiries in the queue in front of the NA and also on the utilisation load of the NA generated by other users (Swisscom Call Center). Multiple SMS enquiries for the same connection number are automatically deleted from the queue.

The measurement values can be influenced by the router type and the current firmware version.

The following measurement types are supported:

Line State Diagnosis (LSD)

A "line state diagnosis" is the standard measurement type, which shows the current status of a line at the time when the measurement is started. If the line is synchronised, information such as the bit rate,

attenuation, noise margin, etc., will be available. If the line is not synchronised, the cause of the current condition will be displayed with the help of a problem description.

Line Quality Diagnosis (LQD)

The „line quality diagnosis“ is a measurement that is completed over a certain period of time, and which can provide additional items of information such as line quality and stability. It can also highlight other potential problems on the line that is being analysed.

The following profile change types are supported:

“Standard“ profile change (CP)
Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any possible service impact will be reported, i.e. the new fixed profile that is determined may not cause any loss in service – at the very most a downgrade to the service limit.

Profile change with a potential service impact (CPSI)
Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any potential service impact is not taken into consideration; a loss in service may therefore be incurred.

Fixed profile change (CPFI)
A new flex profile will be activated according to the grooming rules (DS: 5Mb/s – LQSmax, US: 0.5Mb/s – LQSmax), a single point measurement will then be carried out, the results of which will be used as the basis for activating a new fixed profile. Utilised with “nosyn“. Once the in-house installation has been adjusted, access profile should be modified again with CP.

1.4 Suggestions / Feedback

Suggestions can be forwarded to the following e-mail address: bbcs.service@swisscom.com. Please enter the following text in the subject line: “**NASMS feedback**“.

1.5 Special Cases

In the event of a technology and port switch, a change of residence of the customer or a line change, the following must be observed:

- The NA will take over the new port details on the same day (assignment of the connection number to the port ID), at the very latest within 24 hours.
- If the new port details are not yet available, “NOTPROVISIONED” will be displayed in accordance with tab 2.
- In future, the new port details will be made available within a matter of minutes.

1.6 SMS Server Error Messages

Error messages are forwarded to the user via SMS. Some of the error messages are not particularly meaningful or helpful for the field service technicians; they can however help the NA-SMS administrator to identify the problem. The most probable errors are described below:

Error message	Meaning
Error1: Invalid PIN code ####	An invalid PIN code was sent. Check PIN .
Error2: Subscriber #### not found.	The specified subscriber does not exist.
Error3: Subscriber number or PIN code missing or invalid command.	The command is invalid, incomplete or incorrectly formatted.
Error4: Request rejected due to system overload. Try again in 10 minutes.	NA-SMS is overloaded. Try again later.
Error5: NA-SMS system error.	NA-SMS internal problem. Communication with a peripheral system is experiencing a disruption.
Error6: Subscriber #### has no port provisioned yet.	The DSL port of this subscriber has not been made available yet and cannot, therefore, be analysed.
Error7: NA-SMS System error (UnityDB)	Communication with the UnityDB is experiencing a disruption.
Error8: NA-SMS System error (NA)	Communication between the UnityDB and Network Analyzer is experiencing a disruption.
Error9: Port does not exists in NA	The port of the subscriber does not exist in the Network Analyzer. (Unlikely)
Error10: DSLAM not configured in NA	The Network Analyzer is unaware of the DSLAM on which the port is configured. (Unlikely)
Error11: Precondition not met: ####	Another prerequisite for taking the measurement has not been fulfilled.

Table 1-1: NASMS Server Error Messages

1.7 Measurement Section xDSL

The measurement values determined by the NASMS system consist of values that are measured between the DSLAM and the xDSL modem.

→ See chapter 7

1.8 Additional Information

→ The “xDSL Equipment List“, which can be accessed via the following link, contains the xDSL modems/routers and filters and splitters that have been checked by Swisscom: http://www.swisscom.com/ws/products/Broadband

→ Under “Closed User Group/Tools & Processes/ Processes“ helpful information can be found regarding the correct installation of VDSL2 connection lines. (The documents are available in German, French and Italian). http://www.swisscom.com/ws/products/Broadband

2 Triggering Measurements and Profile Changes

In order to be able to carry out a measurement or profile change, the router must be connected to the line in the direction of the DSLAM. If a measurement needs to be carried out on the connection point (CP), the junction box (JB) or the wall socket (WS), the line must run in the direction of the DSLR socket.

If the router is not synchronised, NASMS will provide a helpful error message regarding the cause, in accordance with table 2.2.

An SMS will be sent to 723, which contains details regarding the connection and the NA measurement values that have just been recorded. An example is given in table 2-1. The evaluation is completed in accordance with chapter 1.3.

SMS	Explanation	Example
Sent to **723**	Code **xxxx** according to the specifications / nine-digit connection number (without a leading zero)	"**dsl xxxx 527207447**"
	dsl pincode subscriber *command* (empty)	dsl xxxx 527207447
	Command: lqd	dsl xxxx 527207447 lqd Start Line Quality Diagnosis
	Command: lqdr	dsl xxxx 527207447 lqdr Start Line Quality Diagnosis with Reset
	Command: cp	dsl xxxx 527207447 cp Start standard profile change Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any possible service impact will be reported, i.e. the new fixed profile that is determined may not cause any loss in service - downgrade to the service limit at the very most.
	Command: cpsi	dsl xxxx 527207447 cpsi Start a profile change with potential service impact (CPSI) Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any potential service impact is not taken into consideration; a loss in service may therefore be incurred.
	Command: cpfi	dsl xxxx 527207447 cpfi Start flex/fixed profile change A new flex profile will be activated according to the grooming rules (DS:

		5Mb/s – LQSmax, US: 0.5Mb/s – LQSmax), a single point measurement will then be carried out, the results of which will be used as the basis for activating a new fixed profile. Utilised with "nosyn". Once the in-house installation has been adjusted, access profile should be modified again with CP.

Received	Measurement type and port ID [LS for LSD; LQ for LQD]	LS:IPC-SRSH780-S-VD-01:1-1-1-3
	Line State	Up
	Current access profile	V_11008_33024_02-08_02-08
	Attainable bit rate, up/down [kbit/s]	AttBr 2200/12000
	Occupation (capacity utilisation) up/down [%]	Occu 90/83
	Attenuation, up/down [dB]	Attnu 12.0/0.0
	Noise margin, up/down [dB]	NoiseM 6.6/8.0
	ICA findings [if no findings (-)], probability as to whether the findings are correct	ICA BT 80%
	Potential access speed after rectification of problem	SpGain [Up/Down]

Table 2-1: Example for a router that is synchronised (line state = "Up")

If the router is not synchronised, NA-SMS will return an error code. The most important codes are described below.

NA error code	Meaning
LOL	No line recognised
LOS	No line signal recognised
LOF	No DSL signal recognised
LPR	Router is switched off
LOM	Noise margin lower than target
COMMF	Router initialisation failed
NOATUR	No router detected
RATETH	The required bit rate cannot be reached
INITF	Router initialisation failed (incorrect configuration)
PROFERR	Incorrect or incomplete values in the configuration profile
CFGF	Line configuration error
ESE	Significant errors on the line
NOATUR	No router detected
OPERDOWN	DSLAM port has been switched off (operatively)
ADMINDOWN	DSLAM port has been switched off (administratively)
MAINT	DSLAM is in maintenance mode
POWEROFF	DSLAM port is switched off (cause unknown)
NOTPROVISIONED	DSLAM port has not been commissioned

Table 2-2: NA error messages, if the router is not synchronised (line state = "Down" + NA error code)

3 Interpretation of the Measurement Values

The router must be connected to the line in the direction of the DSLAM. If the measurement is taken at the CP, JB or MDF, the line must run in the direction of the DSLR socket (in the direction of the apartment, in-house installation).

If the router is not synchronised, NASMS will provide a helpful error message regarding the cause, in accordance with table 2.2.

An SMS will be sent to 723, which contains details regarding the connection line and the NA measurement values that have just been recorded. An example is given in table 2-1. The evaluation is completed in accordance with chapter 3 & 4. → see chapter 5 for examples

Standard profile:

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 80% ***	**< 95%**	MDF, JB, CP, socket
Attnu	VDSL2	**---**	**< 40 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 3-1: VDSL2 limits, standard profile

SI profile (flex profile):

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 100% ***	**< 100%**	MDF, JB, CP, socket
Attnu	VDSL2	**---**	**< 40 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 3-2: VDSL2 limits, SI profile

Fallback profile:

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 80% ***	**< 95%**	MDF, JB, CP, socket
Attnu	VDSL2	**---**	**< 50 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 3-3: VDSL2 limits, SI profile

Value	Δ Delta (CP to DSLR socket)
Attainable bit rate (downstream and upstream)	**<10%**
Downstream attenuation	**< 2 dB**

Table 3-4: VDSL2 in-house installation limits (measured at CP and DSLR socket).

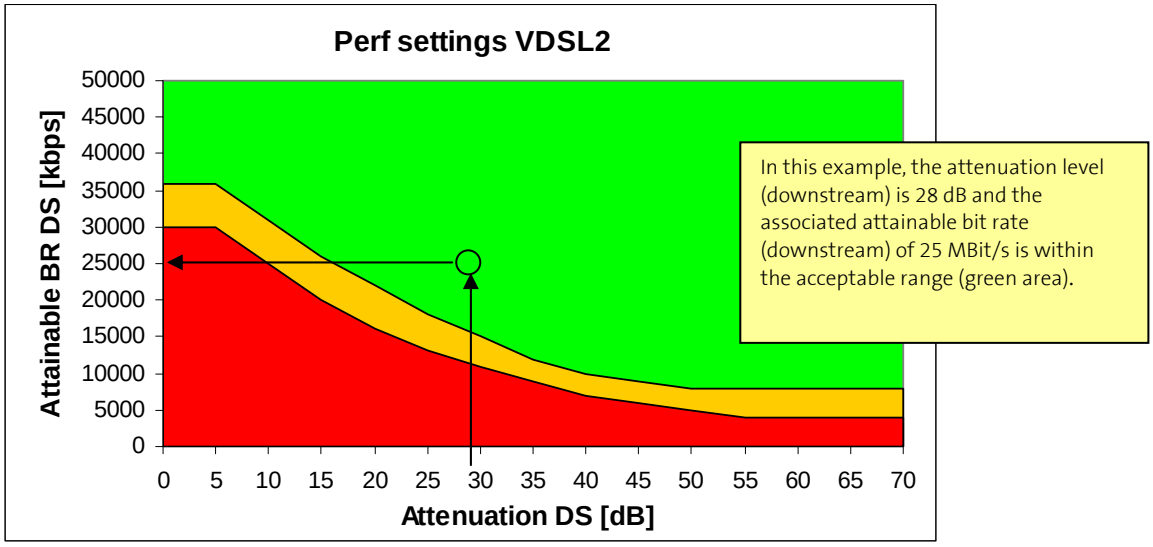


Illustration 3-1: Attainable bit rate (AttBr-Down), which is dependent on the attenuation level (Attnu-Down):

4 Explanation of the Measurement Values

The NA measurements are carried out in two directions (up/down). As different frequencies can be used for the transmission depending on the direction, the NA limits and the measurement values for the two directions (up/down) are different.

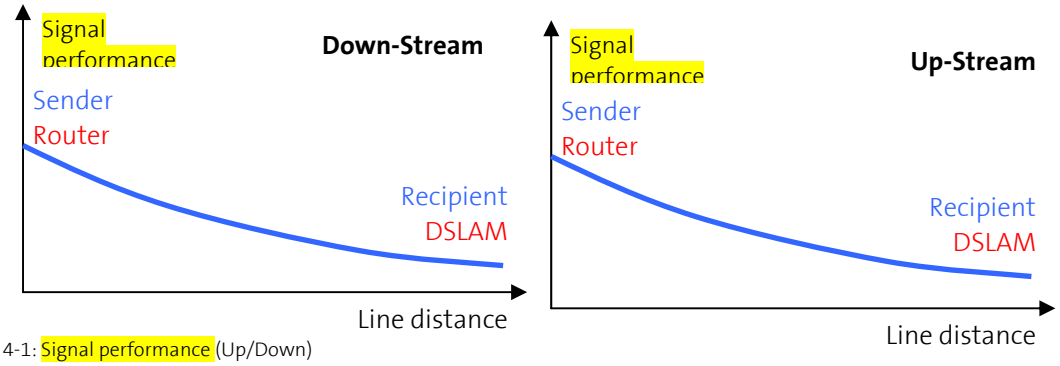


Illustration 4-1: Signal performance (Up/Down)

4.1 PortID

The PortID is also called the port number or line ID. With ADSL, the term ASAM-ID is also used, with VDSL2 the term ISAM/CAN-ID. The PortID consists of the following elements:

- <Messtyp> = LS for LSD; LQ for LQD
- ICP = Swisscom NetworkID
- <Ort> = DSLAM location (from *Baskal)*
- <Fkt> = Function: e.g s = Switch
- <HW> = Hardware: e.g. VD = VDSL2 DSLAM (ISAM/CAN); DM = ADSL DSLAM (ASAM)
- <HWID> = Consecutive hardware ID per location: e.g. 01
- <Port> = Consists of the rack – sub-rack – slot/card – port

4.2 Line State [UP/Down]

Line State Up	Modem/router synchronised
Line State Down	Modem/router not synchronised

→ see also table “NA-error messages“ 2.2

4.3 Access Profile

The counterpart to the xDSL modem at the customer’s location is the DSLAM located in the Swisscom exchange. The access profile is configured on the DSLAM. It may contain higher or lower values than the service profile. It is based on the maximum possible bandwidth provided by the technology and is used to ensure each customer is provided with the fastest possible Internet connection. The access profile can be displayed on the modem, it is therefore important that the meaning thereof is understood. The access profile consists of the following elements (<up> is always lower than <down>):

- ALP = ADSL line profile or
- V = VDSL2 line profile
- LR = Line rate (i.e. access bit rate)
- <up> = Upstream access bit rate in [kbit/s]
- <down> = Downstream access bit rate in [kbit/s]
- <flex> = Flexible access profile, often designated with an “f”

4.4 Service Profile

The various xDSL offers for residential and business customers are called service profiles. The service profile is configured on the BRAS.

4.5 Max. Profile

Swisscom has increased the ADSL and VDSL2 bandwidths on numerous occasions in the past, and in doing so, the maximum attainable bandwidth for some of the service profiles was defined. However, due to different lengths of the connection lines, the effective usable bandwidth may be lower than the defined bandwidth. The word “Max.” was therefore added to the respective service profiles.

4.6 Effective Speed

The theoretically usable bandwidth for the end user is based on the configured access profile and the service profile ordered by the customer. This value can, however, be limited under certain circumstances through the specific installation at the customer's premises (wireless network, applications, etc.)

4.7 Bit rate [kbit/s]

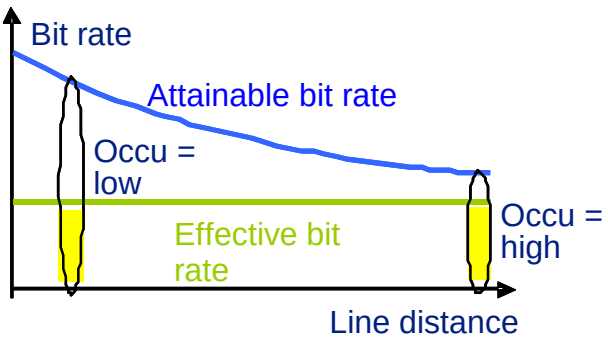
The bit rate is a unit for measuring the transmission speed in kbit/s (Kilobits per second). It is used for both directions, upstream and downstream.

Upstream	Downstream	Description
AttBrUp	AttBrDw	Current maximum attainable bit rate (up and down): **attainable bit rate**
ActBrUp	ActBrDw	Effective bit rate (up and down): **actual bit rate**

Table 4-1: Bit rate

4.8 Occupation (capacity utilisation) up/down [%]

The NA measurement highlights the current maximum attainable bit rate (AttBr). The effective bit rate (actual bit rate) is defined via the access profile, if no flex access profile is being used. The relative capacity utilisation is a unit for measuring the current load. Reserve capacity is required, as the attainable bit rate can vary over time.



$$Occu\ in\ \% = 100 \times \frac{\text{effective bit rate}}{\text{attainable bit rate}}$$

Illustration 4-2: Occupation

4.9 Attenuation, up/down [dB]

The signal strength weakens the further it travels. This attenuation of the signal can also be influenced by the condition of the line. The downstream values are usually more meaningful, as the variations with the downstream are smaller than with the upstream. The upstream values can also vary greatly depending on the frequency bands in use. This means these values may not be as precise.

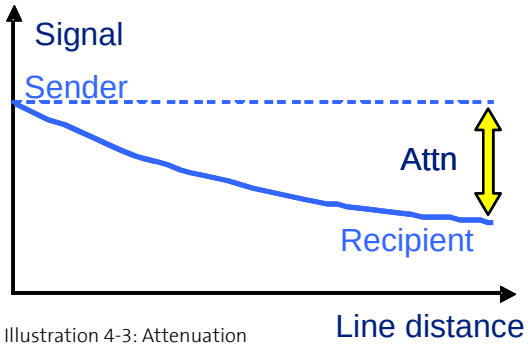
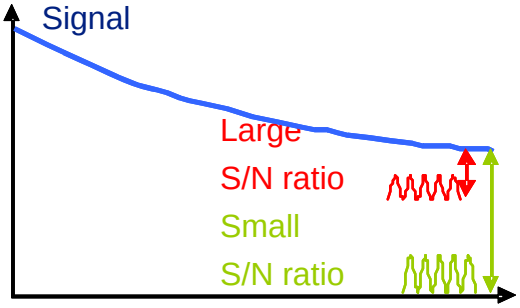


Illustration 4-3: Attenuation

$$Attnu\ in\ dB = 10 \times \log\left(\frac{Outputpower}{Inputpower}\right)$$

4.10 Noise margin, up/down [dB]

The signal-to-noise ratio is a unit for measuring the quality of an underlying signal with a certain amount of overlying noise. This noise can be a number of different causes. The noise margin is equal to the measured signal-to-noise ratio minus a calculated signal-to-noise ratio k with a bit rate of 1E-7.



$$NoiseM\ \ in\ dB = 10 \times \log\left(\frac{Signalpower}{noisepower}\right) - k$$

Illustration 4-4: Noise Margin

The noise margin is an important parameter for determining the quality of a connection line. The signal-to-noise ratio level is primarily dependent on the DSL bit rate. (Defined via the access profile).

4.11 ICA Findings

The ICA findings are a result of the NA measurement. The ICA function allows the condition of an in-house installation to be analysed. NA-SMS can also be used to trigger a new ICA measurement. At the moment, the ICA function can only be used with VDSL2. The following ICA findings are possible:

BT	=	Bridge tap
DC	=	Degraded contact
MS	=	Missing splitter
MA	=	Missing splitter on alarm system
IF	=	External interference detected
IC	=	Intermittent contact
LU	=	Loop unbalanced
UT	=	Untwisted in-house wiring
VN	=	Time varying noise (crosstalk and RFI)
CP	=	CPE interoperability problem
BL	=	Black-listed CPE
AC	=	Abnormal crosstalk
PS	=	Defect switched power supply
OI	=	Other unknown (not mapped) impact

4.12 Access Speed after Rectification of the Problem

Potential access speed after rectifying all installation problems

SpGain	=	Up Speed-Gain / Down Speed-Gain

5 Evaluation Examples

Example 1: OK: all VDSL2 limits fulfilled

IPC-BIGW650-S-VD-01:1-1-5-4
Up
V_11008_33024_02-08_02-08
AttBr 18000.0/53440.0
Occu 59.0/63.0
Attnu 22.2/15.5
NoiseM 16.9/18.7

Example 2: Not OK: Occu-Up too high (**88.0** instead of <80)

IPC-WAB640-S-VD-03:1-1-2-13
Up
V_1152_8832_02-08_02-08
AttBr 1272.0/14976.0
Occu **88.0**/64.0
Attnu 21.8/38.7
NoiseM 11.7/19.2

Example 3: Not OK: Occu-Down too high (**96.0** instead of <95)

IPC-CAL630-S-VD-03:1-1-5-6
Up
V_1152_16512_02-08_02-08
AttBr 1472.0/17108.0

Example 4: Not OK: Attnu-Down too high (**48.2 dB** instead of < 40 dB)

IPC-HAP620-S-VD-03:1-1-1-19
Up
V_704_8832_02-08_02-08
AttBr 3928.0/15520.0

Occu 75.0/**96.0**
Attnu 55.9/28.0
NoiseM 15.3/8.0

Occu 21.0/57.0
Attnu 12.9/**48.2**
NoiseM 22.9/10.5

Example 5: Not OK: NoiseM-Down too low (**7.7dB** instead of >8dB)

IPC-LAED770-S-VD-01:1-1-2-2
Up
V_11008_33024_02-08_02-08
AttBr 16656.0/41600.0
Occu 64.0/82.0
Attnu 11.6/7.5
NoiseM 14.1/**7.7**

Example 6: Not OK: diagram 1 not acceptable (**34.9dB /9912kb/s** not within green area)
ICA finding: BT with 80% probability and 2176 speed gain in downstream direction

IPC-WIP780-S-VD-04:1-1-2-2
Up
V_1152_8832_02-08_02-08
AttBr 1480.0/**9912.0**
Occu 74.0/89.0
Attnu 22.5/**34.9**
NoiseM 15.6/17.5
ICA BT 80%
SpGain [0/2176]

Example 7: OK: all limits fulfilled
"f-" = flex profile
i.e. Occu-Up limit is 100%

IPC-ASC630-S-VD-03:1-1-1-23
Up
Vsi_1152**f**_8832**f**-02-08_02-08
AttBr 1232.0/15296.0
Occu **95.0**/63.0
Attnu 7.0/38.5
NoiseM 6.1/17.5

Example 8: Not OK: multiple items not fulfilled (NoiseM-Up, NoiseM-Down, diagram 1)
"f-" = flex profile

IPC-UET770-S-VD-03:1-1-1-23
Up
Vsi_2304**f**_13248**f**-02-08_02-08
AttBr 2312.0/**15104.0**
Occu **100.0**/90.0
Attnu 22.2/**28.2**
NoiseM **5.0**/**7.7**

6 Troubleshooting (VDSL2)

6.1 Noise margin lower than limit

If the noise margin is lower than the acceptable limit, the line must be improved to make it more robust against interference.

Possible causes: incorrect cable type, power transformer, cross talk, star quad, dimmer, power line.

6.2 Attenuation higher than the limit

If attenuation is too high, the quality of the line will need to be improved. The downstream attenuation level is used as a reference value.

Possible causes: age, moisture, isolation, poor contacts, incorrect splitter, line between the modem and splitter is too long.

With VDSL2, attenuation generally increases for the downstream the longer the line is (similar to ADSL). With regard to the upstream, attenuation can be higher over shorter distances than over longer ones, as the frequency band US0 is only used for longer distances and the frequency band US2 for shorter ones.

6.3 Occupation higher than the limit

If the relevant capacity utilisation level (**occupation**) is too high, a lower access profile must be activated. Prerequisite for this is that the VDSL2 limits for the noise margin and attenuation are fulfilled. This conversion has hardly any affect on attenuation levels. If required, a lower access profile can be activated via the ISP of Swisscom.

6.4 Avoiding Interference

Special measures are required with the high frequency VDSL2 signal in order to avoid interference:
→ See also chapter 1.9 Additional Information

Clamp connections:
All clamp connections from the CP via junction box to the DSLR socket must be checked:

- Screws and clamps must all be securely tightened.
- Cable contacts should be replaced, if in doubt as to their condition (e.g. corrosions).
- The utilisation of screw terminals is recommended. If plug-in connectors are used, they must support high frequencies.

Junctions:
All junctions (bridge taps) from the CP via junction box to the DSLR socket must be removed:

- Undesired junctions may be in place in the apartment and/or riser zone; these must be identified along the entire length of the cable from the CP to the DSLR socket.

Cable connections:
All cable connections between the DSLR socket and the CPE or CPE and all STBs must be subjected to a special check.

- Whenever possible, ready-made cable should be used, and this should not be rolled up but laid out as straight as possible over a large area.
- If you attach the connectors to the cable yourself, high quality plug-in connectors should be attached using tools that are in perfect condition. Any connectors that do not appear to be in perfect condition should be replaced.

7 In-house Installations and Facility Installations

The measurement values determined by the NASMS system consist of values that were measured on the DSL cable (between the DSLAM port and the xDSL modem). The measured section consists of a number of individual segments. Swisscom is responsible for the segment up to the HCB (house connection box), which is also known as the connection point. The ISP or end customer is responsible for the in-house installation.

The home installation can be divided up into several sections. A differentiation can be made between the in-house installation and the facility installation. Interference on the connection line often points to a problem with the in-house installation or the facility installation.

Most of the ICA findings relate to issues with the in-house and/or facility installations, i.e. in the segment between the HCB and DSL CPE (e.g. bridge tap, missing splitter, etc).

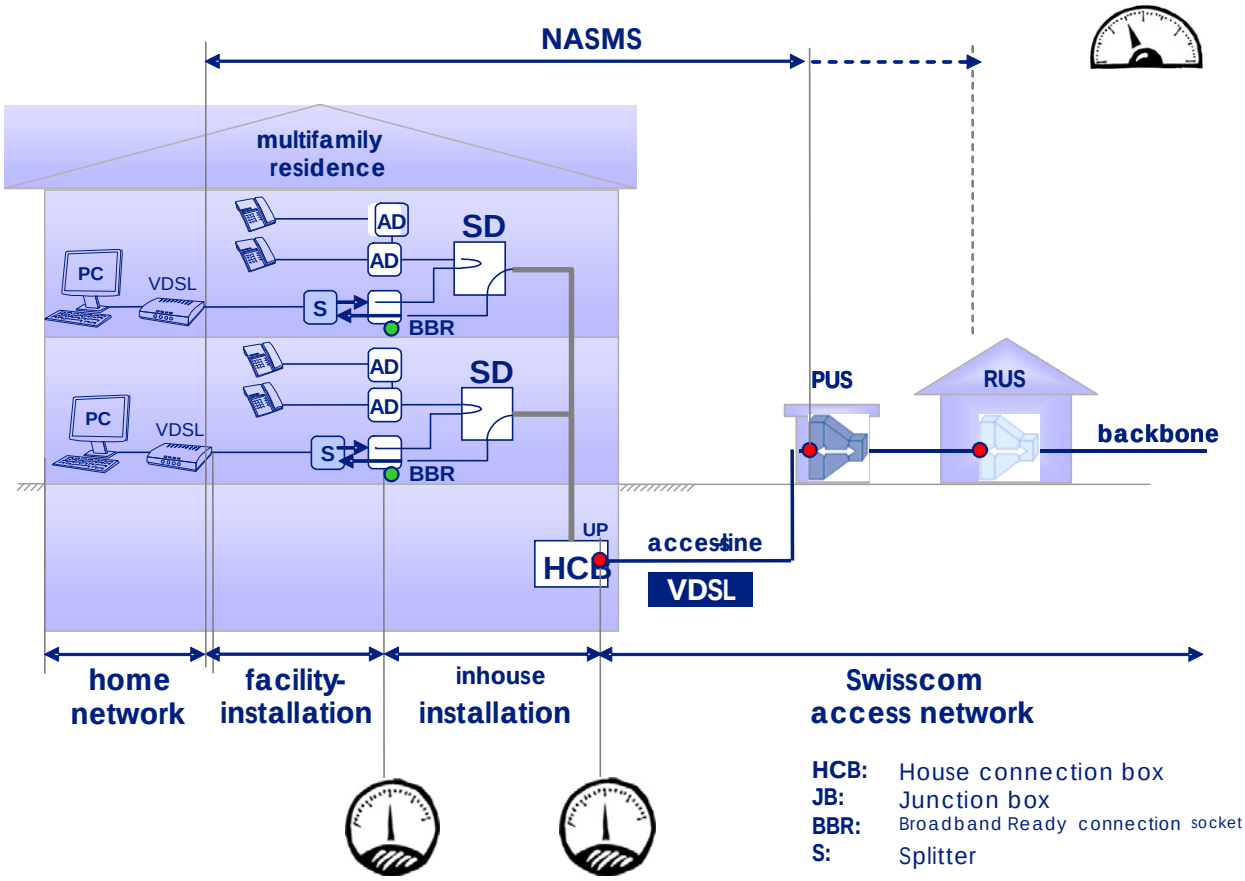


Illustration 7-1: Overview of in-house installation

8 Brief Operating Instructions - NASMS

The most important content regarding the NASMS System has been summarised below.

Triggering a measurement / profile change

In order to be able to carry out a measurement or profile change, the router must be connected to the line in the direction of the DSLAM. If a measurement needs to be carried out on the connection point (CP), the junction box (JB) or the wall socket (WS), the line must run in the direction of the DSLR socket.

SMS	Explanation	Example
Sent to **723**	Code **xxxx** according to the specifications / nine-digit connection number (without a leading zero)	"**dsl xxxx 527207447**"
	dsl pincode subscriber *command* (empty)	dsl xxxx 527207447
	Command: lqd	dsl xxxx 527207447 lqd Start Line Quality Diagnosis
	Command: lqdr	dsl xxxx 527207447 lqdr Start Line Quality Diagnosis with Reset
	Command: cp	dsl xxxx 527207447 cp Start standard profile change Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any possible service impact will be reported, i.e. the new fixed profile that is determined may not cause any loss in service - downgrade to the service limit at the very most.
	Command: cpsi	dsl xxxx 527207447 cpsi Start a profile change with potential service impact (CPSI) Starts a single point measurement, the results of which will be used as the basis for activating a new fixed profile. Any potential service impact is not taken into consideration; a loss in service may therefore be incurred.
	Command: cpfi	dsl xxxx 527207447 cpfi Start flex/fixed profile change A new flex profile will be activated according to the grooming rules (DS: 5Mb/s – LQSmax, US: 0.5Mb/s – LQSmax), a single point measurement will then be carried out, the results of which will be used as the basis for activating a new fixed

		profile. Utilised with “nosyn“. Once the in-house installation has been adjusted, access profile should be modified again with CP.

Received	Measurement type and port ID [LS for LSD; LQ for LQD]	LS:IPC-SRSH780-S-VD-01:1-1-1-3
	Line State	Up
	Current access profile	V_11008_33024_02-08_02-08
	Attainable bit rate, up/down [kbit/s]	AttBr 2200/12000
	Occupation (capacity utilisation) up/down [%]	Occu 90/83
	Attenuation, up/down [dB]	Attnu 12.0/0.0
	Noise margin, up/down [dB]	NoiseM 6.6/8.0
	ICA findings [if no findings (-)], probability as to whether the findings are correct	ICA BT 80%
	Potential access speed after rectification of problem	SpGain [Up/Down]

If the router is not synchronised, NA-SMS will return an error code. The most important codes are described below.

NA error code	**Meaning**
LOL	No line recognised
LOS	No line signal recognised
LOF	No DSL signal recognised
LPR	Router is switched off
LOM	Noise margin lower than target
COMMF	Router initialisation failed
NOATUR	No router detected
RATETH	The required bit rate cannot be reached
INITF	Router initialisation failed (incorrect configuration)
PROFERR	Incorrect or incomplete values in the configuration profile
CFGF	Line configuration error
ESE	Significant errors on the line
NOATUR	No router detected
OPERDOWN	DSLAM port has been switched off (operatively)
ADMINDOWN	DSLAM port has been switched off (administratively)
MAINT	DSLAM is in maintenance mode
POWEROFF	DSLAM port is switched off (cause unknown)
NOTPROVISIONED	DSLAM port has not been commissioned

Table 8-1: NA error messages, if router is not synchronised. (line state = “Down“ + NA error code)

SMS Server Error Messages

Error message	Meaning
Error1: Invalid PIN code ####	An invalid PIN code was sent. Check PIN .
Error2: Subscriber #### not found.	The specified subscriber does not exist.
Error3: Subscriber number or PIN code missing or invalid command.	The command is invalid, incomplete or incorrectly formatted.
Error4: Request rejected due to system overload. Try again in 10 minutes.	NA-SMS is overloaded. Try again later.
Error5: NA-SMS system error.	NA-SMS internal problem. Communication with a peripheral system is experiencing a disruption.
Error6: Subscriber #### has no port provisioned yet.	The DSL port of this subscriber has not been made available yet and cannot, therefore, be analysed.
Error7: NA-SMS System error (UnityDB)	Communication with the UnityDB is being disrupted.
Error8: NA-SMS System error (NA)	Communication between the UnityDB and Network Analyzer is being disrupted.
Error9: Port does not exists in NA	The port of the subscriber does not exist in the Network Analyzer. (Unlikely)
Error10: DSLAM not configured in NA	The Network Analyzer is unaware of the DSLAM on which the port is configured. (Unlikely)
Error11: Precondition not met: ####	Another prerequisite for taking the measurement has not been fulfilled.

Interpretation of the Measurement Values

The router must be connected to the line in the direction of the DSLAM. If the measurement is taken at the CP, JB or MDF, the line must run in the direction of the DSLR socket (in the direction of the apartment, in-house installation).

If the router is not synchronised, NASMS will provide a helpful error message regarding the cause, in accordance with table 2.2.

An SMS will be sent to 723, which contains details regarding the connection line and the NA measurement values that have just been recorded. An example is given in table 2-1. The evaluation is completed in accordance with chapter 3 & 4. → see chapter 5 for examples

Standard profile:

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 80% ***	**< 95%**	MDF, JB, CP, socket

Attnu	VDSL2	**---**	**< 40 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 8-2: VDSL2 limits, standard profile

SI profile (flex profile):

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 100% ***	**< 100%**	MDF, JB, CP, socket
Attnu	VDSL2	**---**	**< 40 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 8-3: VDSL2 limits, SI profile

Fallback profile:

SMS abbreviation	Protocol	Required upstream value	Required downstream value	NASMS location
AttBr & Attnu	VDSL2	---	Green in diagram 1	MDF, JB, CP, socket
Occu	VDSL2	**< 80% ***	**< 95%**	MDF, JB, CP, socket
Attnu	VDSL2	**---**	**< 50 dB**	MDF, JB, CP, socket
NoiseM	VDSL2	**> 6 dB**	**> 8 dB**	MDF, JB, CP, socket

Table 8-4: VDSL2 limits, SI profile

Value	Δ Delta (CP to DSLR socket)
Attainable bit rate (downstream and upstream)	**<10%**
Downstream attenuation	**< 2 dB**

VDSL2 in-house installation limits (measured at CP and DSLR socket).-{}-

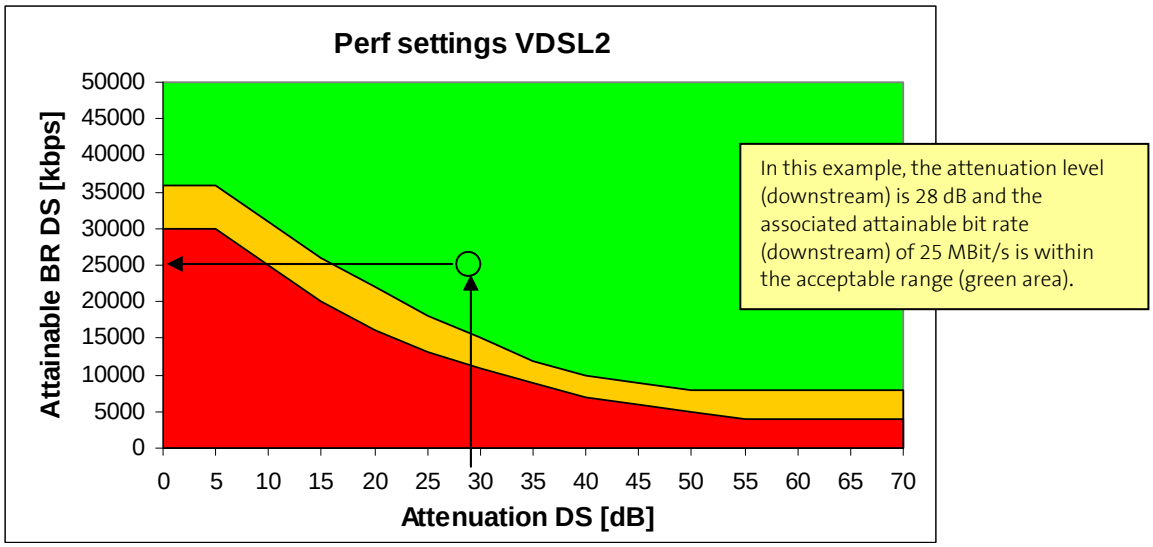


Illustration 8-1: Attainable bit rate (AttBr-Down), which is dependent on the attenuation level (Attnu-Down):

9 Index

– List of abbreviations

Abbreviation	Meaning
ADSL	Asymmetric Digital Subscriber Line
CS	Connection socket
AttBr	Attainable bit rate (maximum attainable bit rate) with NASMS
AttBrDw	Attainable bit rate downstream
AttBrUp	Attainable bit rate upstream
Attnu	Attenuation with NASMS
BBR	Broadband Ready (=DSLR) → see also VDSL2 Installation Guide in chapter 1.9
DS	Downstream (transmission direction from the DSLAM to router)
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DSLR	DSL-Ready (=BBR)
FTP	File Transfer Protocol
IP	Internet Protocol
IPSS	IP Standard Services
ISDN	Integrated Services Digital Network
NA	Network Analyzer
NASMS	Network Analyzer SMS System
NE	Network Element
NM_DN	Noise margin in the Downstream
NM_UP	Noise Margin in the Upstream
NoiseM	Noise Margin with NASMS
Occu	Occupation (relative capacity utilisation) with NASMS
POTS	Plain Old Telephone System
PTP	Primary Transmission Point (can contain VDSL2 equipment, e.g. in an outdoor cabinet)
RTP	Regional Transmission Point (usually the Swisscom exchange)
SA	Service Assurance (fault repair)
JB	Junction Box
SDSL	Symmetric Digital Subscriber Line
SF	Service fulfilment (initial installation)
SMS	Short Message Service
SNR	Signal-to-Noise Ratio
SSID	Service Set Identifier
ST	Service Technician
CP	Connection Point (interface between the in-house installation and the connection line)
US	Upstream (transmission direction from the router to DSLAM)
VDSL	Very High Speed Digital Subscriber Line
VoIP	Voice over IP
WLAN	Wireless Local Access Network
WPA	WiFi Protected Access
WSG TT	Web Service Gateway Trouble Ticket
xDSL	Any kind of DSL technology

Table 9-1: List of abbreviations