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**Federal Network Agency
for electricity, gas, telecommunications,
Post and railways**

Technical guideline for emergency connections

(TR emergency call)

Issue 2.10

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Notified according to Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (OJ L 241, 17.9.2015, p. 1).

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1 Subject matter and implementation deadlines

This Technical Guideline Emergency Call Connections (TR Emergency Call) lays down on the basis of § 164108 Paragraph 64 **of the Telecommunications Act1 (TKG)** and the **Regulation on Emergency Calls2 (NotrufV)** specifies technical details.

Technical requirements that are new in this edition, i.e. supplementary to the previous edition, must be met three years after publication. The requirements according to section 7.1.4 of this TR Emergency Call are excluded from the three-year period; the technical requirements in section 7.1.4 must be met one year after publication of this edition. For technical requirements that are specified in edition 21.0 of the TR Emergency Call, including the addendum from Vfg. No. 14/2013 in the Official Gazette No. 7 of the Federal Network Agency of 24 April 2013,
and the content of this edition of the TR Notruf is not changed, the deadlines specified in edition 21.0 apply3 .

[1] Telecommunications Act of 23 June 2021 (Federal Law Gazette I p. 1858), last amended by Article 5 of the Act of 14 March 2023 (Federal Law Gazette 2023 I No. 71).Telecommunications Act of 22 June 2004 (Federal Law Gazette I p. 1190), last amended by Article 10 paragraph 12 of the Act of 30 October 2017 (Federal Law Gazette I p. 3618).

[2] Ordinance on emergency calls of 6 March 2009 (Federal Law Gazette I p. 481), last amended by Article 44 of the Act of 23 June 2021 (Federal Law Gazette I p. 1858).Ordinance on emergency calls of 6 March 2009 (Federal Law Gazette I p. 481), last amended by Article 1 of the Act of 26 November 2012 (Federal Law Gazette I p. 2347).

[3] All deadlines associated with TR Notruf 21.0, with the exception of the special regulations for ISDN subscriber exchanges in sections 4.3, 7.1.2.2 and 7.1.3.1, have already expired.

2 Normative references

Unless expressly stated in the following list, the current edition of the norm, recommendation, standard or specification at the time of publication of TR Notruf 2.0 applies in view of the updates made.

number	title	source
D2.8.I.1 INSPIRE	Specification on Coordinate Reference Systems - Guidelines	INSPIRE
ESRI White Paper July 1998	ESRI Shapefile Technical Description	ESRI
ETSI EN 300 011-1	Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Part 1: Layer 1 specification	ETSI
ETSI EN 300 012-1	Integrated Services Digital Network (ISDN); Basic User Network Interface (UNI); Part 1: Layer 1 specification	ETSI
EN 300 090	Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Service description	ETSI
ETSI EN 300 092-1	Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol	ETSI
ETSI EN 300 196-1	Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signaling System No. one (DSS1) protocol	ETSI
ETSI EN 300 403-1	Integrated Services Digital Network (ISDN); Digital Subscriber Signaling System No. one (DSS1) protocol; Signaling network layer for circuit-mode basic call control; Part 1: Protocol specification; ITU-T Recommendation Q.931 (1993), modified	ETSI
ETSI-ES 203 283	Protocol specifications for Emergency Service Caller location determination and transport	ETSI
ETSI ETS 300 125	Integrated Services Digital Network (ISDN); User network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441	ETSI
ETSI ETS 300 200	Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service; Service description	ETSI
ETSI-TS 124 229 V17.13.0 (2024-01)	Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 17.13.0 Release 17)	ETSI

number	title	source
ETSI-TS 129 163	Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks	ETSI
ETSI-TS 101 109	Digital cellular telecommunications system (Phase 2+); Universal Geographical Area Description (GAD) (3GPP TS 03.32 version 7.2.0 Release 1998)	ETSI
ETSI-TS 123 003	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Numbering, addressing and identification	ETSI
ETSI-TS 124 008	Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008 version 9.3.0 Release 9)	ETSI
ETSI-TS 103 625 V1.3.1 (2023-03)	Emergency Communications (EMTEL); Transporting Handset Location to PSAPs for Emergency Communications - Advanced Mobile Location	ETSI
ITU-T E.164	The international public telecommunication numbering plan	ITU
ITU-T G.168	Digital network echo cancellers	ITU
ITU-T G.711	Pulse code modulation (PCM) of voice frequencies	ITU
ITU-T I.420	Basic user-network interface	ITU
ITU-T I.421	Primary rate user-network interface	ITU
ITU-T Q.699	Interworking between ISDN access and non-ISDN access over ISDN User Part of Signaling System No. 7	ITU
ITU-T Q.732.2-5	Stage 3 description for call offering supplementary services using signaling system No. 7: Call diversion services; Q.732.4 – Call Forwarding Unconditional (CFU)	ITU
ITU-T Q.763	Signaling System No. 7 – ISDN User Part formats and codes	ITU
ITU-T Q.931	ISDN user-network interface layer 3 specification for basic call control	ITU
ITU-T T.30	Procedures for document facsimile transmission in the general switched telephone network	ITU
ITU-T T.38	Procedures for real-time Group 3 facsimile communication over IP networks	ITU
specification Operator selection	Specification Carrier Selection Release 11.0.0 from 06.02.2013	AKNN
Specification of the NGN inter-connection interface	Specification of the NGN Interconnection Interface Edition: V1.0.0 from October 15, 2014	AKNN
Signaling in ZZN7	Interface specification “Signaling in ZZN7”, version 4.0.0	AKNN
SIPConnect 1.1	SIPConnect 1.1 Technical Recommendation	SIP FORUM

number	title	source
IETF RFC3311	The Session Initiation Protocol (SIP) UPDATE Method A Presence-	IETF
IETF RFC4119	based GEOPRIV Location Object Format RTP Payload for Text	IETF
IETF RFC4103	Conversation Media Type Registration of	IETF
IETF RFC4856	Payload Formats in the RTP Profile for Audio and Video Conferences	IETF
IETF RFC5139	Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO)	IETF
IETF RFC5491	GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations	IETF
IETF RFC5577	RTP Payload Format for ITU-T Recommendation G.722.1 IETF	
IETF RFC6141	Re-INVITE and Target-Refresh Request Handling in the Session Initiation Protocol (SIP)	IETF
IETF RFC6442	Location Conveyance for the Session Initiation Protocol An Extension	IETF
IETF RFC7044	to the Session Initiation Protocol (SIP) for Request History Information	IETF
IETF RFC7315	Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3GPP	IETF
IETF RFC7433	A Mechanism for Transporting User-to-User Call Control Information in SIP	IETF
IETF RFC7852	Additional Data Related to an Emergency Call	IETF

References:

AKNN: http://www.aknn.de

ESRI: http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf

ETSI: http://www.etsi.org/standards

INSPIRE: http://inspire.ec.europa.eu/

ITU: http://www.itu.int/en/ITU-T/publications/Pages/recs.aspx

IETF: https://www.ietf.org/rfc.html

SIPFORUM: http://www.sipforum.org/sipconnect

3 Definitions and abbreviations

3.1 Definitions

In addition to the definitions contained in Section 3 TKG and Section 2 NotrufV and also valid in this TR Emergency Call, the following additional terms are defined for ease of understanding:

Official community key

Sequence of numbers used to identify politically independent municipalities or unincorporated areas.

Provider identification

Identifier that identifies the telephone service provider from whose subscriber the emergency call originates, clearly identified.

Connection area

Range of physical connections connecting the network termination points at subscribers' premises to a main distribution point or to an equivalent facility in fixed public telephone networks.

A-number

Subscriber's telephone number within the meaning of Section 120~~66k~~ Paragraph 1 TKG.

B-number

Destination number; for emergency calls, the number of the emergency connection to which the Emergency call connection is established.

Replacement emergency call point

Emergency call answering point, which assumes the deputy function for other emergency call answering points in accordance with the rules laid down in the Emergency Call Ordinance4. The replacement emergency call answering point is an emergency call answering point in the sense of the Emergency Call Ordinance.

Cell

Geographical area that can be uniquely identified as the smallest unit in a mobile network using a cell identification.

ISDN subscriber exchange

Switching device for subscribers, characterized in that it uses exclusively the signaling system No. 7 to control connection setup and termination on the network side and operates in a circuit-switching manner in the system core.

Nationally significant telephone number

In the national context, the complete telephone number from the numbering plan of ITU-T Recommendation E.164 of a network access to a public telephone network consisting of a code and a subscriber number without a traffic separation digit.

Network operator

Operator of a telecommunications network.

4 § 5 No. 5 and No. 6 Emergency Call Ordinance

Emergency caller

User of a terminal device who requests the provider of the publicly available telephone service to establish an emergency call connection.

Emergency call routing

Path search in the telecommunications network to establish an emergency call connection from the emergency caller's terminal device to the emergency call connection responsible for his location.

Local area

Area in the Federal Republic of Germany designated by an area code (ONKz).

Location of the emergency caller

Geographical location of the terminal device from which an emergency call connection originates.

Transit network

Public telephone network that connects the source network and the destination network.

Source network

Public telephone network from whose subscriber line an emergency call connection originates.

Traffic control number

Number in the range (0)198 to (0)199 for traffic guidance purposes.

Administrative area

A municipality or an unincorporated area, parts thereof or geographical definitions based thereon.

Target network

Public telephone network at whose emergency call connection an emergency call answering point terminates the emergency call connection.

Access network

Telecommunications network that provides a subscriber with access to a public telephone service.

3.2 Abbreviations

Abbreviation	Meaning
AKNN	Working group for technical and operational questions of numbering and Network interconnection
AML	Advanced Mobile Location
ASCII	American Standard Code for Information Interchange
CDIV	Communication Diversion
CFU	Call Forwarding Unconditional
CI	Cell Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
DSS1	Digital Subscriber Signalling System No. 1 (signaling protocol for the D channel of ISDN)
ECI	E-UTRAN Cell Identifier
ESRI	Environmental Systems Research Institute
ETRS89	European Terrestrial Reference System 1989 (ETRS89)
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile Communications
hex	Hexadecimal
HTTPS	Hypertext Transfer Protocol Secure
I AM	Initial Address Message
Ic	Interconnection
IETF	Internet Engineering Task Force
IMSI	International Mobile Subscriber Identity
INSPIRE	Infrastructure for Spatial Information in Europe
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ISUP IAM	ISDN User Part Initial Address Message
ITU-T	International Telecommunication Union - Standardization Sector
LAC	Location Area Code
loc-src	location-source
LTE	Long-term evolution
MCC	Mobile Country Code
MNC	Mobile Network Code
MSD	eCall Minimum Set of Data
NDC	National Destination Code
NGN	Next-Generation Network
Emergency Call Ordinance	Regulation on emergency calls
ONB	Local area
ONKz	Area code

PIDF-LO	Presence Information Data Format Location Object
PMxAs	Primary multiplex connection
RFC	Request for Comments (IETF)
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SMS	Short Message Service
SN	Subscriber Number
TCP	Transmission Control Protocol
TKG	Telecommunications Act
TlnTelephoneNo	Subscriber number
TLS	Transport Layer Security
TR Emergency call	Technical guideline for emergency connections
UAK-S	Sub-working group - Signaling
UDP	User Datagram Protocol
UNI	User Network Interface
URI	Uniform Resource Identifier
UUI	User-to-user information
Vfg.	Disposal
VoIP	Voice over Internet Protocol
WGS84	World Geodetic System 1984

4 Emergency call origination areas

The territory of the Federal Republic of Germany is divided into emergency call origination areas5 . Each location in the Federal Republic of Germany belongs to exactly one emergency call origination area for the European emergency number 112 and exactly one emergency call origination area for the national emergency number 110. The emergency call origination areas for the European emergency number 112 and the national emergency number 110 can be different. The emergency call origination areas apply equally to all originating networks.

When determining the emergency call answering points with their catchment areas and emergency call origination areas6 by the competent authorities under state law, both the procedure under Section 4.2 for the allocation of administrative areas to emergency call origination areas and the procedure under Section 4.3 [7] for the assignment of Local network areas and, if applicable, connection areas.

4.1 Description of the emergency call origination areas

An emergency call origination area is defined by the geographically contiguous area of a administrative area or several neighbouring administrative areas.

An emergency call origination area is described by the list of sub-areas of administrative territories constituting the emergency call origination area as set out in Annex N1.

4.2 Determination of emergency call origination areas

An overview of the procedure for determining the emergency call origination areas8 is provided in Annex I2 shown.

4.2.1 Number for the emergency call origination area

Each emergency call origination area is assigned an emergency call connection, which in turn is assigned a number, which is referred to below as emergency call coding9 . Emergency calls from an emergency call origination area are made to the emergency call connection associated with it. The format of the emergency call coding is defined as follows10:

Type 1	<ONKz> Chex Chex <x>
Type 2	<ONKz> Chex Chex <xy>

<x> = single digit, decimal digits, value range x: 0 to 9
<xy> = two-digit, decimal digits, value range x, y: 0 to 9

In the event of changes or new allocations, only type 2 numbers will be issued. Type 1 numbers will be phased out.

There are also emergency call codes that are not assigned to an emergency call origination area11 .

5 pursuant to Section 3 Paragraph 1 Sentence 2 Emergency Call Ordinance

6 pursuant to Section 3 Emergency Call Ordinance

7 pursuant to Section 7 Paragraph 4 Emergency Call Ordinance

8 pursuant to Section 3 Paragraph 1 Emergency Call Ordinance

9 pursuant to Section 2 No. 4 Emergency Call Ordinance

10 Interface specification “Signaling in ZZN7”, version 4.0.0

11 Emergency call codes without emergency call origination areas are only relevant for destination network operators.

4.2.2 Description of administrative areas

The geographical descriptions of the administrative areas are determined by the authorities responsible under state law12 and are based on municipal boundaries.

4.2.2.1 Designation of administrative areas

The administrative areas are clearly identified in accordance with Annex N1.

4.2.2.2 Geographical description of administrative areas

The administrative areas apply equally to the determination of the emergency call origination areas of the European emergency number 112 and the national emergency number 110.

The authorities responsible under state law provide the geographical description of the administrative areas of their federal state in the format set out in Annex N1 to the Federal Network Agency.

4.2.2.3 Changes in administrative areas

Following an officially announced change in the boundaries of administrative areas, the competent authority under state law may issue to the Federal Network Agency amended geographical descriptions of the administrative areas in accordance with Annex N1 for the procedure pursuant to Section 3 of the Emergency Call Ordinance.
The amended geographical descriptions of the administrative areas will then be used to describe the emergency call origination areas.

If a change in the boundaries of administrative areas affects the border between countries, the countries involved must each initiate a change in the geographical description of the administrative areas. The changes are made simultaneously for all countries affected.
effective.

4.3 Continuation of the preliminary procedure pursuant to Section 7 Paragraph 4 of the Emergency Call Ordinance

The preliminary procedure for describing the catchment areas and emergency call origin areas pursuant to Section 7 Paragraph 4 of the Emergency Call Ordinance, published with Order No. 6 in the Official Gazette No. 6 of the Federal Network Agency on 01.04.2009, in the form of descriptions of the catchment areas and emergency call origination areas on the basis of local network areas and, if applicable, connection areas, will be continued for network technologies that route emergency calls exclusively on the basis of Local network areas and, if applicable, connection areas, see section 7.1.3.1. For the provisional procedure under Section 7 Paragraph 4 of the Emergency Call Ordinance (subscriber exchanges in fixed networks using ISDN technology), the Federal Network Agency provides the directory “Geographical boundaries of all local network areas (ONB)” on its website13 .

4.4 Information for telephone service providers and network operators

The Federal Network Agency manages the emergency call numbers and maintains the table on the allocation of administrative areas according to Annex N1 to the emergency call origination areas14 . It allocates the emergency call numbers to the emergency call origination areas. It makes this available to telephone service providers and network operators in a directory. The details of the format and transmission of the data are made available to telephone service providers and

12 pursuant to Section 3 Paragraph 1 Emergency Call Ordinance

13https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Nummerierung/Telephone numbers/ONRufnr/ON_Division_ONB/ON_ONB_ONKz_ONBGrenzen_Basepage.html?nn=316054

14 pursuant to Section 3 Paragraph 2 Emergency Call Ordinance

Network operators after registration for the closed user group emergency call traffic control15
made available.

Changes in the directory regarding

1. Emergency number numbers in accordance with the specifications of the Federal Network Agency,
2. Specifications for catchment areas and emergency call origin areas

are communicated to telephone service providers and network operators by the Federal Network Agency16 .

The Federal Network Agency makes the geographical descriptions of the administrative areas provided by the competent state authorities in accordance with Annex N1 available for retrieval to the Closed User Group Emergency Traffic Control. A separate compilation of the geographical descriptions is made available for each federal state. The right to
Use of the data is limited to the purposes of emergency call routing; passing it on to third parties is not permitted.

15 https://www.bundesnetzagentur.de/DE/Fachthemen/Telekommunikation/unternehmenspflichten/Notruf/Emergency call routing/notruflenkung-node.htmlhttp://www.bundesnetzagentur.de/cln_1431/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Provider obligations/emergency call/emergency call routing/emergency call routing node.html

16 pursuant to Section 3 Emergency Call Ordinance

5 Requirements for emergency call connections

5.1 Characteristics of emergency connections

5.1.1 Establishing the emergency call connection

The telephone networks involved in an emergency call connection are classified as follows:

- Source network,
- Transit network (optional),
- Target network.

The source network and the destination network can be identical or belong to different telephone networks.

5.1.1.1 Technology change

As far as technically possible, emergency call connections must be made using the same technology from the subscriber connection to the emergency call connection17 . This also applies to network interconnections.

Technology changes must be designed in such a way that they do not lead to any data loss - except for technology-related, unavoidable data loss when switching from SIP to ISUP - and do not result in any deterioration compared to the usual voice quality.

5.1.1.2 Direct traffic routing

Emergency connections should preferably be established from the source network directly to the destination network and only secondarily via a transit network and, as a last resort, via two transit networks to the destination network.

5.1.2 Identification of emergency connections

Emergency calls must be identified at the telephone network gateways by the B number containing two consecutive hexadecimal digits Chex or, after the country code +49 or the prefix 0, the code of the traffic routing number “1982”.

The traffic control numbers with the code “1982” are defined in the “Traffic Control Numbers Numbering Plan” by order in the Official Journal of the Federal Network Agency18 .

5.2 Information accompanying the emergency call

5.2.1 Telephone number of the connection

The telephone number to be transmitted is the telephone number in accordance with Section 12066k Para. 1 TKG , hereinafter referred to as the A telephone number .

For users of foreign mobile phone services who use national mobile phone networks via roaming agreements, the full internationally significant telephone number must be transmitted.

If the mobile network operator does not know the A number, an A number must be transmitted, consisting of the service code and block identifier of the receiving mobile network and a terminal number that contains the number 9 multiple times and exclusively (e.g. 999 9999). The number of digits is specified by the rules for allocating mobile numbers. This number - known as the default number - cannot be recalled.

[17] This refers to technologies such as ISDN or VoIP.

[18] see Communication 962/2016 in the Official Journal of the Federal Network Agency

5.2.2 Provider identification of the telephone service provider

The provider identification consists of a four-digit hexadecimal number sequence.

Until the Federal Network Agency allocates an individual provider identifier for each telephone service provider, the porting identifier assigned to the A telephone number in accordance with the porting data exchange procedure must be used.

5.2.3 Data for determining the location from which the emergency call connection runs out

5.2.3.1 Location determined by the telecommunications network

5.2.3.1.1 Determination of the location

The information on the location of the terminal19 from which the emergency call connection originates is required for real-time emergency call routing from information from the network element of the telecommunications network which can provide the most precise location information when establishing the connection. If this is not possible or the data is unsuitable for emergency call routing due to a lack of accuracy, the use of location data stored in daily updated databases is permitted.

Exceptions to the daily update requirement are only permitted for connections affected by network restructuring. In such cases, the databases must be updated immediately after the restructuring is completed.

5.2.3.1.2 Information on the location of the terminal device

The information on the location of the terminal device must be provided in the form of the geographical coordinates of the location by specifying the geographical longitude and latitude. In addition, the accuracy of the coordinate information must be described by an uncertainty ellipse.

5.2.3.1.3 Coordinate reference system

The coordinate reference system is the “European Terrestrial Reference System 1989” (ETRS89) - – described in D2.8.I.1 INSPIRE “Specification on Coordinate Reference Systems – Guidelines“ – to be used.

5.2.3.1.4 Other information on the location of the terminal device

The information on the location of the end device should preferably be given as geographical coordinates. If the geographical coordinates cannot be determined by the service provider in accordance with Section 16408 Para. 1 Sentence 1 TKG determined, other location information may be possible depending on the network technology used, as described below.

5.2.3.1.4.1 Location of telephone connections to fixed networks

For telephone connections to fixed networks – this also includes fixed connections that are Mobile radio technologies are used - – instead of the geographical coordinates of the location of the terminal device, the address of the installation location of the network termination point from which the emergency call connection originates can be transmitted to the emergency call center. If neither the coordinates nor the address can be determined on the network side, the area in which the emergency caller's connection is located must be determined using a polygon as in section N3-A.6.1.3 or. N4.3.3.4 shall be specified with the greatest possible accuracy.

[19] pursuant to Section 4 Paragraph 4 Sentence 1 No. 2 NotrufV

The accuracy requirements according to section 5.2.3.3 must be observed.

5.2.3.1.4.2 Location of mobile phone connections

For ~~mobile phone connections~~ in mobile phone networks that are based entirely or partially on GSM or LTE technology, instead of the geographical coordinates of the location of the terminal device, the area of the radio cell from which the emergency call connection was established must be specified.

The possible formats for the transmission of location data from mobile phone connections are defined in Annex N3-A.6 in the case of ISDN emergency connections and in Annex N4.3.3.3 in the case of IP emergency connections.

The information required to convert the identifier or reference coordinate of the radio cell into cartographic information must be available for retrieval no later than 1 s after the start of the connection establishment and must be transmitted within 3 s when retrieved by the emergency call point.

For connections in mobile networks, based on Advanced Mobile Location (AML) to transmit available location information during an existing emergency call.

5.2.3.2 Location determined by the participant

In cases where the subscriber side has its own information on the location of the emergency caller and this information is transmitted to the
If the location information is transmitted by a telephone service provider, this information must be forwarded to the emergency call center in addition to the location data determined by the telecommunications network. Transit and destination network operators are obliged to pass this information on transparently. The originating network operator is not obliged to do so if the subscriber-side location information is transmitted to subscriber connections using circuit-switched technology (see last sentence in the introductory paragraph of Annex N3).

Incorrectly formatted or excessive subscriber location information that endangers the integrity of the transport network or the telephone service may be discarded.

5.2.3.3 Accuracy of location information

The location data determined by the telecommunications network must in principle be as accurate as is necessary for routing emergency calls to the locally responsible emergency call center or, alternatively, to a neighboring emergency call center and for effective assistance by the emergency services .

For connections to fixed networks, the location, if possible due to its nature, house-specific if the location information is provided on the network as coordinates or address can be determined. When providing location information as a polygon or similar, the greatest possible accuracy should be sought.

For connections in mobile networks that are based entirely or partially on GSM or LTE technology the location determined by the telecommunications network must be specified at least with radio cell accuracy . For connections in mobile networks that are not based entirely or partially on GSM or LTE technology, the location of the terminal device from which the emergency call is made must be must be specified on the network side with an accuracy of at least 50 meters or an uncertainty of at most 50 meters. In addition, for connections in mobile networks, the information for identifying the radio cell (Cell Global Identifier) must always be provided .

5.2.3.4 Reliability of location information

In cases where the required accuracy of the location information to be transmitted to the emergency call point cannot be achieved for connections to fixed networks and for connections to mobile networks, these must be reported to the Federal Network Agency once a year, broken down by connection type and technology or combination of technologies used, justified and expressed as an error rate as a percentage.

If necessary, the Federal Network Agency reserves the right to specify future success rates for the reliable and accurate transmission of location information in percent per connection type, per technology used or per technology combination used.

5.3 Technology-specific requirements for emergency call connections

5.3.1 ISDN technology

Requirements for emergency connections and sections of emergency connections using ISDN technology are described in Annex N3.

5.3.2 IP technology

Requirements for emergency connections and sections of emergency connections using IP technology are described in Annex N4.

The requirements for location information based on Advanced Mobile Location (AML) must be implemented for emergency call connections using IP technology in accordance with Annex N9.

5.3.3 Transition between networks of different technologies

In the event of a technology transfer, the operator of the transferring telephone network ensure that compatibility with the receiving telephone network is ensured at all layers and that all required information is transmitted.

5.3.3.1 Transition to ISDN

When switching to an ISDN, the parameters in the ISUP IAM must be set by the outgoing telephone network in accordance with Appendix N3, Annex N3-A.

5.3.3.1.1 From IP technology

The conversion of information accompanying emergency calls shall be carried out in accordance with section N7.2.

5.3.3.1.2 From technologies other than ISDN or IP

For telecommunications networks that are neither ISDN nor IP-based, it must be ensured that the transmission method used and the interfaces to the ISDN are compatible with the method described in section 5.3.1.

5.3.3.2 Transition to IP technology

When switching to an IP-based public telephone network, the parameters according to Annex N4 by the issuing telephone network.

5.3.3.2.1 From ISDN technology

The conversion of information accompanying emergency calls shall be carried out in accordance with Section N7.1.

5.3.3.2.2 From technologies other than IP or ISDN

For telecommunications networks that are neither IP-based nor circuit-switched, it must be ensured that the transmission method used and the interfaces to the IP-based public telephone network are compatible with the method described in Section 5.3.2.

6 Requirements for emergency call connections

Emergency call connections can be technically implemented in the following ways:

Type 1 connection without multi-way guide,
Type 2 connection with edge-disjoint multi-way guidance,
Type 3 connection with node-disjoint and therefore necessarily edge-disjoint multi-path routing.

The type of connection (fiber optic, DSL, etc.), possible redundancies such as node and/or edge-disjoint multi-path routing as well as concrete measures to achieve the necessary reliability are agreed between the operator of the emergency call point and the target network operator.

Telephone service providers that provide emergency call connections must interconnect their destination networks for emergency call connections directly, i.e. not via a transit network.

6.1 Operational readiness

In the event that there is a dispute between the operator of the emergency call point and the provider of the
If no minimum availability is agreed for the emergency call connection, the emergency call connection must be provided with the following availability:

Type 1 availability greater than 98.5%,
Type 2 availability greater than 99.5%,
Type 3 availability greater than 99.8%.

These availability requirements must be met annually.

In the event that nothing else is agreed between the operator of the emergency call point and the provider of the emergency call connection, the target network operator must keep the network components of the emergency call connection operational for at least 6 hours in the event of a power failure. This does not include the technical equipment in the building of the emergency call point.
including network termination devices.

6.2 Continuous monitoring of emergency call connections

The functionality and transmission quality of the emergency call connection must be monitored continuously and independently of each other at both the transport and service levels, i.e.

- at the transport level between the network node in the public telephone network, which is the Emergency call center provides network access and message packets on the Transport level processed, and the emergency call center and
- at the service level between the network node in the destination network that provides the switching function (Call Control) and the emergency call point.

For emergency call connections with multi-path routing (type 2 and type 3), the functionality of all paths must be monitored. The monitoring functions should take place more frequently at the transport level than at the service level, so that faults are usually detected earlier at the transport level than at the service level.

If a fault is detected, the responsible network management center must be alerted immediately and troubleshooting must be initiated without delay.

For emergency call connections without multi-path routing (Type 1), if an emergency call connection is specified at a substitute emergency call answering point, the redirection of newly incoming emergency calls to the substitute emergency call connection must be activated.

In the case of emergency call connections with multi-path routing (type 2 and type 3), the emergency call switch must be implemented at the transport level in the event of a fault at the transport level. If the emergency call switch is not successful at the transport level, then if an emergency call connection is specified at an emergency call answering point, the redirection of newly incoming emergency calls to the emergency call connection must be activated.

In the case of emergency call forwarding to an emergency connection at a substitute emergency call point, a second destination network may be involved.

6.3 Traffic direction

Emergency call connections must be set up in such a way that only incoming traffic is allowed for the telephone service. is possible[20] .

6.4 Redirection of emergency calls to the substitute emergency call point

Replacement emergency answering points can be emergency answering points with a catchment area and one or more emergency call origination areas or emergency answering points without a catchment area. In both cases, the connections of replacement emergency answering points to the public telecommunications network must meet the technical requirements for emergency call connections. Emergency call codes can be specified for emergency call connections at replacement emergency answering points that are not assigned to an emergency call origination area. Emergency call forwarding is activated by the telephone service provider that provides the emergency call connection when a technical fault is detected or on request by the operator of the emergency answering point. The number of the connection of the forwarding destination - – of an emergency call connection of the replacement emergency answering point - – must be set in advance in the technical facilities of the telephone service provider providing the emergency call connection, in accordance with the directory of the Federal Network Agency.

Deactivation of emergency call forwarding must not affect existing emergency call connections.

In the event that an emergency call connection fails and no emergency call connection is set up at a replacement emergency call point for the emergency call connection, the emergency caller must be informed of the unavailability of the emergency call connection by means of a suitable announcement or an appropriate error message.

6.4.1 Redirection in case of technical fault

In the event of a technical fault in the emergency call connection or the connection-specific parts of the emergency call answering point, the telephone service provider providing the emergency call connection must activate the redirection immediately after detecting the fault in accordance with Section 6.2.

Technology-specific requirements for redirection are set out in Annexes N5 and N6.

Once the fault has been rectified, the emergency call forwarding or announcement must be deactivated immediately. The prerequisite for this is that the emergency call connection is stable for at least 1 minute after the fault has been rectified.

6.4.2 Redirection upon request of the emergency call center

The operator of the emergency call answering point must be able to activate or deactivate the redirection using technical means and to check the activation status of the redirection. The technical means of redirection must be agreed between the operator of the emergency call answering point and the provider of the emergency call connection. Different procedures can be agreed between the operator of the emergency call answering point and the provider of the emergency call connection.

[20] pursuant to Section 2 No. 3 Emergency Call Ordinance

6.5 ISDN emergency connections

Emergency connections using ISDN technology must be set up in accordance with Annex N5.

6.6 Emergency call connections in IP technology

Emergency call connections using IP technology must be set up in accordance with Annex N6.

The requirements for accessibility through real-time text must be implemented for emergency call connections using IP technology in accordance with Annex N8.

6.7 Emergency connections in technologies other than ISDN or IP

The specification of emergency call connections in other technologies will be made, if required, in a future edition of the TR Emergency Call.

7 Tasks of telephone service providers and Telephone network operators

7.1 Tasks of the originating telephone service provider

7.1.1 Recognising requests to establish emergency calls

7.1.1.1 Evaluation of the selected digits

The digits dialed by the end user must be evaluated. If an emergency number is preceded by an area code and/or a code for selecting the network operator, the Digit dialing is to be handled in accordance with section 4.1.7 of the “Specification for Carrier Selection” of the AKNN version 11.0.0 of 06.02.2013.

7.1.1.2 Emergency call-specific signaling

The emergency service category values *(Service Category information element)* are defined in the standard ETSI TS 124 008, Clause 10.5.4.33 *(Emergency Service Category Value (octet 3))* . For LTE and 5G, the implementation table in ETSI TS 124 229 Table B.2.2.6.1 must be taken into account.

In the case of an eCall, the emergency call connection must be identified in accordance with Section N3-A.5 or Section N4.3.4, depending on the technology of the emergency call connection.

7.1.2 Location of the terminal device determined by the telephone service provider

The telephone service provider determines the *location of the* emergency caller's terminal device as determined by the telecommunications network in accordance with Section 5.2.3.1. It also transmits location information unchanged in accordance with Section 5.2.3.2.

7.1.2.1 Use of location information from wholesale service providers

The establishment of an emergency call may not be delayed by more than 2 s by obtaining location data from upstream service providers. If the delay is expected to be longer than 2 s, plausible customer data can be used as an alternative.
be used.

7.1.2.2 Provision of information accompanying the emergency call

For emergency calls originating from line-based telephone connections to ISDN subscriber exchanges, the procedure pursuant to Section 7 Paragraph 6 of the Emergency Call Ordinance for providing location data is permissible for the remaining operating time of the ISDN subscriber exchange, but no later than December 31, 2025.

7.1.3 Local emergency call point

7.1.3.1 Transition procedure for ISDN switching technology

Emergency call routing for emergency calls originating from telephone connections to ISDN subscriber exchanges may be carried out until the end of the operating life of these subscriber exchanges, but no later than 31 December 2025, on the basis of local network areas and, if applicable, connection areas in accordance with Section 4.3.

7.1.4 Conversion of the selection into a connection destination

When converting the emergency number into a B number, two cases must be distinguished depending on the technology used by the originating telephone service provider.

1) In the case of ISDN technology, the telephone service provider must assign the emergency number depending on the determined emergency call origination area in its emergency call coding21 according to the following principle to implement:

either (if the emergency call connection is implemented using ISDN technology):

110 ÿ <(target)ONKz> ChexChex <x(y)>
112 ÿ <(Target-)ONKz> ChexChex <x(y)>

or (if the emergency call connection is implemented using IP technology)22:

110 ÿ 1982 <tuvwxyz> (where tuvwxyz is a 3- to 7-digit number sequence)

112 ÿ 1982 <tuvwxyz> (where tuvwxyz is a 3- to 7-digit number sequence)

2) The telephone service provider has to implement the emergency numbers in IP technology 110 and 112 in the format according to section 7.1.2.2 of the AKNN UAK-S specification “Specification of the NGN-Interconnection Interface” (Version 1.0.0).

Regardless of the technology used by the originating telephone service provider, for emergency connections using IP technology the digit sequence tuvwxyz is formed from the 3 to 7 digits in the order given by <(target) ONKz> <x(y)>23 .

7.1.5 Transmission of information accompanying emergency calls

In accordance with Section 5.2, the telephone service provider must transmit the emergency call-related information and the emergency call coding for the determined emergency call origination area either directly to the destination network or to a transit network that is suitable for the publicly accessible telephone service and handles the further connection setup, including the unchanged forwarding of the emergency call-related information to the destination network.

For emergency calls from source networks using IP technology, in addition to the *Geolocation header field,* the User-to-User parameter of the ISUP IAM must be set in accordance with Annex N3, Appendix N3-A and transmitted in the User-to-User Header Field in accordance with ETSI TS 129 163, Section 7.4.21.1.
If the *User-to-User header field* has been used by the subscriber, it must be overwritten by the telephone service provider.

In the case of originating networks using IP technology, the telephone service provider has to pass through any *geolocation header field* and *PIDF-LO XML body* transparently. Incorrectly formatted or excessively extensive location information from the subscriber that exceeds the maximum size of the INVITE message specified by the telephone service may be discarded.

When switching between networks of different technologies, Section 5.3.3 must be followed. procedure.

For source networks using technologies other than IP or ISDN, the information accompanying the emergency call must be provided in accordance with the technology-specific requirements in Annexes N3 and N4 respectively.

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21 pursuant to Section 4 Paragraph 2 Sentence 2 Emergency Call Ordinance

22 The technology used for the emergency call connection can be found in the emergency call routing data of the Federal Network Agency be taken

23 Note: The Federal Network Agency intends to specify more than 7 digits in the future.

N4 into the circuit-switched network or IP-based network from the originating telephone network.

7.1.6 Establishing a connection

The emergency call connection must be marked in accordance with section 5.1.2.

Technology changes must be designed in such a way that they do not lead to any data loss - with~~ the~~ exception of technology-related, unavoidable data loss when switching from SIP to ISUP - and do not result in any deteri~~o~~ration compared to the usual voice quality.

7.1.6.1 Establishing a connection in circuit-switched networks

When using ISDN, the telephone service provider carries out the procedures described in the interface specification “Signaling in ZZN7” (version 4.0.0).

7.1.6.2 Establishing a connection in IP-based networks

When using IP-based networks, the telephone service provider carries out the procedures described in the interface specification of the AKNN UAK-S “Specification of the NGN Interconnection Interface” (version 1.0.0). Deviations from or additions to this specification are specified in Appendix N4.

7.1.7 Page dial-in protection

The telephone service provider shall refuse a connection request from an end-user who wishes to establish a connection directly to a specific emergency number by dialling a number of type 1 or type 2 in the table in section 4.2.1 or starting with a routing number code in accordance with section 5.1.2.

7.2 Tasks of the telephone service provider with transit function

Telephone service providers offering the routing of telephone services must also offer the routing of emergency calls with indication of the emergency call destination in the form of the emergency call code according to section 4.2.1 or with a code of the traffic routing number according to section 5.1.2
make possible.

The information accompanying the emergency call in accordance with sections 5.2 and 7.1.5 must be transmitted unchanged.

Technology changes must be designed in such a way that they do not lead to any data loss - exc~~ept~~ for technology-related, unavoidable data loss when switching from SIP to ISUP - and do not result in any deterioration com~~p~~ared to the usual voice quality. Necessary conversions must be carried out in accordance with Appendix N7.

7.3 Tasks of the terminating telephone service provider

The information accompanying the emergency call in accordance with sections 5.2 and 7.1.5 must be transmitted unchanged.

Technology changes must be designed in such a way that they do not lead to any data loss - with~~ the~~ exception of technology-related, unavoidable data loss when switching from SIP to ISUP or SIP to DSS1 protocol - and do not result in any deterioration co~~mp~~ared to the usual voice quality.

Normative Annexes

The specifications and technical details in these annexes are binding requirements of this technical guideline.

Appendix N1: Data format description administrative areas

The geographical description of administrative areas (municipalities and unincorporated areas, parts thereof or geographical definitions based on them) is carried out in accordance with VG250-N of the Federal Office for Cartography and Geodesy. The Federal Network Agency makes the documentation on VG250-N available for retrieval to the closed user group Emergency Traffic Control and the authorities responsible under state law. The data is provided in the "SHAPE data format" - described in ESRI White Paper July 1998: ESRI Shapefile Technical Description - a de facto industry standard for the exchange of geodata.24

Administrative areas

Administrative areas consist of land and water areas. All parts of an administrative area are identified by the same official municipality code in the AGS attribute.

If the land or water area of an administrative area consists of several geographically separate areas, there is a separate data set for each sub-area. To distinguish between these sub-areas, the official municipality key is extended by a lowercase letter (az) in the AGS_N attribute. The largest water or land area in each case has the letter "a".

Trunk area

The main area of an administrative area is the largest land area of the administrative area. Land areas are identified by the value “4” in the GF attribute. If an administrative area consists of several land areas, the area of the main area has the extension “a” in the AGS_N attribute.

If the administrative area has only one land area, no extension is used in the AGS_N attribute. In this case, the AGS_N attribute contains the official municipality key.

Clear identification of a geographical area

The data set of a geographical area is uniquely identified by the combination of the attributes AGS_N and GF.

Allocation of areas to emergency call origin areas

The allocation of subareas of administrative areas to emergency call origin areas is done via the following attributes of the areas:

1. AGS_N (official community key specifically for emergency calls)
2. GF (separation of land and water areas)
3. GEN (Geographical Name)

The attribute GEN is redundant and is intended to help avoid errors or confusion.

[24] Source: Federal Office for Cartography and Geodesy

Annex N2: Specification ETSI TS 101 109

Editorial corrections to ETSI TS 101 109 V7.2.0 (2002-12):

The correct form of section 6.7 is as follows:

6.7 Angle

Offset and included angle are encoded in increments of 2° using an 8 bit binary coded number N in the range 0 to 179. The relationship between the number N and the range of offset (ao) and included (ai) angles a (in degrees) it encodes is described by the following equations;

Offset angle (ao)

2 N <= ao < 2 (N+1)
Accepted values for ao are within the range from 0 to 359.9...9 degrees.

Included angle (ai)

2 N < ai <= 2 (N+1)
Accepted values for ai are within the range from 0.0...1 to 360 degrees.

Appendix N3: Emergency connections using ISDN technology

For emergency calls to ISDN emergency connections, the emergency call-related information to be transmitted to the emergency call connection using *User-to-user Signaling Service 1 implicitly* in accordance with Appendix N3-A. This is a deviation from the standard, as this parameter is intended to exchange information between the terminal devices. This deviation from the standard is necessary because the ISUP parameters that would be suitable for transmitting location data are not supported in the DSS1 protocol and therefore cannot be transmitted via an ISDN emergency call connection. Therefore, the *User-to-user Signaling Service 1* can no longer be used for its original purpose in emergency calls. If the emergency caller or the terminal device has used the *User-user information element ,* it must be overwritten by the telephone service provider.

N3.1 Identification of the emergency call connection

Emergency calls must be identified at the telephone network gateways by the B number containing two consecutive hexadecimal digits Chex . The identification is in the ISUP IAM parameter *Called party number .*

N3.2 Transmission of emergency call information

The transmission of the information accompanying the emergency call must be carried out using the signaling protocol when establishing the connection in the ISUP IAM and DSS1 setup messages.

N3.2.1 Transfer of the A number

The A-number is to be transmitted in the ISUP IAM parameter *Calling party number* and in the DSS1 setup message in the *Calling party number information element .*

N3.2.2 Transfer of provider identification

The provider identifier must be transmitted in the ISUP IAM parameter *User-to-user information* and in the DSS1 setup message in the *User-user information element* according to Annex N3-A.4.

N3.2.3 Transmission of location data

The location data shall be transmitted in the ISUP IAM parameter *User-to-user information* and in the DSS1 Setup message in the *User-user information element* according to Annexes N3-A.5 and N3-A.6.

Due to the length limitation of the *User-user information element,* restrictions apply to the description of the site in accordance with Annex N3-A.6.

Annex N3, Appendix N3-A:
Using the User-to-user Information Parameter (UUI)

When transmitting the UUI parameter in the ISUP IAM and the DSS1 Setup, the following ITU-T Recommendation Q.931 should be preceded by the following information:

UUI Parameter	octet
Parameter name = User-to-user information	1
Length Indicator	2
Protocol discriminator	3

The current length of the UUI parameter must be entered in the “Length Indicator”.

The maximum length of the information content is 31 octets.

Information elements in the UUI parameter

Unused encodings are reserved for future additions.

N3-A.1 Parameter Name

The Parameter Name field shall be used in accordance with ITU-T Recommendation Q.931.

8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**octet**
	User-user information element identifier							
0	1	1	1	1	1	1	0	**1**
Length of user-user contents								**2**
Protocol discriminator								**3**
User information								**4**
								etc.

Figure 4-36/Q.931 – User-user information element

The specification in Figure 4-36/Q931 applies to emergency connections. For telephone network gateways, the Parameter Name field must be set to 00100000 in accordance with ITU-T Recommendation Q.763 (Table 5/Q.763, User-to-user information).

N3-A.2 Length Indicator

This field must specify the number of characters of the location data currently to be transmitted. The number of octets starting from the "length indicator" must be specified.

Encoding: Binary

Content: Number of characters transmitted according to the geographical description form used.

Value range: 6 to 32

N3-A.3 Protocol discriminator

The use of the “Protocol discriminator” field must be in accordance with ITU-T Recommendation Q.931.

Protocol discriminator (octet 3) Bits
8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 0 User-specific protocol *The user information is structured according to user needs.*

Table 4-26/Q.931 – User-user information element

Encoding: Binary

Content: When transmitting location data, the following bit sequence must be used:

8	7	6	5	4	3	2	1	octet
0	0	0	0	0	0	0	0	3

N3-A.4 Provider identification

The provider identification must be transmitted in octets 4 and 5.

UUI Parameter (Provider Identification)	octet
Provider identification	4
	5

This field must contain the provider identification of the telephone service provider that accepts the connection request made to an emergency number.

Encoding: Hexadecimal, 4 characters in octets 4 and 5

Contents:

8	7	6	5	4	3	2	1	octet
Provider identification character 2				Provider identification character 1				4
Provider identification character 4				Provider identification character 3				5

Example of a provider identification:

Sign			
1	**2**	**3**	**4**
D1		2	3

N3-A.5 Description form of the transmitted location data in the UUI

The description form of the transmitted location data must be transmitted in octet 6:

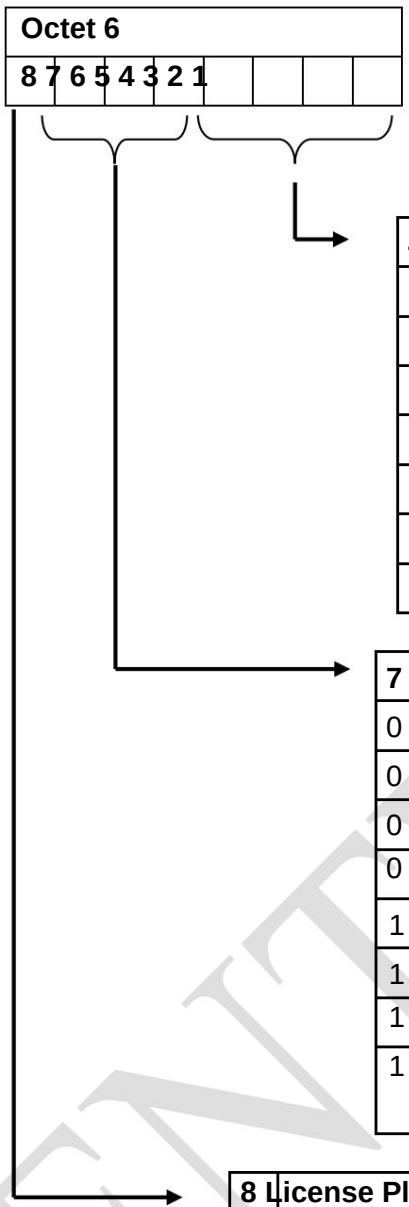
UUI Parameter (description form of location data) Octet	
Description form of location data	6

Three characteristics must be transmitted:

- Type of geographical description
- Availability of an MSD
- Type of location information.

Encoding: Hexadecimal, 2 characters in octet 6

Contents:



4 3 2 1	Location
0 0 0 0	Location of the network termination point in the fixed network
0 0 0 1	Location of the terminal in the mobile network
0 0 1 0	Location of the mobile radio transmitter
0 0 1	1 Focus of the radio cell area
0 1 0 0	Name of the radio cell
0 1 0 1	Radio cell within the meaning of Section 7 Paragraph 7 Emergency Call Ordinance
1 1 1	1 error; no location specified

7 6 5	Geographical description
0 0 0	Geographical coordinate
0 0 1	Geographical coordinate with uncertainty ellipse
0 1 0	Area using polygon
0 1	1 Address
1 0 0	Description of the radio cell
1 0 1	circular ring segment
1 1 0	Reference coordinate
1 1	1 Coverage area and designation of the radio cell / Error case

8	License Plate eCall
0	No eCall
1	eCall

In contrast to ETSI TS 101 109, the unused bits 1 to 3 are to be used to describe the type of location information. Bit 8 is intended to identify an eCall.

The permitted combinations of location and geographical description are set out in the Table N3-1 listed

Bit in octet 6							Location/Geographical Description	basis
7	6	5	4	3	2	1		
			0	**0**	**0**	**0**	**Location of the network termination point in the fixed network**	
0	0	1	0	0	0	0	Geographical coordinate with uncertainty ellipse 1)	5.2.3.1.2
0	1			1	0	0	0 0 Address 1)	5.2.3.1.4.1
			0	**0**	**0**	**1**	**Location of the terminal in the mobile network**	
0	0	1	0	0	0	1	Geographical coordinate with uncertainty ellipse 1)	5.2.3.1.4.2
0	1	0	0	0	0	1	Area using polygon 1)	5.2.3.1.4.2
1	0	1	0	0	0	1	circular ring segment 1)	5.2.3.1.4.2
			0	**0**	**1**		**0 Location of the mobile radio transmitter**	N3-A.6.3.1
0	0	0	0	0	1		0 Geographical coordinate 1)	N3-A.6.3.1.1
1	0	1	0	0	1		0 circular ring segment 1)	N3-A.6.3.1.2
			0	**0**	**1**		**1 Focus of the radio cell area**	N3-A.6.3.2
0	0	0	0	0	1		1 Geographical coordinate 1)	N3-A.6.3.2.1
0	0	1	0	0	1		1 Geographical coordinate with uncertainty ellipse 1)	N3-A.6.3.2.2
			0	**1**	**0**	**0**	**Name of the radio cell**	5.2.3.1.4.2 and N3-A.6.3.3
1	0	0	0	1	0	0	Description of the radio cell 1)	N3-A.6.3
			0	**1**	**0**	**1**	**Radio cell within the meaning of Section 7 Paragraph 7 of the Emergency Call Ordinance**	N3-A.6.4
1	1		1	0	1	0	1 Coverage area and designation of the radio cell 2)	N3-A.6.4.1
1		1	0	0	1	0	1 Reference coordinate 2)	N3-A.6.4.2
			1	**1**	**1**		**1 error; no location specified**	
1	1	1	1	1	1		1 error case 2)	N3-A.6.5
1) Combinations that have already been defined in TR Emergency Call Edition 1.0 2) Combinations supplemented by Regulation No. 14/2013								

Table N3-1: permissible combinations of location and geographical description

N3-A.6 Description of the site

Octets 7 to 34 are available for transmitting location data.

Depending on the type of location data, different information must be transmitted.

When using geographical coordinates, the coding according to ITU-T Recommendation Q.763 “Signalling System No. 7 – ISDN user part formats and codes”, Clause 3.88.1 (Ellipsoid point shape description) must be used.

N3-A.6.1 Geographical description of the site

The geographical description of the location must be in octets 7 to 31. The actual parameter length results from the selected description form. The coding must be in accordance with ETSI TS 101 109, Clause 7.3.3 or 7.3.4.

N3-A.6.1.1 Geographic coordinate

The location information is provided in accordance with ETSI TS 101 109, Clause 5.1 in the form

- a geographical coordinate in longitude and latitude.

UUI parameters (coordinates)	octet
ETSI TS 101 109, Clause 7.3.1, Octets 2 to 7	7 to 12

N3-A.6.1.2 Geographical coordinate with uncertainty ellipse

The location information is provided in accordance with ETSI TS 101 109, Clause 5.3 in the form

- a geographical coordinate in longitude and latitude,
- an uncertainty ellipse using two semi-axes and angles to the main axis and
- an indication of the level of confidence.

The confidence level should be set to 100%.

UUI parameters (coordinates with uncertainty ellipse)	octet
ETSI TS 101 109, Clause 7.3.3, Octets 2 to 11	7 to 16

N3-A.6.1.3 Polygon

The location information is provided in accordance with ETSI TS 101 109, Clause 5.4 in the form of

- the number of polygon points (minimum 3, maximum 4),
- geographical coordinates in longitude and latitude for each polygon vertex.

UUI Parameters (Polygon)	octet
ETSI TS 101 109, Clause 7.3.4, octets 1 to 25	7 to 31

N3-A.6.1.4 Area using circular ring segment

The location information is provided in accordance with ETSI TS 101 109, Clause 5.7, in the form

- a geographical coordinate in longitude and latitude and
- Information on the inner radius and width of the ring,
- Starting angle in degrees relative to north and latitude of the angle segment in degrees and
- Trust level of the information.

The confidence level should be set to 100%.

UUI Parameter (Annular Ring Segment)	octet
ETSI TS 101 109, Clause 7.3.7, Octets 2 to 13	7 to 18

N3-A.6.2 Address

The address to be transmitted consists of:

- Postal code,
- Street name and
- House number

Due to the length limitation of the UUI parameter, street names are limited to a maximum of 21 characters. Longer street names must be shortened accordingly when assigning the parameter.

UUI Parameter (Address)	octet
Postal code	7 to 9
House number	10 to 12
Street name	13 to 33

N3-A.6.2.1 Postal code (ZIP)

The field must contain the 5-digit postal code.

Encoding: Decimal 5 digits in octets 7 to 9.

Contents:

8	7	6	5	4	3	2	1	octet
Postcode number 2				Postcode number 1				7
Postcode number 4				Postcode number 3				8
Fhex				Postcode number 5				9

N3-A.6.2.2 House number

The field must contain the house number of the address. Two characteristics must be transmitted:

- Digits of the house number
- Addition to the house number

Coding: Decimal 4 digits in octets 10 and 11 and 1 ASCII character in bits 1 to 7 of octet 12. Bit 8 of octet 12 is to be set to the binary value 0 and is not to be evaluated on the receiver side.

Empty half-octets in one-, two- or three-digit house numbers are encoded with Fhex . An empty addition to the house number is encoded with FFhex .

In cases where the address contains a range of house numbers (example: Bahnhofstr. 32-38), the first house number must be indicated with the character "-" (hexadecimal 2D) as an addition to the house number, and the second house number must not be indicated (example: 32-, coding therefore hexadecimal 23 FF 2D).

Contents:

8	7	6	5	4	3	2	1	octet
House number digit 2				House number digit 1				10
House number digit 4				House number digit 3				11
Addition to the house number								12

N3-A.6.2.3 Street name

The field must contain the street name of the address.

Coding: maximum of 21 ASCII characters in bits 1 to 7 of octets 13 to 33. Bit 8 of each octet is to be set to the binary value 0 and not evaluated on the receiver side. The specific German characters ä, ö, ü and ß are to be converted to ae, oe, ue and ss.

Content: Street name 21 characters. If the street name is longer than 21 characters, characters 1 to 21 of the street name must be used.

N3-A.6.3 Description of the radio cell

The geographical description of the radio cell must be given as

- Location of the mobile phone transmitter or
- Centre of gravity of the radio cell area.

Alternatively or in addition, a unique *designation of the radio cell* from which the connection was established can be specified. When using the *designation of the radio cell ,* it must be ensured that the information for converting the designation into the geographical information about the area is available at the emergency call answering points in accordance with Section 5.2.3.1.4.2.

N3-A.6.3.1 Location of the mobile radio transmitter

The location of the mobile radio transmitter can be specified as the geographical coordinate of the base point or as the geographical coordinate of the base point in conjunction with the main beam direction of the antenna.

N3-A.6.3.1.1 *Geographical coordinate of the mobile radio transmitter*

The location of the mobile radio transmitter shall be described using the geographical coordinates of the base point of the antenna support by specifying the geographical longitude and latitude in accordance with N3-A.6.1.1.

N3-A.6.3.1.2 *Main beam direction of the mobile radio transmitter antenna*

The location of the mobile radio transmitter shall be described using the geographical coordinates of the base point of the antenna support by specifying the geographical longitude and latitude in accordance with N3-A.6.1.4.

The main beam direction of the antenna is determined from the 3 dB opening angle of the horizontal antenna pattern in conjunction with the range of the radio transmitter in the form of the planned cell radius of the coverage area. The description has to be in the form of a circular segment according to
ETSI TS 101 109, Clause 5.7 in conjunction with Clause 7.3.7. The information element *Inner radius* is to be assigned the numerical value "0", the information element *Uncertainty radius* is to be assigned the range of the base station in accordance with the network planning. In the case of antennas with horizontal omnidirectional characteristics, the information element *Offset angle* is to be assigned the value "0°" and the information element *Included angle* is to be assigned the value "360°".

N3-A.6.3.2 Focus of the radio cell area

The centroid of the radio cell area can be specified as the geographical coordinate of the cell centroid or as the geographical coordinate of the cell centroid in conjunction with the geographical description of the coverage area.

N3-A.6.3.2.1 *Geographical coordinate of the center of gravity*

The centre of gravity of the radio cell area is to be described using the geographical coordinates of the geographical centre of gravity of the coverage area by specifying the geographical longitude and latitude in accordance with N3-A.6.1.1.

N3-A.6.3.2.2 *Geographical description of the supply area*

The center of gravity of the radio cell area is to be described using the geographical coordinates of the geographical center of gravity of the coverage area by specifying the geographical longitude and latitude in accordance with N3-A.6.1.2. The description of the extent of the radio cell is to be in the form of an ellipse in relation to the center of gravity of the radio cell in accordance with ETSI TS 101 109, Clause 5.3 in conjunction with Clause 7.3.3.

N3-A.6.3.3 Designation of the radio cell

The designation of the radio cell is to be formed using *Cell Global Identification* according to specification ETSI TS 123 003, Clause 4.3.1 and consists of

- *Mobile Country Code* (MCC),
- *Mobile Network Code* (MNC),
- *Location Area Code* (LAC),
- *Cell Identity* (CI)

N3-A.6.3.3.1 Mobile Country Code (MCC) and Mobile Network Code (MNC)

To specify MCC and MNC, one of the IMSI block identifiers of the mobile network operator assigned by the Federal Network Agency must be used.

Encoding:

MCC: three decimal digits in octets 20 to 21

MNC: two decimal digits in octet 22

8	7	6	5	4	3	2	1	octet
MCC Clause 2				MCC Item 1				20
Fhex				MCC Clause 3				21
MNC Number 2				MNC Number 1				22

N3-A.6.3.3.2 Location Area Code (LAC)

LAC has a fixed length of 2 octets. The values "0000" and "FFFE" as well as all values starting with Dhex are not allowed.

Encoding: four hexadecimal digits in octets 23 to 24.

8	7	6	5	4	3	2	1	octet
LAC paragraph 2				LAC Number 1				23
LAC paragraph 4				LAC paragraph 3				24

N3-A.6.3.3.3 Cell Identity (CI)

CI has a fixed length of 2 octets. All hexadecimal values can be used.

Encoding: four hexadecimal digits in octets 25 to 26

8	7	6	5	4	3	2	1	octet
CI paragraph 2				CI paragraph 1				25
CI paragraph 4				CI paragraph 3				26

N3-A.6.3.3.4 E-UTRAN Cell Identifier (ECI)

For mobile radio cells with LTE technology, the ECI of the E-UTRAN Cell Global Identifier must be transmitted instead of LAC and CI. Dhex in octet 23 indicates the use of the ECI.

Encoding: seven hexadecimal digits in octets 23 to 26.

8	7	6	5	4	3	2	1	octet
ECI Item 1				Dhex				23
ECI paragraph 3				ECI paragraph 2				24
ECI paragraph 5				ECI paragraph 4				25
ECI paragraph 7				ECI paragraph 6				26

N3-A.6.4 Procedure according to Section 7 Paragraph 7 Emergency Call Ordinance

When using geographical coordinates, the coding according to ITU-T Recommendation Q.763, “Signalling System No. 7 – ISDN user part formats and codes”, Clause 3.88.1 (Ellipsoid point shape description) shall be used in accordance with N3-A.6. This specification is deviated from in the procedure according to

Section 7 paragraph 7 of the Emergency Call Ordinance has been deviated from.

N3-A.6.4.1 Description of the radio cell by main service area and designation of the radio cell

The antenna location is specified using a coordinate with geographical longitude and latitude in degrees, arc minutes and arc seconds.

UUI Parameter (location of the mobile radio transmitter)	octet
Geographical latitude	7 to 9
Geographical longitude	10 to 12

Encoding: Decimal two digits each in octets 7 to 12. Digit 1 is the most significant digit.

8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**octet**
Latitude Degree Number 2				Latitude Degrees Number 1				7
Width Minute Digit 2				Width Minute Digit 1				8
Width Second Digit 2				Width Second Digit 1				9
Longitude Degrees Digit 2				Longitude Degrees Digit 1				10
Length Minute Digit 2				Length Minute Digit 1				11
Length Second Digit 2				Length Second Digit 1				12

The description of the geographical extent of the coverage area as a circular ring segment related to the antenna location is carried out according to ETSI TS 101 109, Clause 5.7 in the form

- the inner radius and width of the ring,
- Starting angle in degrees relative to north and latitude of the angle segment in degrees and
- Trust level of the information.

The confidence level should be set to 100%.

UUI Parameter (Supply Area)	octet
ETSI TS 101 109, Clause 7.3.7, Octets 8 to 13	13 to 18

Octet 19 is set to 00hex

In addition, the designation of the radio cell is specified in octets 20 to 26 according to section N3-A.6.3.3.

In octet 6, bits 1 to 7 are to be assigned as follows:

7	**6**	**5**	**4**	**3**	**2**	**1**	**octet**
1	1	1	0	1	0	1	6

N3-A.6.4.2 Description of the radio cell by reference coordinate

A reference coordinate is specified using the geographical longitude and latitude in degrees, arc minutes and arc seconds for the location. It must be ensured that the information for converting the reference coordinate into the geographical area of the radio cell is in accordance with Section 5.2.3.1.4.2 is present.

UUI parameters (reference coordinate)	octet
Geographical longitude	7 to 9
Geographical latitude	10 to 12

Note: The order of longitude and latitude is different here than in N3-A.6.4.1

Encoding: Decimal two digits each in octets 7 to 12. Digit 1 is the most significant digit.

8	7	6	5	4	3	2	1	octet
Longitude Degrees Digit 2				Longitude Degrees Digit 1				7
Length Minute Digit 2				Length Minute Digit 1				8
Length Second Digit 2				Length Second Digit 1				9
Latitude Degree Number 2				Latitude Degrees Number 1				10
Width Minute Digit 2				Width Minute Digit 1				11
Width Second Digit 2				Width Second Digit 1				12

In octet 6, bits 1 to 7 are to be assigned as follows:

7	6	5	4	3	2	1	octet
1	1	0	0	1	0	1	6

N3-A.6.5 Error case

If an error occurs during the provision of the location data which makes the correct transmission of the location data impossible, the error must be indicated as the location information25 .
Bits 1 to 4 are set to 1 and bits 5 to 7 are also set to 1 until further notice.

In octet 6, bits 1 to 7 are provisionally assigned as follows in the event of an error:

7	6	5	4	3	2	1	octet
1	1	1	1	1	1	1	6

[25] If the error is not displayed, the location data may be formally correct but incorrect in content. transmitted (see section 5.2.3.3).

Appendix N4: Emergency connections using IP technology

Emergency call connections using IP technology are to be established on the basis of the AKNN interface specification “Specification of the NGN Interconnection Interface” (Version 1.0.0) – hereinafter referred to as “Ic specification” . Deviations from or additions to this specification are defined in this appendix.

N4.1 Identification of the emergency call connection

Emergency calls must be identified at the telephone network transitions by including a routing number with the code “1982” in the SIP URI of the INVITE request after the country code +49 or the prefix 0.

N4.2 B-number

The B number shall be transmitted in accordance with sections 7.1.2.2.1 or 7.1.2.2.2 of the Ic specification.

N4.3 Transmission of emergency call information

N4.3.1 Transfer of the A number

The A-number must be transmitted with the *P-Asserted-Identiy header field* according to sections 5.1.4 and 7.1.3 of the Ic specification.

N4.3.2 Transfer of provider identification

The provider identifier is to be transmitted in the XML body to the *Call-Info header field* with the *emergencyCallData.ProviderInfo* according to IETF RFC 7852, Section 4.1 Tables 14-5 and 14-6 in Section 14.3.2.1 of the Ic specification .

N4.3.3 Transfer of location data

The location data must be transmitted in the *Geolocation header field* . It should be noted that, depending on the case, several location descriptions from different sources must be transmitted in one *INVITE request* . In these cases, each location description must be transmitted with its own *Geolocation header field* to separate the sources .

The source of the location data is specified with the *loc-src parameter* according to Table 5.5 in Section 5.5.1 of the standard ETSI ES 203 283.

N4.3.3.1 Geographical coordinate with uncertainty ellipse

The gGeographical coordinate is specified by specifying the geographical longitude and latitude as a decimal number with 6 decimal places in the format specified in section 14.3.2.3.1 of the Ic specification. The uncertainty ellipse determined with a confidence level of 100% shall be transmitted by specifying the semi-axes and the reference angle in the format described in section 14.3.2.3.2 of the Ic specification.

The requirements according to section 5.2.3.3 apply. For connections in mobile networks that are not based entirely or partially on GSM or LTE technology, this results in a maximum permissible length of the semi-major axis of the uncertainty ellipse of 50 meters.

N4.3.3.2 Address

The address shall be transmitted in the format described in section 14.3.2.2 of the Ic specification.

N4.3.3.3 Cellular cell

N4.3.3.3.1 Designation of the radio cell

The designation of the radio cell is specified in the *PANI header field* according to IETF RFC 7315 and ETSI TS 124 229, section 7.2.A.4.3 .

N4.3.3.3.2 Geographical description of the radio cell

The geographical description of the radio cell shall be transmitted as a polygon with a reference point spacing of up to 100 m in the format described in section 14.3.2.3.3 of the Ic specification or as a circular ring segment - – described in section 14.3.2.3.4 of the Ic specification - – .
The number of vertices in a polygon is not limited.

N4.3.3.4 Geographical description of an area

The geographical description of an area shall be transmitted as a polygon with a distance between the vertices of up to 100 m in the format described in section 14.3.2.3.3 of the Ic specification. The number of vertices in the polygon is not limited.

N4.3.4 Marking of eCalls

Information on whether an eCall has been made and, if so, whether it is a manual or automatic eCall must be transmitted in the XML element *Comment* according to IETF RFC 7852, section 4.5.
One of the following three possible texts must be transmitted to the emergency call center:

- “no eCall” if the emergency call is not an eCall,
- “automatic eCall” if the emergency call is an automatically triggered eCall,
- “manual eCall” if the emergency call is a manually triggered eCall.

The absence of the XML element *Comment* means that the emergency call is not an eCall.

N4.3.5 Location determined by the participant

Participant location information is required according to IETF RFC 5491, in conjunction with IETF RFC 6442, Section 5.2.

The location is to be transmitted as a geographical coordinate in the coordinate reference system “European Terrestrial Reference System 1989” (ETRS89) - – alternatively also WGS84 - – or as an address as an object *civicAddress* according to IETF RFC 4119 in conjunction with IETF RFC 5139.
The information elements according to section N4.3.3.2 must be used.

N4.4 History Info header field

The *History-Info header field* must be generated in accordance with sections 7.1.6 and 8.3 of the Ic specification in case of call forwarding (CDIV) and transmitted to the emergency call answering point.

N4.5 Codecs

Transit and destination networks must transmit the RTP streams for emergency calls transparently, at least for the G.711 A-law codec.

Appendix N5: ISDN emergency connections

An emergency call connection in ISDN technology is an ISDN system connection that uses the “Digital Subscriber Signalling System No. one (DSS1) protocol” according to ETSI EN 300 196-1 and EN 300 403-1 in point-to-point operation.

ISDN emergency connections can be implemented as basic connections or as primary multiplex connections (PMxAs). The type of connection and specific measures to achieve the necessary reliability are determined by the operator of the emergency call center in consultation with the target network operator.

When switching from ISUP to DSS1, ITU-T Recommendation Q.699 must be observed. The network node to which the emergency call connection is connected must ensure in particular that the parameters containing the information accompanying the emergency call are converted into the corresponding information elements of the SETUP message of the DSS1 protocol (ITU-T Recommendation Q.931).

If call forwarding is active for the emergency connection, the forwarding network node must carry out the procedure according to ITU-T Recommendation Q.732.4.

The emergency connection must support voice connections and T.30 fax connections.

N5.1 Connections

N5.1.1 Basic connection

Emergency connections can be implemented as ISDN basic access in accordance with ITU-T Recommendation I.420.

N5.1.2 Primary multiplex connection

Emergency call connections can be implemented as ISDN primary multiplex connections in accordance with ITU-T Recommendation I.421.

N5.1.3 Continuous monitoring of ISDN emergency connections

To monitor the functionality and transmission quality of the connection, layer 1 of the D channel according to ETSI EN 300 012-1 (basic access) or ETSI EN 300 011-1 (primary multiplex access) and layer 2 according to ETSI ETS 300 125 must be monitored for errors.
Any existing replacement circuit must be completed within 500 ms.

N5.2 Service characteristics

N5.2.1 Display of the A-number

For emergency connections, the transmission of the A number must be set up using the *Calling Line Identification Presentation* (CLIP) service feature in accordance with ETSI EN 300 092-1.

The telephone number of the network termination point from which the emergency call connection originates must be transmitted from the destination node to the emergency call answering point, even if the suppression of the calling line identification is activated for the emergency caller's call. For this purpose, emergency call connections must be equipped with the *CLIR Override* feature in accordance with ETSI EN 300 090.

N5.2.2 Suppression of the display of the emergency call code

The emergency call coding must not be displayed to the emergency caller, therefore the transmission of the emergency call coding must be permanently suppressed using the *Connected Line Identification Restriction* (COLR) service feature in accordance with ETSI EN 300 098-1.

N5.2.3 User-to-User Signaling Service 1

Emergency call connections must be equipped with the *User-to-User Signalling Service 1* feature .

N5.2.4 Emergency call forwarding in ISDN

Emergency call connections are equipped with the service feature *Call Forwarding Unconditional* (CFU) in accordance with ETSI ETS 300 200.

In the case of redirection of an emergency call to a substitute emergency answering point, the redirecting network node must, among other things, forward the received *user-to-user information parameter* unchanged. The CFU procedure according to ITU-T Recommendation Q.732.4 must be carried out.

N5.2.5 Compatibility with existing emergency call point technology

The transmission of the *called party number,* the *user-user information element* and all parameters related to call forwarding to the emergency call answering point must be suppressed by the operator of the switching equipment to which the emergency call answering point is connected at the request of the operator of the emergency call answering point.

Appendix N6: IP emergency connections

An emergency call connection using IP technology must be set up on the basis of the “SIPConnect 1.1 Technical Recommendation” (SIP Forum Document Number: TWG-2) - – hereinafter referred to as SIPConnect 1.1 - – Restrictions and selected options of SIPconnect 1.1 are specified in the following sections of this appendix.

The reference points for signaling (1) and media stream (2) in Figure N6-1 form the interface according to the SIPConnect 1.1 specification. The following specifications refer to refer to these reference points.

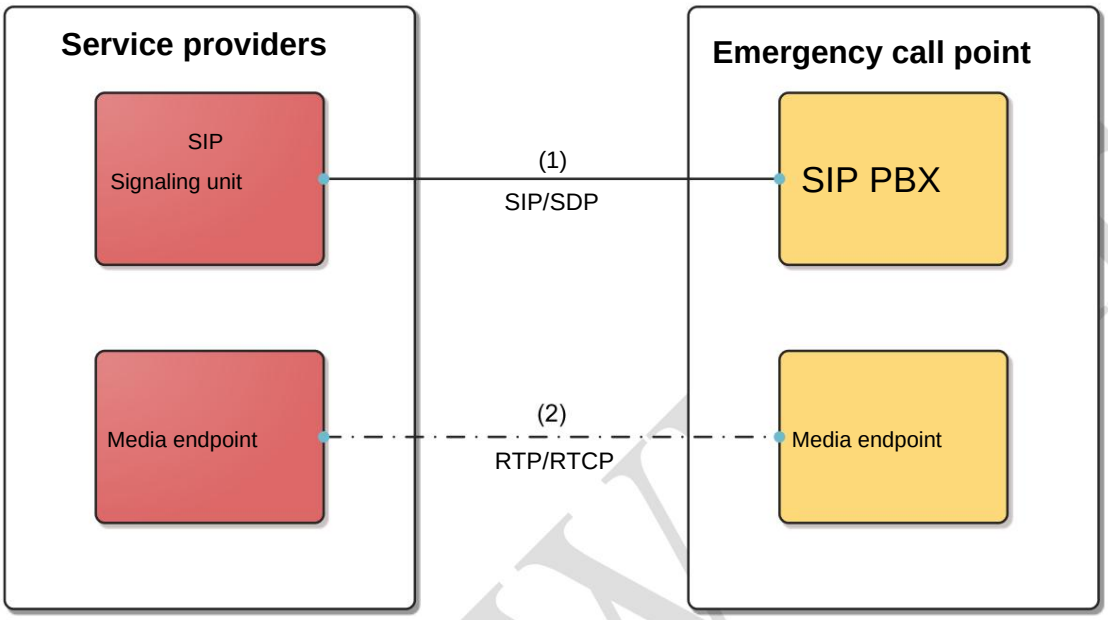


Figure N6-1 Reference model

N6.1 Operational readiness and monitoring

N6.1.1 Monitoring and redirection at the service level

The operational readiness of IP emergency connections is monitored at the service level using *SIP OPTIONS* and *SIP INVITE* . In the event of a fault, a network management center must be alerted immediately and fault rectification initiated immediately. If the target network operator uses other methods for monitoring the functionality of connections that include equivalent procedures and deliver comparable results, such methods can also be used, provided the same follow-up measures are taken.

N6.1.1.1 Monitoring via *SIP OPTIONS Request*

The provider of the emergency call connection must send a *SIP OPTIONS request* to the emergency call center every 30 seconds and check whether a *SIP response* has been received. If three consecutive *SIP OPTIONS requests* do not receive a *SIP response* , the emergency call connection is faulty and is to be classified as unavailable. For emergency calls to the emergency call connection that is unavailable due to the fault, *SIP INVITE requests* must be redirected to the specified replacement emergency call connection immediately, i.e. without delaying the connection setup due to unsuccessful *SIP INVITE requests* to the faulty emergency call connection. An emergency call connection classified as unavailable due to the fault must be checked for availability every 10 seconds using *SIP OPTIONS requests* . If six consecutive *SIP OPTIONS requests* each receive a valid *SIP response* , the emergency call connection is to be classified as available and the redirection canceled if necessary.

N6.1.1.2 Monitoring via *SIP INVITE Request*

If no *SIP response* is received to a *SIP INVITE request* , the *SIP INVITE request* must be repeated after 1 second, then after a further 2 seconds and then after a further 4 seconds until a *SIP response* is received. If no *SIP response* is received 10 seconds after the first *SIP INVITE request* , the emergency connection is to be classified as faulty and unavailable. The emergency connection request is to be automatically redirected to the substitute emergency call answering point. After a redirected *SIP INVITE request, SIP INVITE requests* for further emergency connection requests are to be redirected immediately, i.e. without delaying the connection setup due to unsuccessful *SIP INVITE requests* to the emergency connection that is unavailable due to the fault, to the specified emergency connection of the substitute emergency call answering point.
to redirect.

The emergency call connection is considered unavailable until six consecutive *SIP OPTIONS requests,* each 10 seconds apart, have received a *SIP response* .

N6.1.2 Monitoring at the transport level

A network node in the public transport network which provides network access to the emergency call answering point and processes message packets at the transport level must receive packets with monitoring function from the emergency call answering point with a frequency of not more than one packet per second.

Which protocol is used must be agreed between the provider of the emergency call connection and the operator of the emergency call center.

N6.1.2.1 IP emergency call connections without multi-path routing (Type 1)

In the event of a fault, the relevant network management center must be alerted immediately and fault rectification initiated without delay.

N6.1.2.2 IP emergency call connections with multi-path routing (Type 2 and Type 3)

When designing the standby circuit for an IP emergency call connection with edge-disjoint or node-disjoint multipath routing, it must be ensured that if the main path is interrupted, the system immediately switches to the standby path and that, if an emergency call connection is already in place, the voice signal is not interrupted for more than 2-4 seconds.
becomes.

N6.2 Display of the A-number

For emergency connections, the *P-Asserted-Identiy header field,* as described in sections 5.1.4 and 7.1.3 of the AKNN IC specification, regardless of whether the *SIP INVITE request* contains a *Privacy header field* and what value this has.

N6.3 User-to-User Signaling Service 1

Emergency connections must support the transmission of the *SIP UUI header field* according to IETF RFC 7433, Support Section 4.1.

N6.4 Fax transmission

Emergency connections must support fax connections in accordance with ITU-T Recommendation T.30 through transport in accordance with ITU-T Recommendation V.152. Fax connections in accordance with ITU-T Recommendation T.38 must at least be supported through transparent data transmission in accordance with ITU-T Recommendation T.38 are supported. The requirements of section 14.5 of SIPconnect 1.1 must be met.

N6.5 Transfer of location data

Emergency call connections must support the transmission of location data as described in sections N4.3.3 and N4.3.5.

N6.6 Transfer of provider identification

Emergency call connections must support the transmission of the provider identifier in the XML body to the *Call-Info header field* according to IETF RFC 7852, Section 4.1 Tables 14-5 and 14-6 in Section 14.3.2.1 of the AKNN IC specification .

N6.7 Transfer of eCall marking

Emergency call connections must support the transmission of eCall identification using the XML element *Comment* as per IETF RFC 7852 section 4.5.

N6.8 Support for SDP types and media transport

Emergency connections must support the SDP types that are classified as mandatory or optional in Tables 8-8 and 8-9 in Section 8.4.4 of the AKNN IC specification. The *payload formats* according to IETF RFC 4856 and IETF RFC 5577 must be supported for the *audio media types* .

The requirements in section 14.2 of SIPconnect 1.1 must be met.

The RTP streams must be transmitted transparently via emergency connections, at least for the G.711 A-law codec.

N6.9 Security

It must be ensured that only communications to request and receive emergency assistance from emergency services, in particular voice communications and real-time text or a full conversation service, location data, emergency call-related or emergency call-related information, eCalls, fax as in-band transmission and T.38 fax will be transmitted to the emergency connection. It must be ensured that no other communication, possibly containing malicious code, reaches the emergency connection.

N6.10 IP support

The emergency call connection must meet the requirements of Section 6 of SIPConnect 1.1.

N6.11 Operating mode

In the event that nothing else is agreed between the operator of the emergency call point and the provider of the emergency call connection, the mode for emergency call connections shall be as follows: Section 7 and Annex B of SIPConnect 1.1 to select “Static mode”.

The configuration of the IP addresses and ports is carried out by the provider of the emergency call connection. To do this, they must use the minimum required number of UDP and TCP ports and inform the operator of the emergency call center.

N6.12 Addressing the emergency call point

The emergency call coding must be transmitted in the form of a SIP URI according to section 9 of SIPConnect 1.1, whereby the special requirements in section 7.1.2.2.2 of the AKNN Ic specification must be observed.

N6.12.1 Routing INVITE requests to the emergency call center

The SIP signaling unit of the target network is in accordance with Section 9.1, SIPConnect 1.1 to set up.

N6.13 Incoming calls

For incoming calls, the SIP signaling unit has the request URI according to Section 10.1.1, the *To header field* according to Section 10.1.2 and the *From header field* according to Section 10.1.3 of SIPConnect 1.1.

N6.13.1 “P-Asserted-Identity” header field

Deviating from section 10.1.4 of SIPConnect 1.1, the A-number in the *P-Asserted-Identity header field* must always be transmitted to the emergency call center.

N6.14 Outgoing calls from the emergency call point

Sections 10.2, 11 and 12 and their subsections of SIPConnect 1.1 do not apply because emergency connections are only to be set up for incoming traffic.

N6.15 SDP Offer/ Answer Model

The SIP signaling unit of the target network and the SIP PBX of the emergency call center must use the SDP protocol and the Offer/Answer Model as defined in Section 14.1 of SIPConnect 1.1.

N6.16 Echo cancellation

Media endpoints that may cause echoes must suppress echoes in accordance with ITU-T G.168.

N6.17 Session on Hold

For session on hold, the procedure according to section 14.8 of SIPConnect 1.1 is to be followed with the Restrictions to realize that only the *SDP directionality attribute* is set to “a = sendonly“ is set and the requirement “A SP-SSE/SIP-PBX MUST support the ability to receive SDP session descriptions that have the 'c=' field set to all zeros (0.0.0.0), when the addrtype field is IPV4.” is not met.

N6.18 Authentication

For mutual authentication, *TLS mutual authentication* must be used in accordance with section 16.5 of SIPConnect 1.1. The provider of the emergency call connection and the Operators of the emergency call point have the necessary regulations for certificate management.

Appendix N7: Conversion between ISDN and IP

The conversion between ISDN and IP must be carried out on the basis of ETSI TS 129 163.
Some conversions specific to emergency calls in Germany, which are not specified in ETSI TS 129 163, are defined in the following sections N7.1 and N7.2.

N7.1 Conversion of emergency call relevant information from ISUP IAM to SIP INVITE

The conversion of the information required for the emergency call from ISUP IAM to SIP INVITE shall be carried out as described in Table N7-1.

ISUP IAM ÿ SIP INVITE	
Calling Party Number	*P-Asserted-Identity*
if Nature of Address = nationally significant number:	
<Code> <TlnTelephoneNo>	+49 <Code> <TlnCallNo> @ <host portion>; user=phone
if Nature of Address = international number:	
<CC> <NDC> <SN>	+<CC> <NDC> <SN> @ <host portion>; user=phone
Called Party Number	*INVITE Request URI*
if emergency call coding with hex digits:	
<ONKZ> Chex Chex <x(y)>	+49 1982 <ONKz> <x(y)>; rn = +49 <ONKz> Chex Chex <x(y)> @ <host portion>; user=phone
if emergency call coding with traffic routing number:	
1982 <tuvwxyz>	+49 1982 <tuvwxyz> @ <host portion>; user=phone
Redirecting Number	*hi-entry* in the *History-Info Header Field (IETF RFC7044)*
if emergency call coding with hex digits:	
<ONKz> Chex Chex <x(y)>	+49 1982 <ONKz> <x(y)>; rn = +49 <ONKz> Chex Chex <x(y)> @ <host portion>; user=phone
if emergency call coding with traffic routing number:	
1982 <tuvwxyz>	+49 1982 <tuvwxyz> @ <host portion>; user=phone
GenericNumber	*FROM HeaderField*
if Nature of Address = nationally significant number:	
<Code> <TlnTelephoneNo>	+49 <Code> <TlnCallNo> @ <host portion>; user=phone
if Nature of Address = international number:	
<CC> <NDC> <SN>	+<CC> <NDC> <SN> @ <host portion>; user=phone
uui-data field	*User-to-User header field*
according to Annex N3	according to AKNN Ic specification section 14.3.1

Table N7-1: Conversion from ISUP IAM to SIP INVITE

N7.2 Conversion of emergency call relevant information from SIP INVITE to ISUP IAM

The conversion of the information required for the emergency call from SIP INVITE to ISUP IAM shall be carried out as described in Table N7-2.

SIP INVITE ÿ ISUP IAM	
P-Asserted-Identity	*Calling Party Number*
if +<CC> is +49:	
+<CC> <NDC> <SN> @ <host portion>; user=phone	<NDC> <SN>
if +<CC> is not equal to +49:	
+<CC> <NDC> <SN> @ <host portion>; user=phone	<CC> <NDC> <SN>
INVITE Request URI	*Called Party Number*
if emergency call coding with hex digits in the *routing number parameter:*	
+<CC> 1982 <NDC> <x(y)>; rn = +<CC> <NDC> Chex Chex <x(y)> @ <host portion>; user = phone	<NDC> Chex Chex <x(y)>
if emergency call coding with traffic routing number:	
+<CC> 1982 <tuvwxyz> @ <host portion>; 1982 <tuvwxyz> user = phone	
hi-entry in the *History-Info Header Field (IETF_____ RFC7044)*	*Redirecting Number*
if emergency call coding with hex digits in the *routing number parameter:*	
+<CC> 1982 <NDC> <x(y)>; rn = +<CC> <NDC> Chex Chex <x(y)> @ <host portion>; user = phone	<NDC> Chex Chex <x(y)>
if emergency call coding with traffic routing number:	
+<CC> 1982 <tuvwxyz> @ <host portion>; 1982 <tuvwxyz> user = phone	
User-to-User header field	*uui-data field*
according to AKNN Ic specification section 14.3.1	according to Annex N3
FROM Header Field if	*GenericNumber*
+<CC> is equal to +49 or not present:	
+49 <Code> <TlnCallNo> @ <host portion>; user=phone or: <Code> <TlnCallNo> @ <host portion>; user=phone	<Code> <TlnTelephoneNo>
if +<CC> is not equal to +49:	
+<CC> <NDC> <SN> @ <host portion>; user=phone	<CC> <NDC> <SN>
Geolocation header field(s) is/are not transferred to *ISUP IAM* , ie the *Geolocation header field(s)* must be discarded.	

Table N7-2: Conversion from SIP INVITE to ISUP IAM

Annex N8: Accessibility requirements[26] for IP emergency connections through text in real time

Real-time text must be ensured for emergency call connections in IP technology on the basis of IETF RFC 4103.

Minimum functional requirements are specified in the following sections of this Annex.

N8.1 Characteristics and capabilities

The following features and capabilities must be fulfilled by emergency call connections using IP technology:

- Initiate and receive text in real time to and from the same numbers from which voice calls can be received;
- Send and receive real-time text and voice simultaneously in both directions during the existing emergency call connection.

N8.2 Interoperability

Real-time text interoperability must be ensured for end-to-end emergency call connections.

- Interoperability is assumed when text is reliably and accurately transcoded end-to-end in real time according to IETF RFC 4103.
- The use of (individually agreed) protocol implementations between different networks and services is permitted if the IETF RFC 4103-compliant functionality is maintained end-to-end.

[26] If voice, text (including real-time text) and video are synchronized as a total call service by telephone service providers, the requirements for transmitting this emergency call communication to the locally responsible emergency call answering point will be specified, if necessary, in a future edition of the TR Emergency Call.

Appendix N9: Location information based on Advanced Mobile Location (AML)

Location information generated on the basis of AML must be received by the operator of a public mobile network and transmitted to the emergency call center via the existing emergency call connection.

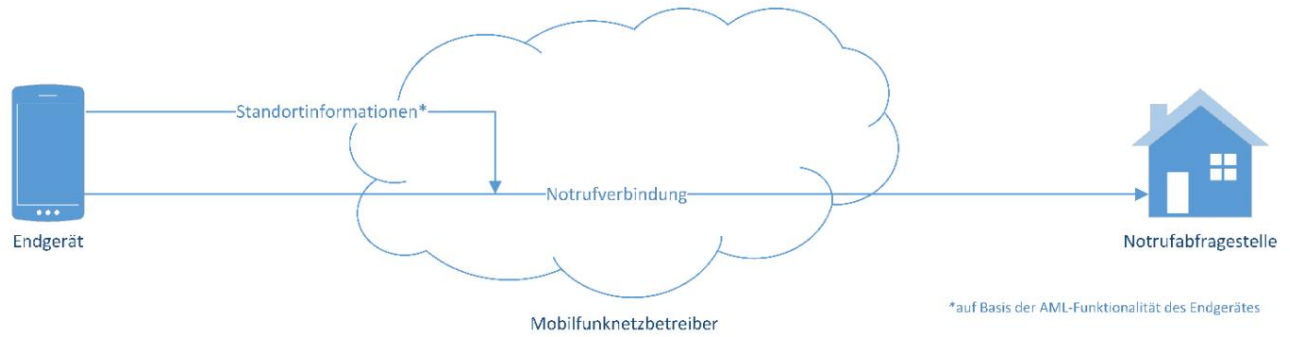


Image N9-1 Architecture

N9.1 General requirements

N9.1.1 Receiving location information based on AML

The operator of a public mobile network must be able to receive the information listed in ETSI TS 103 625 via SMS and HTTPS.

N9.1.2 Receiving location information based on AML via SMS

The operator of a public mobile network proposes to the Federal Network Agency – in coordination with the other operators of public mobile networks – a short-dial number for receiving location information based on AML via SMS.

The operator of a public mobile network must ensure that the SMS sent to the short-dial number is received within its own network.

Note: The short-dial number is determined by the Federal Network Agency and communicated to the manufacturers of the three most commonly used operating systems for mobile devices in Germany, the operators of public mobile networks and the operators of virtual mobile networks.

N9.1.3 Receiving location information based on AML via HTTPS

The operator of a public mobile network proposes to the Federal Network Agency – in coordination with the other operators of public mobile networks – an HTTPS address for receiving location information based on AML via HTTPS.

The operator of a public mobile network must ensure that the data stream addressed to the HTTPS address is received within its own network.

Note: The HTTPS address is determined by the Federal Network Agency and communicated to the manufacturers of the three most commonly used operating systems for mobile devices in Germany, the operators of public mobile networks and the operators of virtual mobile networks.

N9.1.4 Mobile virtual network operators

Operators of virtual mobile networks must immediately make the location information they have and generated on the basis of AML available to the operator of the public mobile network that establishes the emergency call connection via suitable interfaces.

N9.1.5 Transmission of location information based on AML

Operators of public mobile networks must immediately transmit the location information determined on the basis of AML via the existing emergency call connection.

If location information of an emergency caller generated on the basis of AML is received both via SMS and via HTTPS, only one of the two pieces of information needs to be transmitted in the emergency call connection.

The location information is transmitted in accordance with section N4.3.3.

N9.1.6 Updating location information based on AML

If updated location information based on AML is received during an existing emergency call, this must also be immediately transmitted to the existing emergency call connection.

N9.2 Specific requirements

N9.2.1 Geographical coordinate with uncertainty ellipse

The geographical coordinate of the location shall be transmitted by specifying the geographical longitude and latitude as a decimal number with 5 decimal places in the format described in section 14.3.2.3.1 of the Ic specification. The uncertainty ellipse shall be transmitted by specifying the semi-axes corresponding to the radius of a circle and the reference angle of 0° in the format described in section 14.3.2.3.2 of the Ic specification.

N9.2.2 UPDATE Request / re-INVITE Request

For emergency calls using IP technology, (updated) AML-based generated Location information must be transmitted immediately with an *UPDATE request* according to IETF RFC 3311 or with a *re-INVITE request* according to IETF RFC 6141.

Informative attachments

The specifications and technical details in these annexes are for information purposes only and do not constitute binding requirements of this technical guideline.

Annex I1: Update

The procedure for updating the TR Emergency Call is governed by the provisions of Section 16408 TKG, according to which the Federal Network Agency determines the necessary technical details with the involvement of the associations, the representatives of the operators of emergency call centers appointed by the Federal Ministry of the Interior and the manufacturers.

Expenditure overview

Issue Date		Description
0.1	11 October 2010	First draft for public consultation
1.0	22 June 2011	First edition of TR Emergency Call
-	24 April 2013	Expansion of site description forms (ABl. Vfg. 14/2013)
-	25 January 2017	Draft of edition 2.0 for public consultation
2.0	27 March 2018	Second edition of the TR Emergency Call
2.1	08 May 2024	Draft of issue 2.1 for public consultation

Annex I2: Determination of catchment areas of Emergency call centers

Section 3 of the Emergency Call Ordinance regulates the determination of the catchment areas of emergency call centers.

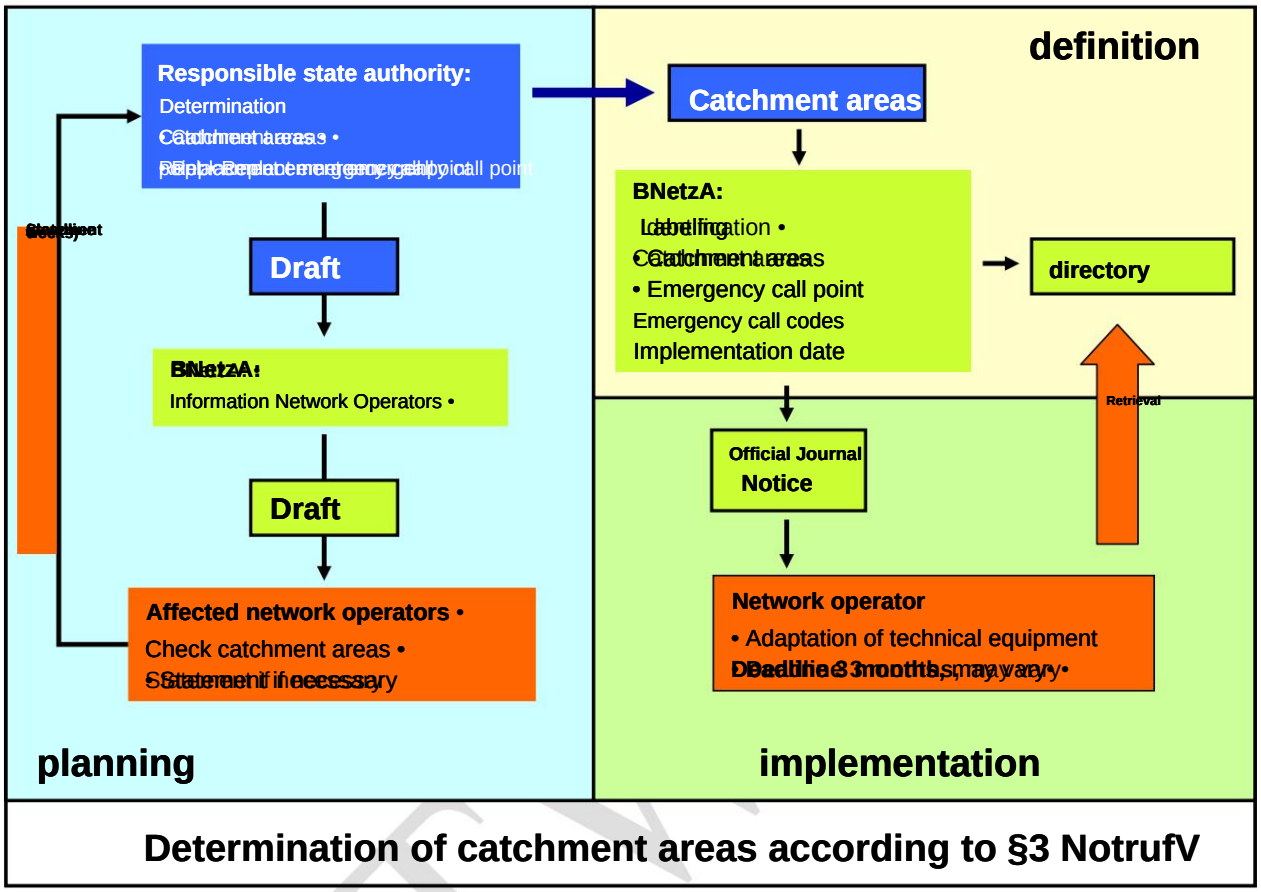


Figure I2-1: Principle of defining catchment areas

The authorities responsible under state law determine the catchment areas and the respective replacement emergency call point in consultation with the network operators concerned. The boundaries of the catchment areas should, if possible, be defined in such a way

- on the one hand, that unnecessarily fine subdivisions of the established structure of the subscriber networks are not

required, • on the other hand, the locations of the emergency callers are assigned as precisely as possible to the locally responsible emergency call point.

- The catchment areas must not overlap and must be connected to each other without gaps border.

To involve the network operators, the authorities submit the drafts for defining the planned catchment areas to the Federal Network Agency.

The Federal Network Agency informs the affected network operators, who can submit a statement to the relevant authority within four weeks.

In cases where the planned catchment areas do not correspond to the network structures, the authority responsible under state law determines the allocation of the network-side locations of the terminal devices used by the emergency callers to the respective responsible emergency call point in consultation with the network operators concerned.

Finally, the authority responsible under state law informs the Federal Network Agency of the catchment areas defined and the date on which these definitions take effect.

After receiving a notification, the Federal Network Agency completes the procedure, assigns a unique identifier to each catchment area and each emergency call point and

- assigns a number containing two Chex digits to each emergency connection and informs the network operator providing the emergency connection of the number assigned,
- shall provide the information provided to it and the information it has assigned markings and the assigned emergency call code immediately in a Directory available for retrieval by network operators and telephone service providers and
- publishes a notice of the availability of the information in its Official Journal.

Network operators and telephone service providers must make adjustments to their technical facilities within three months of publication of the relevant notice.

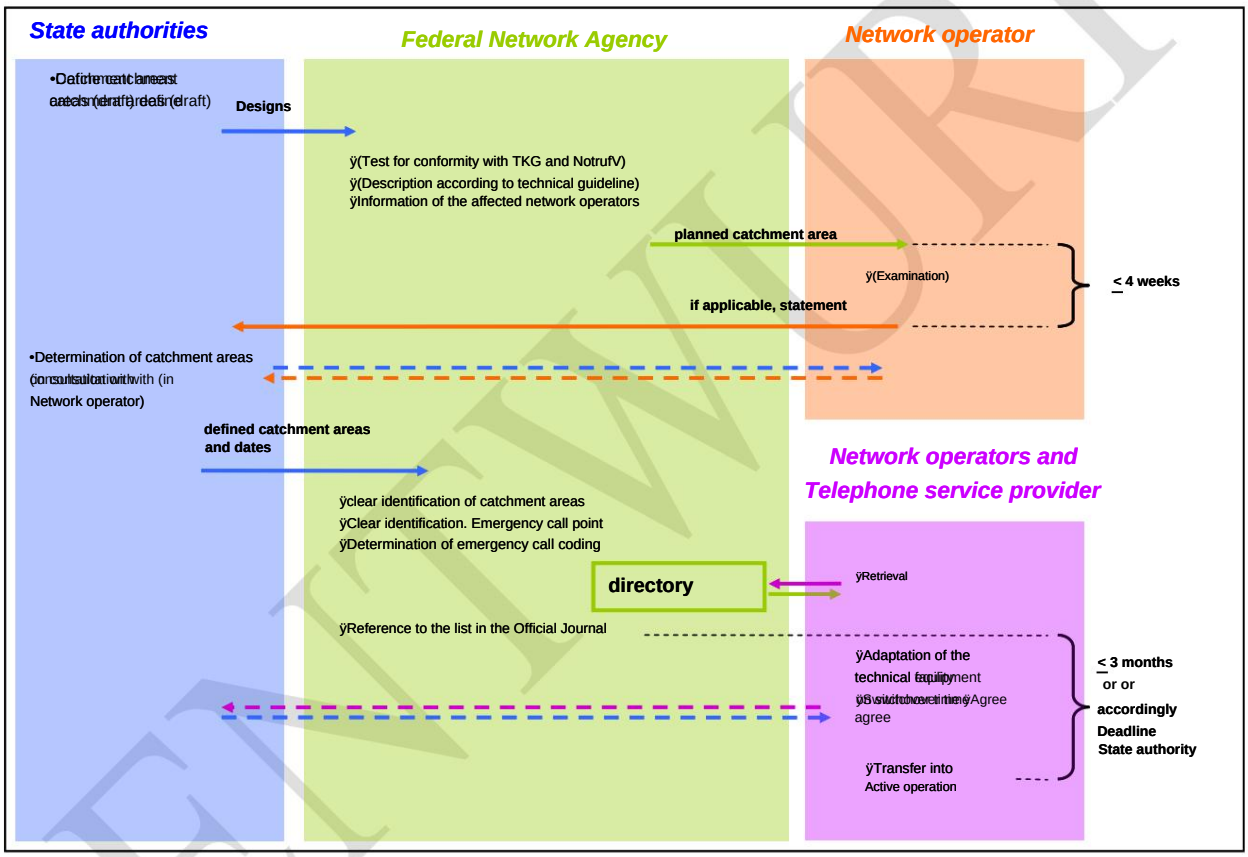


Figure I2-2: Process flow of determining catchment areas

The catchment area of an emergency call answering point can consist of several emergency call origination areas. In this case, the above provisions for the emergency call origination areas apply.