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## Interface Properties of the Analogue Network Interface

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## **1 Introduction**

### **1.1 Object and purpose**

This document describes the physical properties of the analogue subscriber interface at the NTP.

### **1.2 Scope of validity**

The contents of this document apply to the analogue fixed-line connection of Swisscom (Switzerland) Ltd. The connection is referred to as EconomyLINE.

The description is not valid for analogue subscriber connections to an NT+2ab

### **1.3 Target audience, reader requirements**

This document is intended for manufacturers of analogue devices.

### **1.4 Terms and abbreviations**

ADSL	Asymmetric Digital Subscriber Line
ALASS	Analogue Local Access Signalling Services
CLIP	Calling Line Identification Presentation
TE	Terminal Equipment
LF	Loading Factor
MWI	Message Waiting Indication
NTP	Network Termination Point
NSP	Network Separation Point
PSTN	Public Switched Telephone Network
RT	Resistance of loop power supply
SMS	Short Message Service

### **1.5 References**

- [1] ES 201 970 V1.1.1 (2002-08)  
Access and Terminals (AT); Public Switched Telephone Network (PSTN); Harmonized specification of physical and electrical characteristics at a 2-wire analogue presented Network Termination Point (NTP)
- [2] TBR 21; 01.1998  
Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice

telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling

- [3] TBR 38; 05.98  
Public Switched Telephone Network (PSTN); Attachment requirements for a terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe
- [4] 2007-09-30 GV08 Hausinstallation.doc  
Technical requirements for in-house installation of wired analogue and digital interfaces
- [5] ITU-T Q.552 (11/2001)  
Transmission characteristics at 2-wire analogue interfaces of digital exchanges
- [6] ES 201 187 (1999-03)  
2-wire analogue voice band interfaces; Loop Disconnect (LD) dialling specific requirements
- [7] ETSI EN 300 659-1 V1.3.1 (2001-01); Accesses and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services: Part 1: On-hook data transmission
- [8] ETSI EN 300 659-2 V1.3.1 (2001-01); Accesses and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services: Part 2: Off-hook data transmission
- [9] ETSI EN 300 659-3 V1.3.1 (2001-01); Accesses and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services: Part 3: Data link message and parameter codings
- [10] ETSI ES 201 912 V1.2.1 (2004-08); Access and Terminals (AT); Short Message Service (SMS) for PSTN/ISDN; Short Message Communication between a fixed network Short Message Terminal Equipment and a Short Message Service Centre

## 2 Location of interface

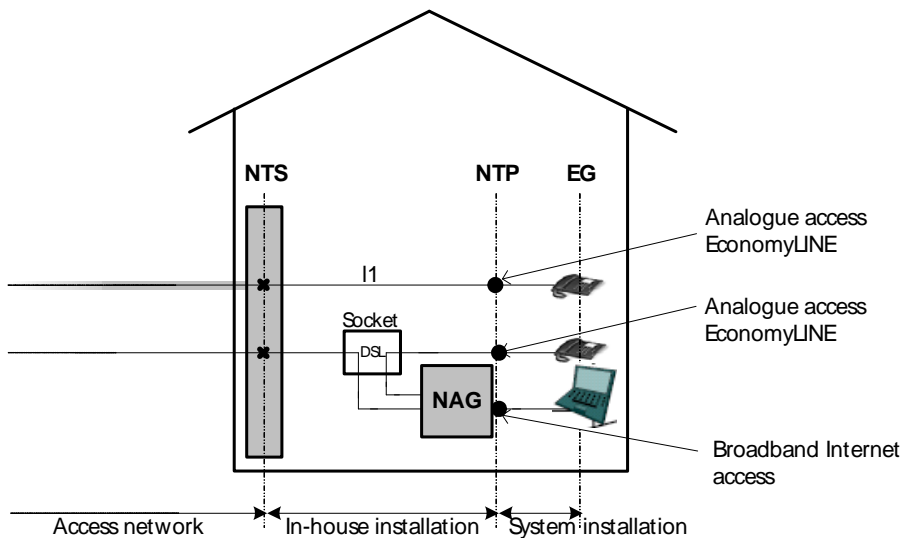


Figure 1 Location of interface

The interface properties specified in section 3 refer to the NTP. The requirements for in-house installation are specified in [4]. The NTP data specified in section 3 are only valid if the in-house installation fulfils the requirements listed in [4].

### 3 Interface properties at the NTP

In principle, [1] applies. Any deviations from [1] are listed.

Section of [1] ES 201 970	Values / Comments
<b>4 General</b>	The interface supports end devices as per TBR 21 [2] and TBR 38 [3]
<b>5 Physical connections</b>	
5.1 Mechanical aspects	The socket as termination point for the in-house installation corresponds to the NTP. Swisscom (Switzerland) Ltd is responsible for selecting the type.  The national socket system TT83 or TT87 is used as standard.
5.2 Support of more than one terminal	The interface supports an LF of 100 as a minimum, i.e. terminal as per TBR 21 [2] or TBR 38 [3]. If additional terminals are connected in parallel, functionality cannot be guaranteed.
<b>6 DC feed condition</b>	
6.1 Polarity	Corresponds to [1]
6.2 Quiescent state	
6.2.1 Maximum voltage	Corresponds to [1]
6.2.2 Minimum voltage	Corresponds to [1]  LF is 100 (i.e. measurement is taken at a resistance of 1M $\Omega$ )
6.2.3 Supply interruption	Corresponds to [1]  RT may be less than 2 x 50 k $\Omega$ in idle mode
6.3 Loop current	
6.3.1 Loop current range	Corresponds to [1]  The maximum value of 70 mA may be exceeded in extreme situations (short subscriber line, maximum power supply).
6.3.2 Loop current interruptions caused by the terminal	Local loop interruptions (power < 1 mA) from 0 – 12 ms do not result in any changes to the NTP.
<b>7 Seize signal</b>	
7.1 Must not seize condition Current	Corresponds to [1]
7.1 Must not seize condition	A loop closure of 0 -5 ms is not recognized as busy.

Section of [1] ES 201 970	Values / Comments
Time	
7.2 Must seize condition	A current of $\geq 15$ mA is not recognized as busy.
Current	
7.2 Must seize condition	Corresponds to [1]
Time	
<b>8 Clear signal</b>	
8.1 Clear signal generated by TE a) Shall not accept	An interruption of $< 200$ ms is not recognized as a loop opening
8.1 Clear signal generated by TE b) Shall accept	Corresponds to [1]
8.1 Clear signal generated by TE For the called party	$3 \pm 1$ min.
8.2 Clear indication from the network	Corresponds to [1]
8.3 Seizing the line for a new call	Corresponds to [1]
<b>9 Impedance</b>	
9.1 NTP impedance	Corresponds to [1] in region of 300 to 3400 Hz.
9.2 Balance about earth	Corresponds to [1] in region of 300 to 3400 Hz.
<b>10 Transmission</b>	
10.1 Relative level	Input relative level = $+2.5 \pm 2.5$ dBr Output relative level = $-9 \pm 2.5$ dBr
10.2 Frequency response	Corresponds to [1]
10.3 Coding law	Corresponds to [1]
10.4 Noise	Corresponds to [1]
10.5 Maximum input levels	3.14 dBm
10.6 Stability	Corresponds to [1]
10.7 Crosstalk	Corresponds to [1] in accordance with [5]
<b>11 DTMF Dialling</b>	Corresponds to [1]
<b>12 Ringing</b>	

Section of [1] ES 201 970	Values / Comments				
12.1 Ringing drive capability					
12.1.1 Ringing frequency	Frequency 25 ± 3 Hz				
12.1.2 Ringing voltage	Corresponds to [1]				
12.1.2.1 Ringing with DC	Corresponds to [1]				
12.1.2.2 Ringing without DC	Option not available				
12.2 Ring cadence	Corresponds to [1]  Normal call: Call 1000 ± 100 ms, pause 4000 ± 400 ms				
12.3 Ring trip	Corresponds to [1]				
13 Supervisory signals					
13.1 Supervisory tones	The following tones are available  a) Dial tone b) Ringing tone c) Busy tone d) Congestion tone, release tone e) Special dial tone 1 f) Special dial tone 2 g) Special information tone h) Call waiting tone				
13.2 Tone levels and 13.3 Cadence and frequencies	Tone	Cadence		Frequency	Level
	a)	Continuous		425 Hz ± 15 Hz	- 6.2 to – 14.7 dBm
	b)	1 s on	4 s off	425 Hz ± 15 Hz	- 6.2 to -19.7 dBm
	c)	0.5 s on	0.5 s off	425 Hz ± 15 Hz	- 6.2 to -19.7 dBm
	d)	0.2 s on	0.2 s off	425 Hz ± 15 Hz	- 6.2 to -19.7 dBm
	e)	Continuous		425 Hz ± 15 Hz	- 6.2 to -14.7 dBm
		1.1 s on	1.1 s off	340 Hz ± 15 Hz	- 6.2 to -19.7 dBm



Section of [1] ES 201 970	Values / Comments				
	f)	0.5 s on	0.05 s off	425 Hz $\pm$ 15 Hz	- 6.2 to -19.7 dBm
	g)	3 x 0.33 s on	1 s off	950 Hz 1400 Hz 1800 Hz tolerance $\pm$ 50Hz	-23.2 to -34.7 dBm
	h)	0.2 s on 0.2 s on	0.2 s off 4 s off	425 Hz $\pm$ 15 Hz	-17.2 to -28.7 dBm
	Tolerances of cadence $\pm$ 10 %				
Comment on supervisory signals	The requirements outlined in this section apply only to tones generated in the equipment that serves the NTP. Example: The ringing tone is normally fed to the exchange of the B subscriber. In this case, this tone may have other characteristics.				
<b>14 Optional functions</b>					
14.1 Loop disconnect dialling	Impulse dial-up with the following characteristics is recognized:				
- Make and break	Impulse dial-up (loop opening) of 40...80 ms Impulse dial-up break (loop closure) of 30...55 ms i.e. impulse dial-up as per [6] 4.2.4 Option b) is supported.				
c) make current	Corresponds to [1]				
d) break current	Corresponds to [1]				
e) interdigital pause	$\geq$ 250 ms				

Section of [1] ES 201 970	Values / Comments
14.2 Register recall	Corresponds to [1]
14.3 Metering	Level according to [1] not guaranteed; frequency 12 kHz
14.4 ALASS services	The services CLIP, MWI, SMS are supported See section 4 for details
14.5 Polarity reversal	Option not available
14.6 End of call signal ("K break")	Loop interruption of 120 $\pm$ 20 ms at the NTP of B subscriber when A subscriber hangs up.  The interruption is not guaranteed in all cases.

## **4 "Display Services PSTN" services CLIP, MWI and SMS**

### **4.1 Subscriber signalling**

The "Display Services PSTN" service enables information that can be depicted on the display of an appropriate device to be transferred via the analogue subscriber's individual connection.

The data for the additional services CLIP (Calling Line Identification Presentation) and MWI (Message Waiting Indication) is only transmitted in one direction, from the network to the subscriber. SMS data is transmitted in both directions.

Data are transmitted as per [7] (on-hook) and [8] (off-hook). The signalling protocol to be used is defined in [9].

#### **4.1.1 Subscriber Line Protocol; Part 1: On-hook data transmission**

The provisions outlined in [7] apply, subject to the following additions:

§5.2: 180±25 "mark bits" are sent.

§6.1.2 Data transmission prior to ringing is not used.

§6.2 Data transmission is not associated with ringing

- 6.2 a): DT-AS is used.

- 6.2 b): RP-AS is not used.

- 6.2 c): Line reversal followed by DT-AS is not used.

§6.3: TAS physical characteristics

- 6.3.1: DT-AS is used.

- 6.3.2: RP-AS is not used.

- 5 Annex B is not used.

#### **4.1.2 Subscriber Line Protocol; Part 2: Off-hook data transmission**

The provisions outlined in [8] apply with regard to SMS transmission.

#### **4.1.3 Subscriber Line Protocol; Part 3: Data link message and parameter codings**

The provisions outlined in [9] apply, subject to the following additions:

§5.2: The following messages are used:

§5.2.1 Call Setup message

§5.2.2 Message Waiting Indicator message

§5.3 and §5.4: Only the following parameters are used:

§5.4.1 Date and Time

§5.4.2 Calling Line Identity

§5.4.4 Reason for absence of Calling Line Identity

§5.4.7 Visual indicator

§5.4.8 Message identification

§5.4.9 Last message CLI

§5.4.14 Number of messages

## **4.2 Services**

### **4.2.1 Calling Line Identification Presentation (CLIP)**

The CLI is transmitted between the first and second call to the subscriber, as per [7] §6.1.1.

Only one CLI is transmitted to the subscriber. If two CLIs are available only the "user provided not screened number" ("additional calling party number") is transmitted.

### **4.2.2 Message Waiting Indication (MWI)**

The additional service MWI lets subscribers know when someone has left them a voicemail message (e.g. in their Combox).

Identification is only sent if the voicemail operator supports this service.

The provisions outlined in [7] §6.2 "Data transmission not associated with ringing" apply when transmitting MWI information to the subscriber.

### **4.2.3 Short Message Service (SMS)**

The SMS service is provided as per the provisions outlined in [10], subject to the following additions:

§5.2.1 SM submission from SM-TE to AM-SC:

Sub-addresses in the area 0-9 are used. 0 is used as default.

§5.2.2 SM Delivery from SM-SC to SM-TE:

The deliver mode identifier is set to 0.

§5.3.1 Physical layer

The T10 timer is set to 2000 ms.

## §5.5 Requirements for the Short Message Terminal Equipment

### §5.5.1 SM-SC phone numbers

The following numbers are used for the SM-SC: 062 21 000 xy (x = subaddress, y = deliver mode)

For calls from the SM-TE to the SM-SC, the subaddress can also be sent after the SM-SC number. If no subaddress is sent, 0 is used as default.

When delivering SMS messages, the calling party number is comprised as follows: <SM-SC-Number><Called Subaddress Digit><Deliver Mode Identifier Digit>

### §5.5.2 Ringing suppression

SM-TEs should suppress the first call.

### §5.5.3 SMS memory full

As per Delivery Mode 0, the SM-TE will respond to the connection and send an error code.

### §5.5.4 SM-TE busy

When the subscriber called is busy, the SM-SC will attempt to place the call again after a certain period of time.

### §5.5.5 Calling Line Identification Restriction (CLIR)

The CLI of the SM-TE-O is transmitted to the SM-TE-T without fail. No hash code is used.

### §5.5.6 Incoming calls

Delivery Mode Identifier = 0 is used.

### §5.5.7 Outgoing calls

The collect option is not supported.

## §5.6 Extensions to the cited GSM standards

The TP-FCS E0 is not used.

## §6 Protocol 2

The Protocol 2 is not used.