Transmission paths in Alarm Transmission Systems (ATS)
Guidelines for Alarm Systems (AS)

Transmission paths in Alarm Transmission Systems (ATS)

CONTENTS

1 General ................................................................................................................................. 4
  1.1 Scope ............................................................................................................................. 4
  1.2 Validity .......................................................................................................................... 5

2 Normative references ........................................................................................................ 5

3 Terms, definitions and abbreviations .............................................................................. 6
  3.1 Terms and definitions .................................................................................................... 6
  3.2 Abbreviations ............................................................................................................... 12

4 Connections and test signals/messages .......................................................................... 13
  4.1 Types of connections .................................................................................................... 13
  4.2 Definition of the types of connections ......................................................................... 13
  4.3 Test signals/messages ................................................................................................. 14

5 Classification of signals/messages .................................................................................. 15

6 Net-specific requirements for transmission paths ........................................................... 16

7 Selection of transmission paths ....................................................................................... 17
  7.1 Selection criteria ........................................................................................................... 17
  7.2 Signals/messages class III with alternative paths ......................................................... 17
  7.3 Examples for different transmission paths .................................................................. 18
  7.4 Listing of qualified transmission paths ....................................................................... 18

8 Tests .................................................................................................................................. 18

Annex A – Network specific requirements for transmission paths .................................... 20
  A.1 General ......................................................................................................................... 20
  A.2 Transmission protocol ................................................................................................. 20
  A.3 Interface S2/S3 via analogue dedicated connections (lines) ........................................ 20
  A.4 Interface S2/S3 for the connection to a Public Switched Telephone network (PSTN) with analogue subscriber terminal ....................................................... 21
  A.5 Interface S2/S3 for connection to a digital dedicated connection (line) (in Germany “Digitale Festverbindung”) .......................................................... 23
  A.6 Interface S2/S3 for the connection to ISDN ................................................................. 24
  A.7 Interface S2/S3 for the connection to an X.25 dedicated or dial-up connection .......... 27
  A.8 Interface S2/S3 via MODACOM radio data transmission .......................................... 29
  A.9 Interface S2/S3 for the connection to Trunked Private Mobile Radio Systems (in Germany “Bündelfunknetze”) according to MPT 1327 ............................ 29
  A.10 Interface S2/S3 via GSM data radio connections ....................................................... 30
  A.11 Interface S2/S3 via GSM Short-Message-Service (SMS) ........................................... 31
  A.12 Interface S2/S3 via the “C-Telefon-Net” ................................................................. 32
  A.13 Interface S2/S3 for the connection to IP-nets using the TCP-protocol ...................... 32
  A.14 Interface S2/S3 for the connection to IP-nets using the UDP protocol ................. 35
1 General

1.1 Scope

These guidelines contain requirements for transmission paths used for alarm signals/messages (e.g. fire, intrusion, fault signals/messages). They shall be applied in conjunction with the “Guidelines for intruder alarm systems, general requirements and test methods”; VdS 2227.

The transmission path is the connection between the Alarm System (AS) and a remote provider in charge of assistance (Alarm receiving centre (ARC)). In the simplest case it consists of a net and the two dedicated network termination points (NTP) or of different nets, which are connected with each other within the transmission paths. Further on additional equipment, e.g. communications devices (CD) may be available within the transmission path, which are owned by a net operator, by the user of the alarm transmission system or a third party. Depending of the transmission path and the transmission procedure the use of sub-receiving centre transceiver (SRCT) may be necessary.

Annex A of these guidelines contains special requirements for specific public and company-internal nets; an application on other nets is possible if the requirements are fulfilled accordingly.

According to the OSI reference model communication in open systems

- the guidelines „Transmission protocol”, VdS 2465 describe the layers 2, 4, 5, 6 and 7, whereas the specifications for the layers 2 and 4 are taken from DIN EN 60 870 ¹, ²,
- the guidelines „Transmission paths”, VdS 2471 describe the layers 1 and 3.

Note 1: The CCITT recommendations are mentioned in the following in a short form (instead of „CCITT recommendation V.24” just „V.24”).

Note 2: The German company „Deutsche Telekom AG” will be named as „Telekom” in the following.

Note 3: Certain names and abbreviations are subject to steady changes. Therefore these guidelines may be out-dated already at the time of application.

Figure 1.01 shows the elements of an Alarm Transmission System (ATS) and the interfaces S₁ to S₄, whereas figure 1.02 illustrates the schematic design of the transmission paths inclusive all the possible components.

¹) DIN EN 60870 supersedes DIN 19244.
1.2 Validity

These guidelines are valid from 01. October 2005; they replace the edition VdS 2471 : 1998-04 (02).

2 Normative references

These guidelines contain dated and undated references to other publications. The normative references are cited at the appropriate places in the clauses, the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to these rules only when announced by a change of these rules. For undated references the latest edition of the publication referred will be applied.

- **DIN 14675** Fire detection and fire alarm systems - Design and operation
- **DIN EN 60870** Telecontrol equipment and systems
- **DIN VDE 0833-1** Alarm systems for fire, intrusion and hold-up - Part 1: General requirements
- **DIN VDE 0833-2** Alarm systems for fire, intrusion and hold up - Part 2: Requirements for fire alarm systems
- **EN 50136-1-1** Alarm systems - Alarm transmission systems and equipment - part 1-1: General requirements for alarm transmission systems
3 Terms, definitions and abbreviations

3.1 Terms and definitions

For general terms and definitions refer to the “Guidelines for intruder alarm systems, general requirements and test methods”, VdS 2227, whereas for fire alarm systems the terms and definitions in DIN VDE 0833 parts 1 and 2 and DIN 14675 are applicable.

The following additional or deviating terms and definitions are applicable.

*Alarm receiving equipment (ARE):* Receiving equipment in alarm transmission systems which receives, acknowledges, processes and indicates signals/messages from alarm systems and transmits control signals to the Alarm transmission equipment (ATE). Alarm receiving equipment (ARE) consist at least of a Receiving centre transceiver (RCT) and an Annunciation equipment (AE).

*Alarm transmission equipment for alarm signals (ATE):* ATE pick up signals from alarm systems, prepare them for transmission via transmission paths and serve as an interface to these transmission paths. They also prepare the control commands issued in the alarm receiving equipment (ARE) and pass them on to the connected alarm system.

*Note: Formerly known as Transmission facility, Telephone dialling device, auto dialler*

*Alarm transmission system (ATS):* Equipment and networks transferring information on the status of one or more alarm systems to one or more alarm receiving centres (ARC).

*Alternative path:* Transmission path used for the transmission of signals/messages when the primary transmission path is not available, for example because of faults or tampering.

*Annunciation equipment (AE) of an alarm transmission system:* Device which displays the signals/messages and information from the Receiving centre transceiver (RCT), stores them if required, and allows sending control commands to the Alarm transmission equipment (ATE).

Asynchronous network: With an asynchronous network, each party which is connected can transfer data to the network at any time. The network transports this data to the chosen party using the specified destination number. An asynchronous network has a honeycomb networking structure and is equipped with standby paths which the network automatically uses if a path fails. Examples of asynchronous networks include ISDN, X.25 (Datex-P), Telex, analogue telecommunications networks.

AWUG (German abbreviation): see Digital communicator

Note: This term is outmoded; see „Alarm transmission equipment (ATE)“

B-channel: Operational channel of an ISDN interface with a transmission rate of 64 kbit/s.

BAPT (Bundesamt für Post and Telekommunikation): German government organization responsible for the use of communications paths and services by setting approval rules and licences in the frame of the German “Fernmeldeanlagengesetz” (FAG) – and supervising these.

Note: The tasks of the BAPT which has been suspended are taken over now by the Regulierungsbehörde für Telekommunikation and Post (RegTP; German authority which regulates and monitors the use of communications media and services and postal services by issuing authorisation provisions and licences).

Blockade release: Absolute precedence of the alarm transmission equipment (ATE)/Receiving centre transceiver (RCT)/Sub-receiving centre transceiver (Sub-RCT) over other devices using the same communications device or network terminal. Among other things, this means the forced interruption of a connection which is being set up or already exists and which is interfering with the alarm transmission.

BZT (Bundesamt für Zulassungen in der Telekommunikation): German government organization responsible for issuing authorisation provisions and licences for equipment used for telecommunication purposes. Authorisation provisions and licences are made on the basis of approval rules of the BAPT.

Note: The tasks of the suspended BZT are now performed by „Notified Bodies“.

Closed user group: Group of participants within a network who can only communicate with each other and cannot be reached by other participants of the network or from outside the network.

Comité Consultatif International Télégraphique et Téléphonique (CCITT): International advisory committee of the International Telecommunications Union for telegraphy and telephony services. The CCITT drafts recommendations for telecommunications. V-series and X-series recommendations are of importance to alarm transmission.

Note: The organisation is now called ITU-T.

Communications devices (CD): Devices within transmission paths in alarm transmission systems which do not belong to networks. Communications devices include e.g. multiplexers, concentrators, processing nodes and service transition points. They may belong to the network operator, the operator of the alarm transmission system, the operator of the alarm system or third parties.

D-channel: Control channel in ISDN for the transmission of control and administrative data in the connection.
Data radio: In data radio systems, data is sent via a radio infrastructure and can be passed on via wired networks.

Note: Example “MODACOM” from Deutsche Telekom.

DDV: Daten-Direktverbindung (Data Direct Connection) from Deutsche Telekom. A DDV is a constant connection between two computer or networks via public lines.

Formerly in Germany known as: Hauptanschluss für Direktruf; HfD (Main access for direct call).

Dedicated line: Physical or logical connection which, once set up or created, is constantly available for the transmission of signals/messages or for monitoring the connection.

Different route: Different routes exist if transmission paths around the alarm transmission equipment (ATE) and the Receiving centre transceiver (RCT resp. Sub-RCT) are designed in such a way that attacks on one route (e.g. attack on a telecommunications cable) do not have a negative effect on the other route.

Example: Different routing of two telecommunications cables in a building, transmission via telecommunications cable and radio network.

Digital Communications System (DCS): Digital mobile telephony network which operates in the 1800 MHz frequency band. In Germany this is known as the “E-Plus-Netz”.

Digital communicator: Alarm transmission equipment (ATE) for connection to switched telephone networks. Information is transmitted via coded signals. The subscriber’s device is known in Germany as “AWUG-T” and the receiver in the alarm receiving centre in Germany is known as “AWUG-Z”.

Note: This term is outmoded; see „Alarm transmission equipment (ATE)”

Euro ISDN: ISDN in which the DSS1 protocol is used in the D-channel.

Global System for Mobile Communications (GSM): Digital mobile telephony network which operates in the 900 MHz frequency range.

Note: Example “D-Netz” in Germany.

Integrated Services Digital Network (ISDN): Service-integrated digital communication network bringing together various communications services, e.g. telephony and data transmission.

Interface: Theoretical or actual transition at a boundary between two functional units with agreed rules for the transfer of data and signals.

Interface S₁: Interface between the Alarm system (AS) and the Alarm transmission equipment (ATE).

Interface S₂: Interface between the alarm transmission equipment (ATE) and the network termination point or an available communications device.

Interface S₂₁: If a communications device is located between the alarm transmission equipment (ATE) and the network termination point, its output is known as S₂₁.

Interface S₃: Interface between the network termination point and the Receiving centre transceiver (RCT) resp. Alarm receiving equipment (ARE).
Interface S₃.₁: If a communications device is located between the network termination point and the Receiving centre transceiver (RCT), its input is known as S₃.₁.

Interface S₄: Interface between the Receiving centre transceiver (RCT) and the Annunciation equipment (AE).

IP (Abbreviation for „Internet Protocol“): In the internet, IP makes the exchange of data between computer possible.

Needs-based connection (dialup line): Physical or logical connection which has to be dialed-up prior to transmission of signals/messages or connection monitoring operations, and cleared again after the transmission or monitoring operation is complete.

Negative acknowledgement: Information from the alarm transmission equipment (ATE) to the alarm system to advise that an alarm signal could not be passed across interface S₂.

Network: Networks transmit information from A to B without changing it; Network-specific information may be added to or left out of the transmission process.

Network termination point (NTP): Electrical (interface) and mechanical connection (e. g. socket) which the network provider makes available and which constitutes the end point of the providers area of responsibility.

Note: The network termination point may also contain electronic and/or energy supply equipment.

Network terminator (NT): Name for the network termination point of the German Telekom ISDN system.

OSI layer (Open Systems Interconnections): Layer within the reference model for the communication of open systems. The OSI-reference model has been graded into seven layers which are hierarchically super-imposed, whereas layer 1 is the lowest and layer 7 the highest.

OSI-reference model: Within the OSI reference model, an international standardization, communication of two partners has been standardized. The sequence of the set-up and clearing of a connection for communication has been graded in communication layers. The reference model begins with layer 1 (physical), of the hardware with is used transferring and ends with layer 7 (application), the in- and output of information between the machine and human-beings. Within the layers 2 (data link) and 3 (network) the procedures are specified which are necessary to specify the procedure of set-up and clearing of a connection and maintaining of a connection. The layers 4 (transport) throughout 7 are used for the structuring of the applications (e. g. software for an alarm centre). In the area of the transmission of signals/messages it is necessary to secure the transmission path against tampering. Within ISDN there are possibilities of securing the interconnection on the OSI-layers 1, 3 and 4.

Packet Assembler/Disassembler (PAD): Device or function of a device which assembles or disassembles packets of data for transmission, thereby preparing the data for synchronous data transmission in the X.25 network.

PAD: see Packet Assembler/Disassembler

Permanent Virtual Circuit (PVC): Connection which is set up by the network operator and then persists.
Point-to-multipoint-connection (PTM): Type of connection in ISDN, which makes the connection of multiple terminal connection devices (telephone, telefax, PC) possible.

Note: The point-to-multipoint-connection is also called multiple device connection (in German "Mehrgeräteanschluss").

Point-to-point connection (PTP): Type of connection in ISDN, which makes the connection of one terminal connection device (usually PBX - private branch exchange) possible.

Note: The point-to-point-connection is also called system connection (in Germany "Anlagenanschluss").

Private automatic branch exchange (PABX): PABX is standing for a private automatic branch exchange for telephones. Connected to ISDN not only speaking is possible but also language, data, text or photos, etc. may be transmitted. Transfer is carried out mainly via 64 kbit-paths.

Receiving centre transceiver (RCT): Receiving facility in alarm transmission systems which receives signals/messages from alarm systems, evaluates them, passes them to the Annunciation equipment (AE), stores them if necessary and passes on control signals to the Alarm transmission equipment (ATE).

S₀: Technical name for the interface at the NT network termination point of an ISDN standard connection. Deutsche Telekom calls this "Basic rate interface". The S₀ access point has two B-channels for actual communication and a D-channel for setting up, clearing down and controlling the connections. The S₀ interface can be used

- as a BUS for connecting several devices, e. g. telephones, fax machines. The two B-channels allow a maximum of two devices to communicate independently over the network (multiple devices access or point-to-multi-point access),
- as an interface to a Private automatic branch exchange - PABX (system or point-to-point connection).

S₀-point-to-point: If an ISDN-PABX (Private automatic branch exchange) is intended to be operated at a basic rate interface, the functionality of the BUS is not necessary. Therefore the connection-point of Telecom directly (point-to-point) is connected to the PABX. ISDN and analog end-devices are connected to the PABX. The S₀-connection serves in this case only as connection to the network and not as distributor.

Scanning connection: Physical or logical connection which is regularly available after set-up or dial-up for transmitting signals/messages or for monitoring the connection.

Short-Message-Service (SMS): Telecommunication service for the transmission of test messages, first developed for the use in GSM mobile phone nets and now also available in landline telephone services.

Signals/messages transmission: Transmission of a signal/message in the normal state (no faults) of the Alarm transmission system (ATS) from the interface S₂ to the interface S₃.

Note: Recognition of the reception of a signal/message on application level (OSI-layer-7) is not integral part of the signals/messages transmission.

Sub-receiving centre transceiver (Sub-RCT): Processing unit for the concentration, handling, conversion and processing of signals/messages and control signals. The unit may also serve as a connection between two different networks. In the signal (alarm) direction (ATE ⇒ alarm receiving equipment - ARE), the sub-receiving centre transceiver (Sub-RCT) has an S₃ interface at the input and an S₂ interface at the output.
Switched Virtual Call (SVC): Connection (dialup line) which is set up when required and then cleared down again when no longer needed.

Switched Virtual Call-Permanent (SVC-P): Connection (dialup line) which is set up when required and remains in existence when no longer needed.

Synchronous network: Network with a tree-like structure and a central processor plus a processor on each branch. It is polled from above and at the same time polls all the participants or branches below it. Application: “SNA network”


Tamper release: Performance of ATE/RCT/SRCT to ensure an alarm transmission even in case of a tamper attempt, e.g. by cutting off additional functions and/or wires (lines).

TCP/IP (Abbreviation for „Transmission Control Protocol / Internet Protocol“): The fundamental connection protocol for the exchange of data between internet-computer. It can be used with different hardware and is supported by almost all operating systems. Originally TCP/IP was developed by the U.S. ministry of defence.

Terminal adapter (TA): Communications device which adapts equipment using other transmission methods to an ISDN S0 basic access, e.g.:
- Terminal adapter a/b for adapting analogue telephone service devices
- Terminal adapter V.24 for adapting devices with V.24 interface
- Terminal adapter X.30 for adapting devices with V.110 interface
- Terminal adapter X.75 for adapting devices with HDLC procedure

Test signal: Signal which does not contain any operational information (e.g. alarm signal) and which is used to test the transmission path and availability.

TK-Anlage: see “Telekommunikationsanlage” (German term)

Transmission path (in alarm transmission system): Logical connection between interfaces S2 and S3.

Trunked Private Land Mobile Radio Systems (in Germany “Bündelfunknetze“): Radio network, whereas a party will get exclusively assigned a temporary free radio channel for a limited time from the system. Via trunked radio system the transmission of data is possible besides voice communication.

UDP/IP (Abbreviation for „User Datagram Protocol / Internet Protocol“): A further connection protocol for the exchange of data between internet-computer. Differing from the TCP protocol UDP is a protocol without connection. For this purpose no dedicated connections are established (no handshake), but data are transmitted in simple form of datagrams (packets). For this reason UDP is not used in practice for the transmission of greater data volumes. UDP has the advantage that the single data packets are designed more effectively than in TCP and contain less overhead (these are data which do not belong to the user data but serve for organisational purposes).

X.25: Collective term for a packet-based data transmission procedure. The data is packed into standardised packets, which are sent one after the other and independently of one another through the network, maybe via different routes, and are assembled by
the recipient to restore the original information. In colloquial terms, the term X.25 encompasses various CCITT recommendations: incl. X.3, X.25, X.28, X.29, X.31, X.75. X.25 is actually only the description of the interface to a packet-based data network. Example: “Datex-P” from Deutsche Telekom.

3.2 Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Annunciation Equipment</td>
</tr>
<tr>
<td>ARE</td>
<td>Alarm Receiving Equipment</td>
</tr>
<tr>
<td>AS</td>
<td>Alarm System</td>
</tr>
<tr>
<td>ATE</td>
<td>Alarm Transmission Equipment</td>
</tr>
<tr>
<td>ASCII</td>
<td>American Standard Code for Information Interchange</td>
</tr>
<tr>
<td>ATS</td>
<td>Alarm Transmission System</td>
</tr>
<tr>
<td>CCITT</td>
<td>Comité Consultatif International Télégraphique et Téléphonique</td>
</tr>
<tr>
<td>CD</td>
<td>Communications Device</td>
</tr>
<tr>
<td>DDV</td>
<td>Datendirektverbindung (German term)</td>
</tr>
<tr>
<td>GSM</td>
<td>Global System for Mobile Communication</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>ISDN</td>
<td>Integrated Services Digital Network</td>
</tr>
<tr>
<td>NA</td>
<td>Network termination point (NTP)</td>
</tr>
<tr>
<td>NSL</td>
<td>Notruf- und Service-Leitstelle (German term)</td>
</tr>
<tr>
<td>OSI</td>
<td>Open System Interconnections</td>
</tr>
<tr>
<td>PAD</td>
<td>Packet-Assembler/Disassembler</td>
</tr>
<tr>
<td>PTM</td>
<td>Point-to-multipoint connection</td>
</tr>
<tr>
<td>PTP</td>
<td>Point-to-point connection</td>
</tr>
<tr>
<td>PVC</td>
<td>Permanent Virtual Circuit</td>
</tr>
<tr>
<td>RCT</td>
<td>Receiving Centre Transceiver</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message Service</td>
</tr>
<tr>
<td>SNA</td>
<td>System Network Architecture</td>
</tr>
<tr>
<td>SRCT</td>
<td>Sub-Receiving Centre Transceiver</td>
</tr>
<tr>
<td>SVC</td>
<td>Switched Virtual Call</td>
</tr>
<tr>
<td>SVC-P</td>
<td>Switched Virtual Call-Permanent</td>
</tr>
</tbody>
</table>
4 Connections and test signals/messages

4.1 Types of connections

For the transmission of alarm signals/messages different transmission paths may be used. These paths are divided in three types of connections.

- Dedicated connections
- Scanning connections
- Needs-based connections (dial-up connections)

The alignment of existing paths to the types of connections is made as e. g. described in the following:

- Dedicated connections
  - Analogue dedicated connection (point-to-point connection)
  - Digital dedicated connection in form of a data point-to-point connection or ISDN-dedicated connection in the D-channel
  - Dedicated connection in the X.25-net in form of a PVC connection or a SVC-P connection
- Scanning connections
  - Radio networks
- Needs-based connections (dial-up connections)
  - PSTN with an analogue subscriber terminal
  - ISDN-net B-channel
  - Dialling connection in X.25-net as SVC-Connection
  - Radio networks

4.2 Definition of the types of connections

According to the European standards for Alarm Transmission Systems (EN 50 136-1-1) types of connections and their basic conditions are defined as follows. Figure 4.01 shows these relations in a graphic form.

4.2.1 Dedicated connection

The transmission of signals/messages between the interface S₁ and the interface S₄ shall not exceed 15 s at the most in the normal state (no faults) of the ATE, transmission path and RCT/SRCT. Interruptions of the monitoring ≥ 20 s shall be detected and signalled as fault.
4.2.2 Scanning connection

The transmission of signals/messages between the interface S₁ and the interface S₄ shall not exceed 240 s at the most in the normal state (no faults) of the ATE, transmission path and RCT/SRCT. Interruptions of the monitoring ≥ 20 s shall be detected and signalled as fault.

4.2.3 Needs-based connection (dial-up line)

The transmission of signals/messages between the interface S₁ and the interface S₄ shall not exceed 80 s inclusively set-up of the connection at the most in the normal state (no faults) of the ATE, transmission path and RCT/SRCT. Interruptions of the monitoring ≥ 25 h shall be detected and signalled as fault.

When using a needs-based (dial-up) connection as alternative path according to table 7.01 the transmission of a signal/message between the interface S₁ and the interface S₄ in the faulty state of the primary path and the normal state (no faults) of the alternative path including establishing the connection shall not exceed 160 s.

Note: The monitoring is performed on needs-based (dial-up) connections e.g. by test signals/messages in a time interval of ≤ 25 h.

![Diagram showing types of connections and permissible times](image)

**Figure 4.01:** Types of connections and permissible times

4.3 Test signals/messages

For specific transmission paths it may be necessary for their monitoring that the Alarm transmission equipment (ATE) will trigger in regular intervals test signals/messages. These test signals/messages are initiated by the ATE and monitored by the alarm receiving equipment (ARE). The loss of a test signal/message shall be indicated at the annunciation equipment (AE). Each data transmission requiring an acknowledgement telegram may be processed in the ARE as a test signal/message.
If a needs-based (dial-up) connection is used as an alternative path according to table 7.01, this shall be tested in contrary to the requirements of the guidelines for alarm transmission equipment (ATE), VdS 2463, clause 11.15 by test signals/messages.

## 5 Classification of signals/messages

The requirements for transmission paths are based in principle on the type of signals/messages which are to be transmitted; for this purpose these signals/messages are classified (see table 5.01). This classification is valid in the same way also for commands which are associated to the signals/messages.

<table>
<thead>
<tr>
<th>Class of signal/message</th>
<th>Type of signal/message</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>General signal/message, e.g. operational, status and fault signal/message; Tamper attempts <strong>are not taken</strong> into consideration</td>
</tr>
<tr>
<td>II</td>
<td>Alarm signal/message, e.g. fire alarm signal/message, intruder alarm signal/ message of a class A IAS; Tamper attempts <strong>are taken</strong> into consideration</td>
</tr>
<tr>
<td>III</td>
<td>Alarm signal/message, e.g. intruder alarm signal/ message of a class B or C IAS; Tamper attempts <strong>are taken</strong> into consideration</td>
</tr>
</tbody>
</table>

**Table 5.01: Classes of signals/messages**
6 Net-specific requirements for transmission paths

Independently of the used transmission path and the type of connection the following requirements of a requirements profile according to table 6.01 shall be fulfilled.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirements profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of the transmission path</td>
<td>At least 95 %</td>
</tr>
<tr>
<td>Availability of CD and NTP</td>
<td>MTBF 45.000 h</td>
</tr>
<tr>
<td>Indication of faults of TP, CD and NTP</td>
<td>No requirements</td>
</tr>
<tr>
<td>Inspection and maintenance of the connection S₂ to S₃ (inclusively equipment)</td>
<td>Inspection and maintenance once a year</td>
</tr>
<tr>
<td>Corrective maintenance of TP, CD and NTP</td>
<td>On weekdays during the normal labour time, within 5 workdays</td>
</tr>
<tr>
<td>Power supply of the CD and NTP in the vicinity of the ATE</td>
<td>No requirements</td>
</tr>
<tr>
<td>Access to the TP from the side of the ATE</td>
<td>No requirements</td>
</tr>
<tr>
<td>Physical protection of CD and NTP in the vicinity of the ATE</td>
<td>No requirements</td>
</tr>
</tbody>
</table>

Note: A transmission of faults signals/messages is not possible in this case

<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirements profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection and maintenance once a year</td>
<td>Inspection 4-times a year and maintenance once a year</td>
</tr>
<tr>
<td>Corrective maintenance of TP, CD and NTP</td>
<td>On weekdays during the normal labour time, within 5 workdays</td>
</tr>
<tr>
<td>Power supply of the CD and NTP in the vicinity of the ATE</td>
<td>No requirements</td>
</tr>
<tr>
<td>Access to the TP from the side of the ATE</td>
<td>No requirements</td>
</tr>
<tr>
<td>Physical protection of CD and NTP in the vicinity of the ATE</td>
<td>No requirements</td>
</tr>
</tbody>
</table>

Abbreviations:
- TP Transmission path
- ATE Alarm transmission equipment
- AS Alarm System
- IAS Intruder Alarm system
- NTP Network termination point
- ARE Alarm receiving equipment
- CD Communication device
- RCT Receiving centre transceiver
- SRCT Sub-Receiving centre transceiver

Table 6.01: General requirements for transmission paths

The special technical requirements for the single effectively available public and company-specific transmission paths are described in Annex A.

1 For requirements in the vicinity of RCT/SRCT see VdS 2466
2 For classes and types of IAS see VdS 2227 and VdS 2311
7 Selection of transmission paths

7.1 Selection criteria

In principle all transmission paths are suitable for the transmission of signals/messages if they fulfil specific requirements. Depending of signal/message class (that means application, see table 5.01) the transmission paths as listed in table 7.01 are to be used. The transmission paths shall fulfil the requirements according to table 6.01 as well as the special technical requirements described in Annex A.

Detailed requirements for the transmission of alarm signals/messages and other signals/messages are contained in the guidelines for planning and installation of Fire alarm resp. Intruder alarm systems (VdS 2095 resp. VdS 2311).

<table>
<thead>
<tr>
<th>Class of signal/message</th>
<th>Necessary transmission path with requirements profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dedicated line</td>
</tr>
<tr>
<td>I (e.g. fault signal/message of an AS)</td>
<td>1 or 2</td>
</tr>
<tr>
<td>II (e.g. fire signal/message, intrusion signal/message of a class A IAS)</td>
<td>2</td>
</tr>
<tr>
<td>III (e.g. intrusion signal/message of a class B or C IAS)</td>
<td>2</td>
</tr>
</tbody>
</table>

1) Deviating to the requirements of clause 11.15 of the guidelines for Alarm transmission equipment (ATE), VdS 2463

Table 7.01: Selection of transmission paths

7.2 Signals/messages class III with alternative paths

7.2.1 Alternative paths for scanning connections

For signals/messages class III (e.g. intrusion signals/messages of a class B or C IAS) an alternative path of optional connection type with requirement profile 2 is necessary for a scanning connection.

This alternative path shall be tested – deviating from the specifications in the guidelines for Alarm transmission equipment (ATE), VdS 2463, clause 11.15 automatically in regular intervals by test signals/messages.
7.2.2 Alternative paths for needs-based (dial-up) connections

For signal/message class III (e.g. intrusion signal/message of a class B or C Intruder Alarm System (IAS) an alternative path of optional connection type with requirement profile 2 is necessary for a needs-based (dial-up) connection.

This alternative path shall be tested – deviating from the specifications in the guidelines for Alarm transmission equipment (ATE), VdS 2463, clause 11.15 automatically in regular intervals by test signals/messages. Further on the primary path and the alternative path shall be run via different routes to the surveilled object as well as to the Alarm receiving centre (ARC).

Note: Different routes are given, if the transmission paths dedicated to the Alarm transmission equipment (ATE) and the Receiving centre transceiver (RCT/SRCT) are designed such that attacks on one route (e.g. attack on a telephone line/cable) do not negatively influence the other route.

Examples: Spatially separated routing of two telephone mainlines in an object, transmission via telephone lines and radio.

7.3 Examples for different transmission paths

For the transmission of an intrusion signal/message of a class B Intruder Alarm System (IAS) – this signal/message corresponds with signals/messages class III – to an Alarm receiving centre (ARC) the following options are possible alternatively:

− A dedicated line with requirement profile 2 (e.g. previous “ÜAG” in connection with a "Standleitung (dedicated line)" of the German “Telekom”).
− A scanning connection with requirement profile 2 and in addition an alternative path with requirements profile 2 (e.g. connection of the previous “TEMEX” service of the German “Telekom” and additionally ATE of optional type).
− A needs-based connection (dialup line) with requirement profile 2 and in addition an alternative path with requirement profile 2; the transmission paths are to be routed via different routes to the surveilled object as well as to the Alarm receiving centre (ARC) (e.g. an ATE connected to a wired telephone net (including line monitoring and “control call”) and in addition an ATE connected to a radio (mobile) telephone net).

7.4 Listing of qualified transmission paths

The qualification requirements of transmission paths for alarm transmission systems (ATS) may be checked by VdS. Suitable/qualified transmission paths are listed regularly in VdS 2532, list of VdS-approved transmission paths in alarm transmission systems.

8 Tests

Testing of transmission paths on their qualification is made by an expert group on base of these guidelines and the proofs of the respective net operator/provider.
Changes

Compared with version VdS 2471 04/98 (02) VdS 2252 : 1996-01 (02) the following changes were made:

1. Amendment of clause 2.1 „Terms and definitions“ by IP and TCP/IP and amendment of clause 2.2 „Abbreviations“

2. Amendment of clause A.7.7.2 with a requirement on a test signal/message (at least every 25 h)

3. Deletion of Annex A.8 „Interface S₂/S₃ via MODACOM radio data transmission“

4. Deletion of Annex A.12 „Interface S₂/S₃ via the „C-Telefon-net“

5. Amendment by Annex A.13 „Interface S₂/S₃ for the connection to IP-Nets using the TCP protocols“ and A.14 „Interface S₂/S₃ for the connection to IP-Nets using the UDP protocols“

6. Editorial changes
Annex A – Network specific requirements for transmission paths

A.1 General
This Annex contains specific requirements for the single public and company-internal transmission paths used in praxis. These requirements concern the provider of the transmission paths (-net) as well as the designer of the Alarm Transmission System (ATS).

The Annex will be amended on demand.

A.2 Transmission protocol
For all types of connections the transmission protocol according to VdS 2465 shall be used; within a closed ATS for which no claims on compatibility are raised, another equivalent protocol may be used.

The procedure as described in the guidelines VdS 2465 is amended in dependency to the used transmission paths by the requirements in this annex. These amendments concern the interfaces $S_2$ and $S_3$.

A.3 Interface S2/S3 via analogue dedicated connections (lines)

A.3.1 Rating
If the interface fulfils additionally to the requirements in clause 6 of these guidelines the following specifications, it is a Dedicated Connection (lines) (the German „Festverbindung”).

A.3.2 Characterisation
The analogue dedicated connection (line) is a transparent, unmeshed and fully capable of duplex transmission path in the voice band from 300 to 3400 Hz. The product name of the German „Telekom” is „Festverbindung analog”.

A.3.3 Admitted connections
Only fixed wired point-to-point connections are possible and admitted.

A.3.4 Technical conditions
Transmitter/receiver in ATE, SRCT and RCT function according to V.22 and with a speed of 1200 Bit/s. If for this purpose standard modems are used as CD, the interfaces $S_2$ resp. $S_3$ shall be designed such, that all mandatory requirements for functions are fulfilled.

Both parties may be active as “master”; the master-slave relation is to be determined with SEND_NORM.
A.3.5 Special requirements

The transmission shall be effected

− without data correction e.g. according to V.42,
− without data compression e.g. according to V.42bis and
− without test operation e.g. according to V.54.

A.3.6 Admittance rules

Equipment which is connected to the Dedicated Connection (lines) (the German „Festverbindung“) shall be tested and admitted.

For development, testing and admittance the respective rules of the “BAPT” (BAPT 221 ZV MÜ 1a/b/c) resp. of the “RegTP” are valid.

A.3.7 Monitoring in the non-alarm state

Scanning cycle: as t1

Test signal/message: not applicable

Line monitoring: not applicable

Variables of the protocol

VdS 2465:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanning cycle t1</td>
<td>2 s</td>
</tr>
<tr>
<td>Response monitoring interval t2</td>
<td>1 s</td>
</tr>
<tr>
<td>Function monitoring interval t3</td>
<td>10 s</td>
</tr>
<tr>
<td>Start request t4</td>
<td>2 s</td>
</tr>
<tr>
<td>Repetition counter in case of faults n1</td>
<td>3</td>
</tr>
<tr>
<td>Repetition counter in case of overflow n2</td>
<td>3</td>
</tr>
</tbody>
</table>

A.3.8 Compatibility with the protocol VdS 2465

At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.4 Interface S₂/S₃ for the connection to a Public Switched Telephone network (PSTN) with analogue subscriber terminal

A.4.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the following specifications it is a so-called Needs-based (dial-up) connection.

A.4.2 Characterisation

The analogue switched (dial-up) connection uses a telephone network. The setup of the connection may either be established via pulse tone procedures IWV or the frequency tone procedures MFV. After the establishment of the connection an analogue, transparent, fully duplex-capable channel in the voiceband (300 .. 3400 Hz) is available for the transmission of information until the clearing of the connection.
A.4.3  Admitted connections

The following connections may be established:

− the calling party (caller) and the called party (callee) are participants of a Public Switched Telephone Network (PSTN) with analogue subscriber terminal
− the called party (callee) is party of the ISDN, which is able to receive, send and analyse the analogue-coded information within the B-channel
− the called party (callee) is reachable via an access towards the X.25-net

A.4.4  Technical conditions

Transmitter/receiver in ATE, SRCT and RCT function according to V.22 with a speed of 1200 Bit/s. The interfaces S2 resp. S3 shall be designed such that the following functions can be fulfilled even if CD’s are present:

− Identification of caller ID
− Transmission of dial information
− Dial tone identification
− Monitoring of the voltage of the connection

The user establishing the connection is identified as „Master“ and the party which accepts the call identifies himself as „Slave“ (SEND_NORM not applicable).

An establishment of the connection in incoming and outgoing direction shall be possible at the S3-Interface; at the S2 is an establishment of a connection only necessary in outgoing direction. If the function monitoring interval t3 is exceeded or the counter for faults n1 is overloaded, the clearing of the connection of the respective side is initiated.

The condition for the access to an X.25-net are described in clause A.7.

A.4.5  Special requirements

The transmission shall be effected

− without data correction e.g. according to V.42,
− without data compression e.g. according to V.42bis and
− without test operation e.g. according to V.54.

A.4.6  Approval rules

Equipment which is directly connected to switched (dial-up) connections shall be tested and approved.

For development, testing and approval the respective rules of the „BAPT“ (BAPT 223 ZV 5) resp. of the „RegTP“ are valid.

A.4.7  Monitoring in the non-alarm state

Scanning cycle:           not applicable
Test signal/message:      at least every 25 h
Line monitoring: Evaluation of the voltage provided by the net provider at least every 20 s or evaluation of the layer-1-monitoring provided by the net provider

Variables of the protocol VdS 2465:
- Scanning cycle $t_1$ 2 s
- Response monitoring interval $t_2$ 1 s
- Function monitoring interval $t_3$ 10 s
- Start request $t_4$ 2 s
- Repetition counter in case of faults $n_1$ 3
- Repetition counter in case of overflow $n_2$ 3

A.4.8 Compatibility with the protocol VdS 2465

At least the obligatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.5 Interface S2/S3 for connection to a digital dedicated connection (line) (in Germany “Digitale Festverbindung”)

A.5.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the following specifications it is a so-called Dedicated Connection (lines) (in Germany “Festverbindung”).

A.5.2 Characterisation

The digital dedicated connection (line) (in Germany “Festverbindung”) is a connection for the transparent transmission of data via standardized data interfaces. The following dedicated connections (lines) are available:

- Dedicated connection (line) on basis of analogue transmission paths; the product name of the German “Telekom” is „Datendirektverbindung DDV“
- Dedicated connection (line) on basis of the ISDN-technology; the product name of the German “Telekom” is „Festverbindung Digital“
- Dedicated connection (line) on basis of packet-based (data) transmission paths; see clause A.7

A.5.3 Admitted connections

Only dedicated (fixed established) point-to-point-connections are possible and admitted.

A.5.4 Technical conditions

A.5.4.1 „Datendirektverbindung DDV“ of the German “Telekom”

As connection e.g. the “Datendirektverbindung Typ 1.2” with 1200 Bit/s and the interface V.24/V.28 is at disposal. The asynchrony data traffic of the ATE/SRCT/RCT has to be transferred in synchrony data traffic before using the DDV; the CD necessary for this is provided by the German “Telekom”. 
A.5.4.2 „Festverbindung Digital“ in ISDN of the German “Telekom”

As connection e.g. the “Festverbindung Digital Typ S01” with one B-channel, one D-channel and the interface SOFV is at disposal.

A.5.5 Special requirements

There are no special requirements.

A.5.6 Admittance rules

There are no regulations for the user of „Datendirektverbindung DDV“, because he uses no direct access to the NTP.

For the user of the “Festverbindung Digital” the respective rules of the „BAPT“ (e.g. BAPT 224 ZV1 and BAPT 223 ZV7) resp. of the „RegTP“ are valid.

A.5.7 Monitoring in the non-alarm state

Scanning cycle: like t1
Test signal/message: not applicable
Line monitoring: not applicable
Variables of the protocol VdS 2465:
- Scanning cycle t1 2 s
- Response monitoring interval t2 1 s
- Function monitoring interval t3 10 s
- Start request t4 2 s
- Repetition counter in case of faults n1 3
- Repetition counter in case of overflow n2 3

A.5.8 Compatibility with the protocol VdS 2465

At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.6 Interface S2/S3 for the connection to ISDN

Note: Under ISDN not only the homonymous net of the German „Telekom“ is understood but each net functioning according to these procedures.

A.6.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the following specifications it is a so-called Needs-based (dial-up) connection (see clauses A.6.3.1 to A.6.3.3) resp. a so-called Dedicated Connection (lines) (according clause A.6.3.4 and A.6.3.5).

Note: Only valid, if SVC-P resp. PVC is used.

A.6.2 Characterisation

For the transmission of signals/messages ISDN provides one or more B-channels and for the transmission of information from the net (e.g. for the establishment and clearing of the
connection) one D-channel. In the D-channel also user data may be transmitted. Depending on the configuration it is a so-called Needs-based (dial-up) or Dedicated connections (lines) in the sense of these guidelines.

A.6.3 Admitted connections

A.6.3.1 „HDLC-transparent transmission (X.75)“

The calling party (caller) and the called party (callee) are participants of ISDN and the transmission transparent in the B-channel. VdS 2465 is used as transmission protocol. For the transmission of data in the B-channel the following adjustments shall be used for the layers 1 to 3:

- Layer 1: 64 kBit/s with „HDLC-framing“
- Layer 2: X.75 SLP
- Layer 3: transparent

A.6.3.2 „Transmission in the B-channel, RCT as called party (callee)“

(S2 is an ISDN-connection, S3 an analogue subscriber terminal)

The called party (callee) is party of the Public Switched Telephone Network (PSTN) with an analogue subscriber terminal. The transmission is effected in the B-channel and the analogue according CCITT V.22 coded information may be transmitted, received and analysed.

A.6.3.3 „Transmission in the B-channel“ (S2 and S3 are ISDN-connections)

The calling party (caller) and the called party (callee) are participants of ISDN and the transmission is effected in the B-channel. VdS 2465 is used as transmission protocol. The analogue according CCITT V.22 coded information may be transmitted, received and analysed.

A.6.3.4 „Transmission in the B-channel as feeder towards an X.25 net“

The called party (callee) is participant of a X.25-net and the transmission is effected in the B-channel (e.g. “Telekom Datex-P101-B“); see also clause A.7.

A.6.3.5 „Transmission in the D-channel as feeder towards an X.25 net“

The called party (callee) is participant of a X.25-net and the transmission is effected in the D-channel according to X.31 (packet mode); see also clause A.7.

A.6.4 Technical conditions

For establishment and clearance of the connection the DSS1-procedure is used in the D-channel (Euro-ISDN). The access to ISDN is effected via the S2/S3 or interface of the public ISDN. The interfaces S2 resp. S3 shall be designed such, that all mandatory functions (e.g. identification of caller ID, transmission of dial information) are fulfilled.

The speed of the transmission at the interfaces S2 and S3 is at least 1200 bit/s (for S2.1 and S3.1 there are no specifications).
A.6.5 Special requirements

For the types of connections according to clause A.6.3.1 the following special requirements are valid. The identification of service is „Bearer Capability Information Element“:

<table>
<thead>
<tr>
<th>Octet 1</th>
<th>00000100</th>
<th>bearer capability information element identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octet 2</td>
<td>00000100</td>
<td>length of the bearer capability contents</td>
</tr>
<tr>
<td>Octet 3</td>
<td>1</td>
<td>no extension</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>CCITT coding standard</td>
</tr>
<tr>
<td></td>
<td>01000</td>
<td>unrestricted digital</td>
</tr>
<tr>
<td>Octet 4</td>
<td>1</td>
<td>no extension</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>circuit mode</td>
</tr>
<tr>
<td></td>
<td>10000</td>
<td>64 kBit/s</td>
</tr>
</tbody>
</table>

For the types of connections according to the clauses A.6.3.2 and A.6.3.3 the following special requirements are valid. The identification of service is „Bearer Capability Information Element“:

<table>
<thead>
<tr>
<th>Octet 1</th>
<th>00000100</th>
<th>bearer capability information element identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octet 2</td>
<td>00000100</td>
<td>length of the bearer capability contents</td>
</tr>
<tr>
<td>Octet 3</td>
<td>1</td>
<td>no extension</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>CCITT coding standard</td>
</tr>
<tr>
<td></td>
<td>00000</td>
<td>Speech</td>
</tr>
<tr>
<td>Octet 4</td>
<td>1</td>
<td>no extension</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>circuit mode</td>
</tr>
<tr>
<td></td>
<td>10000</td>
<td>64 kBit/s</td>
</tr>
</tbody>
</table>

A.6.6 Admittance rules

Equipment which is directly connected to the NT of the public net provider shall be tested and admitted.

For development, testing and approval of the equipment the regulations of the “BAPT” resp. of the “RegTP” are accordingly valid:

− BAPT 224 ZV 1
− BAPT 223 ZV 7
− BAPT 224 ZV 9

A.6.7 Monitoring in the non-alarm state

Scanning cycle: not applicable

Test signal/message: at least every 25 h
Line monitoring: Evaluation of the voltage provided by the net provider at least every 20 s or evaluation of the layer-1-monitoring provided by the net provider

Variables of the protocol
VdS 2465:

- Scanning cycle \( t_1 \) 2 s
- Response monitoring interval \( t_2 \) 3 s
- Function monitoring interval \( t_3 \) 10 s
- Start request \( t_4 \) 2 s
- Repetition counter in case of faults \( n_1 \) 3
- Repetition counter in case of overflow \( n_2 \) 3

A.6.8 Compatibility with the protocol VdS 2465

At least the obligatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.7 Interface \( S_2/S_3 \) for the connection to an X.25 dedicated or dial-up connection

A.7.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the specifications of clauses A.7.3.1 and A.7.7.1 it is a so-called Needs-based dial-up) connection. If, in contrary, clauses A.7.3.2, A.7.3.3 and A.7.7.2 are fulfilled it is a so-called Dedicated Connection (lines).

A.7.2 Characterisation

X.25 nets in the sense of these guidelines are all packet-transmitted X.25-nets independent of the net provider. The trade name of the German „Telekom“ is „Datex-P“. The access to an X.25-net may be performed asynchrone (X.3) as well as synchrony (X.25). The access from and to other nets is possible.

Note: Net components used in the different X.25-nets may differ slightly in their net and system signals/messages. The same is valid for the PAD, which are used besides as CD. The ATE resp. the SRCT/RCT shall be able to analyse these signals/messages.

A.7.3 Admitted connections

There are the following three options of a data transmission in an X.25-net.

A.7.3.1 SVC (Switched Virtual Call)

The connection will be established on demand and cleared later on if there are no further signals/messages pending.

A.7.3.2 PVC (Permanent Virtual Circuit)

The connection is established by the net provider and is persistent. A net fault which results in inhibiting the transmission of signals/messages is signalled to the interfaces \( S_2 \) and \( S_3 \).
A.7.3.3 SVC-P (Switched Virtual Call-Permanent)

The connection will be established from the ATE or from the RCT and remains established. The transmission of signals/messages is effected in the case of a demand without clearing of the connection. Faults of the net are automatically signalled to the interfaces S2 and S3. If the connection is interrupted e.g. by a fault, it shall be immediately automatically established again.

A.7.4 Technical conditions

X.25-nets transmit in case of SVC and SVC-P the original address of the caller together with the establishment of the connection.

In case of network access via PAD the recommendations X.28 and X.29 have to be followed.

A.7.5 Special requirements

In case of SVC a blockade of the net by multiple dialling shall be inhibited. This may be achieved by a prolongation of the repeating times.

Is the connection effected to an X.25-net via an X.3 access, only ASCII signs shall be transmitted in order to avoid a faulty interpretation of telegram data as PAD control sequences (see here VdS 2465, clause 5.7).

A.7.6 Admittance rules

There are no regulations for the user (subscriber), because he uses no direct access to the NTP of the public nets.

A.7.7 Monitoring in the non-alarm state

A.7.7.1 X.25 dial-up connection SVC (Switched Virtual Call)

<table>
<thead>
<tr>
<th>Scanning cycle:</th>
<th>not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test signal/message:</td>
<td>at least every 25 h</td>
</tr>
<tr>
<td>Line monitoring:</td>
<td>Evaluation of the voltage provided by the net provider at least every 20 s or evaluation of the layer-1-monitoring provided by the net provider</td>
</tr>
</tbody>
</table>

Variables of the protocol VdS 2465:

| Scanning cycle t1          | 2 s          |
| Response monitoring interval t2 | 5 s         |
| Function monitoring interval t3 | 10 s        |
| Start request t4           | 10 s         |
| Repetition counter in case of faults n1 | 3          |
| Repetition counter in case of overflow n2 | 3          |

A SEND_NORM shall be answered satisfactorily with the protocol.
A.7.7.2 X.25 point-to-point connection PVC (Permanent Virtual Circuit) as well as SVC-P (Switched Virtual Call - Permanent)

Scanning cycle: Is provided from the X.25-net (OSI-layer-3)
Test signal/message: at least every 25 h
Line monitoring: Evaluation of the voltage provided by the net provider at least every 20 s or evaluation of the layer-1-monitoring provided by the net provider

Variables of the protocol
VdS 2465:
- Scanning cycle t₁: not applicable
- Response monitoring interval t₂: 5 s
- Function monitoring interval t₃: 10 s
- Start request t₄: 10 s
- Repetition counter in case of faults n₁: 3
- Repetition counter in case of overflow n₂: 3

A SEND_NORM shall be answered satisfactorily with the protocol.

A.7.8 Compatibility with the protocol VdS 2465

At least the obligatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.8 Interface S₂/S₃ via MODACOM radio data transmission

Not applicable, because this connection is not available any more.

A.9 Interface S₂/S₃ for the connection to Trunked Private Mobile Radio Systems (in Germany “Bündelfunknetze”) according to MPT 1327

A.9.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the following specifications it is a so-called Needs-based (dial-up) connection.

A.9.2 Characterisation

“Bündelfunk” is a cellular structured mobile radio system according to MPT 1327 for the transmission of voice and data. The transmission of signals/messages is effected in form of packet-transmission in the control channel of the „Bündelfunk“ net.

A.9.3 Admitted connections

The calling party (caller) and the called party (callee) are participants of the “Bündelfunk” net.

A.9.4 Technical conditions

The “Bündelfunk“ net allocates information, which can be analysed by ATE and RCT. The interface according to MAP27 serves for the connection towards the “Bündelfunk“ device.
A.9.5  Special conditions

The maximum length of a telegram is 88 Byte. Recognition of a transmission shall be addressed newly.

A.9.6  Approval rules

There are no regulations for the user (subscriber), because he uses no direct access to the NTP of the public nets.

A.9.7  Monitoring in the non-alarm state

Scanning cycle: not applicable

Test signal/message: at least every 25 h

Monitoring of the "wireless (air) interface": at least every 20 s

Variables of the protocol
VdS 2465:
Scanning cycle t1 not applicable
Response monitoring interval t2 20 s
Function monitoring interval t3 not applicable
Start request t4 not applicable
Repetition counter in case of faults n1 3
Repetition counter in case of overflow n2 3

A.9.8  Compatibility with the protocol VdS 2465

At least the obligatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.10  Interface S2/S3 via GSM data radio connections

A.10.1  Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the following specifications it is a so-called Needs-based (dial-up) connection.

A.10.2  Characterisation

Provider of „D1“: German „Telekom“; provider of „D2“: German „Vodafone“

A.10.3  Admitted connections

There are two variations of data transmission available in the „D1/D2“ radio net (cellular phone net). Thereby a connection between two „D1/D2“-parties is possible as well as between a „D1/D2“-party and a fixed wired party. In case of the use of wired connections the relevant clauses of these guidelines are valid.

A.10.4  Technical conditions

The German „D1/D2“ radio net (cellular phone net) provides information which can be analysed by the ATE and the RCT.
A.10.5 Special requirements
The German „D1/D2“ radio net (cellular phone net) shall provide the performance criteria „data service“, in Germany “Datendienste”, preferably 9600 Bit/s.

A.10.6 Admittance rules
There are no regulations for the user (subscriber), because he uses no direct access to the NTP of the public nets.

A.10.7 Monitoring in the non-alarm state
Scanning cycle:   not applicable
Test signal/message:  at least every 25 h
Line monitoring: Evaluation of the voltage provided by the net provider at least every 20 s or evaluation of the layer-1-monitoring provided by the net provider

Variables of the protocol
VdS 2465:
- Scanning cycle \( t_1 \) 5 s
- Response monitoring interval \( t_2 \) 5 s
- Function monitoring interval \( t_3 \) 20 s
- Start request \( t_4 \) 10 s
- Repetition counter in case of faults \( n_1 \) 3
- Repetition counter in case of overflow \( n_2 \) 3

A.10.8 Compatibility with the protocol VdS 2465
At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.11 Interface S_2/S_3 via GSM Short-Message-Service (SMS)

A.11.1 Rating
If the interface fulfills the following specifications it is a so-called Needs-based (dial-up) connection.

A.11.2 Characterisation
Provider of „D1“: German „Telekom“; provider of „D2“: German „Vodafone“

A.11.3 Admitted connections
The ATE is a wireless party (via radio link) in the German „D1/D2“ radio net (cellular phone net).

The RCT can be connected to the net as follows:
- via radio
- via a virtual dedicated connection (line) according to these guidelines (e.g. X.25-SVC-P).
A.11.4 Technical conditions
An asymmetric transmission is required.

A.11.5 Special requirements
The maximum length of a telegram is 140 Byte. Recognition of a transmission shall be relocated newly.

A.11.6 Admittance rules
There are no regulations for the user (subscriber), because he uses no direct access to the NTP of the public nets.

A.11.7 Monitoring in the non-alarm state

- Scanning cycle: not applicable
- Test signal/message: at least every 25 h
- Monitoring of the „wireless (air) interface“: at least every 20 s

Variables of the protocol

<table>
<thead>
<tr>
<th>VdS 2465:</th>
<th>Scanning cycle t1</th>
<th>not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response monitoring interval t2</td>
<td>60 s</td>
</tr>
<tr>
<td></td>
<td>Function monitoring interval t3</td>
<td>not applicable</td>
</tr>
<tr>
<td></td>
<td>Start request t4</td>
<td>not applicable</td>
</tr>
<tr>
<td></td>
<td>Repetition counter in case of faults n1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Repetition counter in case of overflow n2</td>
<td>3</td>
</tr>
</tbody>
</table>

A.11.8 Compatibility with the protocol VdS 2465
At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.12 Interface S2/S3 via the “C-Telefon-Net”
Not applicable, because this connection is not available any more.

A.13 Interface S2/S3 for the connection to IP-nets using the TCP-protocol

A.13.1 Rating
If the interface in addition to the requirements of clause 6 of these guidelines fulfils the specifications of clause A.13.7.1 it is a so-called Needs-based (dial-up) connection. If clause A.13.7.2 is fulfilled it is a so-called Dedicated connection (lines).

A.13.2 Characterisation
Nets of the protocol family TCP/IP in the sense of these guidelines are fundamentally all net structures, defined by the use of TCP/IP and its addressing. The transfer from and to other nets is possible.
A.13.3 Admitted connections

A.13.3.1 Needs-based and dedicated connection
Requirements see clauses A.13.7.1 and A.13.7.2

A.13.4 Technical conditions

A.13.4.1 Local nets with closed user group (e.g. customer-own data nets)
It is ensured by the net provider that no unauthorized access is possible to the transmission net via third-party nets. Security measures concerning integrity, authenticity and confidentiality of the transmitted data sets may be used but are not precondition.

A.13.4.2 Public nets
In case of public nets it shall be ensured by sufficient means that manipulation of information is inhibited resp. detected from the Alarm transmission equipment - ATE (interface S₂) and the Receiving centre transceiver - RCT (interface S₃). Integrity, authenticity and confidentiality of the transmitted data sets shall be ensured.

A.13.5 Special requirements
If IP-nets are used for the transmission of alarm signals/messages an additional transmission path is necessary.

*For this purpose only VdS-approved transmission paths shall be used. It shall be ensured that the redundant transmission path is not formed of the IP-net which is used as main transmission path.*

A.13.6 Admittance rules
The approval rules depend on the connection option to the data-nets. Equipment which is connected directly to the connection points of a public data net shall correspond with the valid regulations.

A.13.7 Monitoring in the non-alarm state

*Note: In case of use of the following possibilities of connections the requirements of the valid guidelines for planning and installation of Alarm Systems (VdS 2311 and VdS 2095) shall be considered.*

A.13.7.1 Needs-based connection

Scanning cycle: not applicable

Test signal/message: at least every 25 h

Line monitoring: A fault of the function of the network access shall be detected and signalled within 20 s. Thereby e.g. layer 1 of the Network termination point (NTP) may be used where the ATE is connected to.
Variables of the protocol

VdS 2465:

- Scanning cycle $t_1$: maximum 8 s
- Response monitoring interval $t_2$: less than $t_1$
- Function monitoring interval $t_3$: 20 s
- Start request $t_4$: not applicable
- Repetition counter in case of faults $n_1$: 3
- Repetition counter in case of overflow $n_2$: not applicable

The connection may be established on demand either from the ATE or from the RCT. In both cases the RCT takes over the master function in any case. The data are transmitted transparent according to VdS 2465 (extension of protocol for the connection to nets of the protocol family TCP).

A.13.7.2 Dedicated connection

- Scanning cycle: not applicable
- Test signal/message: at least every 25 h
- Line monitoring: A fault of the function of the transmission path shall be detected and signalled within 20 s.

The control of the transmission paths and the connection is effected by the cyclic exchange of signals/messages between RCT and ATE.

Variables of the protocol VdS 2465:

- Scanning cycle $t_1$: **Secure transmission**: constant or random, with maximum 8 s interval.
  **Insecure transmission**: maximum 8 s
- Response monitoring interval $t_1$: less than $t_1$
- Function monitoring interval $t_3$: 20 s
- Start request $t_4$: not applicable
- Repetition counter in case of faults $n_1$: 3
- Repetition counter in case of overflow $n_2$: not applicable

A fixed assignment master-slave exists. The data are transmitted transparent according to VdS 2465 (extension of protocol for the connection to nets of the protocol family TCP).

A.13.8 Compatibility with the protocol VdS 2465

At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.
A.13.9 Secure transmission

For the secure transmission of alarm signals/messages the procedure defined in the protocol VdS 2465 (extension of protocol for the connection to nets of the protocol family TCP) shall be used. Manufacturer-specific, equal procedures are possible.

A.14 Interface S₂/S₃ for the connection to IP-nets using the UDP protocol

A.14.1 Rating

If the interface in addition to the requirements of clause 6 of these guidelines fulfils the specifications of clause A.14.7.1 it is a so-called Needs-based (dial-up) connection. If clause A.14.7.2 is fulfilled it is a so-called Dedicated Connection (lines).

A.14.2 Characterisation

Nets of the protocol family UCP/IP in the sense of these guidelines are fundamentally all net structures, defined by the use of UCP/IP and its addressing. The transfer from and to other nets is possible.

A.14.3 Admitted connections

A.14.3.1 Needs-based and dedicated connection

The connection (communication) is effected on demand. Requirements see clauses A.14.7.1 and A.14.7.2.

A.14.4 Technical conditions

A.14.4.1 Local nets with closed user group (e.g. customer-own data nets)

It is ensured by the net provider that no unauthorized access is possible to the transmission net via third-party nets. Security measures concerning integrity, authenticity and confidentiality of the transmitted data sets may be used but are not precondition.

A.14.4.2 Public nets

In case of public nets it shall be ensured by sufficient means that manipulation of information is inhibited resp. detected from the Alarm transmission equipment - ATE (interface S₂) and the Receiving centre transceiver - RCT (interface S₃). Integrity, authenticity and confidentiality of the transmitted data sets shall be ensured.

A.14.5 Special requirements

If IP-nets are used for the transmission of alarm signals/messages an additional transmission path is necessary.

For this exclusively VdS-approved transmission paths shall be used. It shall be ensured that the redundant transmission path is not formed of the IP-net which is used as main transmission path.

A.14.6 Admittance rules

The admittance rules depend on the connection options to the data nets. Equipment which is connected directly to the connection points of a public data net shall correspond with the valid regulations.
A.14.7 Monitoring in the non-alarm state

Note: In case of use of the following possibilities of connections the requirements of the valid guidelines for planning and installation of Alarm Systems (VdS 2311 and VdS 2095) shall be considered.

A.14.7.1 Needs-based connection

Scanning cycle: not applicable

Test signal/message: at least every 25 h

Line monitoring: A fault of the function of the network access shall be detected and signalled within 20 s. For this purpose e.g. layer 1 of the network termination point (NTP) where the ATE is operated, may be checked.

Variables of the protocol VdS 2465:

Note: Are not available at present time and may be implemented only after a respective extension of VdS 2465 / UDP.

A.14.7.2 Dedicated connection

Scanning cycle: not applicable

Test signal/message: at least every 25 h

Line monitoring: A fault of the function of the network access shall be detected and signalled within 20 s.

The control of the transmission paths and the connection is effected by the cyclic exchange of signals/messages between RCT and ATE.

Variables of the protocol VdS 2465:

Note: Are not available at present time and may be implemented only after a respective extension of VdS 2465 / UDP.

A.14.8 Compatibility with the protocol VdS 2465

At least the mandatory parts of the protocols for alarm signals/messages, VdS 2465 shall be transmitted.

A.14.9 Secure transmission

For the secure transmission of alarm signals/messages the procedure defined in the protocol VdS 2465 (extension of protocol for the connection to nets of the protocol family UDP) shall be used. Manufacturer-specific, equal procedures are possible.