

Traffic and Travel Information (TTI) — TTI messages via cellular networks —

Part 6: External services

ICS 35.240.60

National foreword

This Draft for Development is the official English language version of CEN/TS 14821-6:2003.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because technology in this area is rapidly evolving. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its 3-year life. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee EPL/278, Road transport informatics, at British Standards House, 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

Summary of pages

This document comprises a front cover, an inside front cover, the CEN/TS title page, pages 2 to 325 and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This Draft for Development was published under the authority of the Standards Policy and Strategy Committee on 8 July 2003

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ISBN 0 580 42221 6

Amendments issued since publication

Amd. No.	Date	Comments

English version

**Traffic and Travel Information (TTI) - TTI messages via cellular
networks - Part 6: External services**

This Technical Specification (CEN/TS) was approved by CEN on 10 May 2001 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (CEN/TS 14821-6:2003) has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 204 "Transport information and control systems".

This CEN/TS was prepared by Working Group 7 of CEN TC278. In the field of Traffic and Traveller Information, the innovative rate is high, with many research and development projects under way in many countries, and there is a need to establish prospective standards which allow manufacturers to introduce competitive products to the market in the knowledge that they can accommodate the future issues of the standard(s) without fundamental change to equipment.

In accordance with the CEN/CENELEC "Internal Regulations Part 2: Common Rules for standards work, 04-1996" the original copyright holders on the complete set of documents are Mannesmann Autocom GmbH and TEGARON Telematics GmbH. The original copyright holders hereby grant CEN all necessary rights with regard to said original copyrights to execute the standardisation process as described below.

No known national technical specifications (identical or conflicting) exist on this subject.

CEN/TS 14821 consists of eight parts; one part describing the framework and seven parts providing detailed specifications of all components, protocols and services that are within the scope of CEN/TS 14821.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Traffic and Traveller Information (TTI) may be disseminated through a number of services or means of communication, covering static displays, portable terminals and in-vehicle equipment.

For all such services, the data to be disseminated, and the message structure involved in the various interfaces, require clear definition and standards formats in order to allow competitive products to operate with any received data.

This CEN/TS focuses on an application data specification whereby data is produced at a central location and is disseminated via a cellular radio network. It addresses the data specifications for both downlink and uplink existing between a central location and randomly located vehicles. It enables messages to be exchanged between different systems and service providers adopting a variety of applications specifications.

Other technical specifications are being produced by the CEN TC278 Working Group 4 to cover TTI dissemination via other means or services. This set of specifications is named GATS (Global Automotive Telematics Standard). GATS provides the modular framework for implementing such traffic telematics services on an open technology platform and is network - independent. In many details definitions are necessary to ensure interoperability. Therefore, those detailed definitions are given in a network-specific part (CEN/TS 14821-8). With the development of future mobile communication systems towards UMTS / IMT2000 the bottleneck of narrow-band data communication might fade. Due to its modular structure, the GATS framework and applications are prepared for that due to its network-independence. The same holds for emerging technologies for positioning which today is almost exclusively based on GPS.

Other relevant standard developments are, independent from telematics, the application-independent Wireless Application Protocol (WAP), enabling mobile access to the Internet. It is understood that these emerging technologies might fit into the framework of telematics applications in future WAP-versions. For the time being, GATS already today independently from WAP enables access to telematics services. Utilisation of GATS on a WAP protocol stack and identifying necessary adaptation of WAP specifications (if any) is currently under investigation of the appropriate groups within WAP-Forum and GATS-Forum.

1. Scope

This CEN/TS defines the specific interfaces and functionality of traffic telematics (TT) services based on the use of cellular networks. Device manufacturers are enabled to develop terminal equipment compatible to services based on this CEN/TS. This will allow for interoperability of different terminal equipment and service providers which allows competition between service providers and terminal manufacturers. Furthermore it sets the scene for international availability of these services.

This CEN/TS specifies

- TT-specific interfaces between terminal and service centre. This especially incorporates the message sets of the application data protocols and the service-independent communication handling (including conditional access and transport protocols).
- Functionality, procedures and requirements of basic terminal components as well as their interaction with the service centre. This especially comprises conditional access and security mechanisms.
- Service Specifications, which are essential to ensure consistent behaviour of terminal and service centre.

The services incorporated within this issue comprise:

- breakdown and emergency services
- interactive traffic information services
- broadcast traffic information services
- navigation services (route assistance, route advice, homing)
- operator services
- general information services
- floating car data collection

It is envisaged that future research and development will lead to improvements on the services listed above as well as to the creation of new services. Nevertheless this CEN/TS provides the framework for seamless integration of new features and services into the existing architecture.

2. Normative references

This CEN/TS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this CEN/TS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 14819	Traffic and traveller Information (TTI) - TTI Messages via Traffic Message Coding
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3. Definitions and abbreviations

3.1 Definitions

For the purpose of this CEN/TS, the following definitions apply:

3.1.1 Attribute (of a Traffic Information Message)

A Traffic Information Message is made up of separate parts that can be called attributes. This includes, for example, an item of information and a length of validity.

3.1.2 Authorisation

Reciprocal proof that the identity provided by the communications partner is valid

3.1.3 Broadcast Service

Data service within a cellular wireless network that allows for mono-directional dissemination of data from a service centre to multiple users in the area of signal reception

3.1.4 Bypass Description

Representation of a Bypass, consisting of a Bypass Hint and/or a Bypass Route.

3.1.5 Bypass Hint

Representation of a hint for a Bypass

3.1.6 Bypass Link

Prominent waypoints on a Bypass Route

3.1.7 Bypass Route

Representation of the route for a Bypass

3.1.8 Cell Broadcast

Broadcast service of the GSM network

3.1.9 Customer

User of the terminal device (onboard unit) (see User)

3.1.10 Data telegram

Digital message exchanged between two systems

3.1.11 Delivery Notification

Network acknowledgement for successful/ unsuccessful delivery of a message to the mobile device

3.1.12 FCD Message

The message transmitted by an onboard unit (OBU) to the FCD server.

3.1.13 FCD Server

The collection point for incoming FCD messages.

3.1.14 Floating Car

A vehicle which is equipped with an intelligent onboard unit for assessment of the traffic situation.

Note : Onboard units are referred to as « intelligent » if they are capable of collecting, pre-interpreting and transmitting vehicle-specific measured data to the FCD server. Vehicles equipped with onboard units which are « only » capable of retrieving service information and not collecting data for traffic situation analysis are not referred to as floating cars.

3.1.15 Floating Car Data

Measured data which are collected in floating cards on a certain time cycle and which contain data on the trip profile and derived quantities.

3.1.16 Functional Road Class

A classification based on the importance of the road element in the connectivity of the total road network

3.1.17 Functional Road Class 0

Motorways

3.1.18 Functional Road Class 1

All non-Motorways that are part of a connection used for nation wide traffic and transport

3.1.19 Geocode

Geocodes are unique identifiers unmistakably defining important points on road networks. Geocodes can be derived from / converted into WGS84 co-ordinates by the algorithm described in CEN/TS 14821-3.

3.1.20 Hardware service agents

Partner companies of the traffic telematics service providers who are authorised to install onboard equipment into vehicles and to maintain it

3.1.21 Homing

Simple form of guidance to destination, in which the direction and straight-line distance of the destination are indicated

3.1.22 Information Element

Information unit of a message

3.1.23 Intersection

Junction of two or more roads

3.1.24 Job

A request to the FCD server which may comprise both the collection of additional measured data from a specific geographical area and the cancellation of a previous request.

Note : collection jobs are converted into control information by the FCD server and relayed to the floating cars.

3.1.25 Length of a Speech Report

Length of a Speech Report, including pauses, in tenths of a second

3.1.26 Mobile Originated

Data telegram sent from the onboard equipment to the Service Centre.

3.1.27 Mobile Terminated

Data telegram sent by the Service Centre to the onboard equipment.

3.1.28 Onboard equipment

A system, generally mobile, interacting with the service centre to handle traffic telematics services

3.1.29 Parameter message

A message transmitted by the FCD server to the floating cars and containing onboard-unit specific parameters.

3.1.30 Road Junction

Intersection of two or more roads

3.1.31 Route description

Description of a route showing the geometry of street intersections, manoeuvre instructions, street and place names, and geographical co-ordinates

3.1.32 Service centre

System produced by the traffic telematics operators / service providers to handle traffic telematics services

3.1.33 Short Message Service

Packet-based form of data transfer within the GSM network

3.1.34 Speech connection

Communications channel between two systems for the bi-directional transmission of speech

3.1.35 Speech Report

Traffic Information Report transmitted by a speech system

3.1.36 Terminal Device

Generally mobile system interacting with the service centre for implementation of telematics services

3.1.37 TINFO

Traffic Information Report

3.1.38 TINFO Version

Unique identification of a Traffic Message, consisting of a number and a time stamp

3.1.39 Traffic Data

Data for qualification of Traffic Events. This includes:

- Values: speed, traffic flow, traffic density
- Places: position, place designation
- Facts: description of situation

3.1.40 Traffic Event

An occurrence on a road or in an area that is worthy of reporting, such as a traffic jam, wrong-way driver, or fog.

3.1.41 Traffic Information

Technical representation of a Traffic Situation within the onboard equipment, accomplished by a number of Traffic Information Reports.

This Traffic Information can be displayed to the customer via suitable terminals.

3.1.42 Traffic Information Report

Technical representation of a Traffic Event produced by processing traffic data. Each Traffic Reports uniquely identified by a number, the TINFO ID, a time stamp, the TINFO version.

Note: If the Traffic Event changes, the time stamp changes, but the TINFO ID number does not.

3.1.43 Traffic Situation

The total number of all Traffic Events taking place that deserve reporting within an area. The Traffic Situation is always linked to an area. Thus, for example, an areas could be a conurbation or a geometrically demarcated area; an example is the radius around a point.

3.1.44 User

User of the terminal device (onboard unit) (see Customer)

3.1.45 Voice connection

Circuit-switched channel between two systems for bi-directional voice transmission

3.1.46 Waypoint

Significant points on the route

3.2 Abbreviations

For the purpose of this CEN/TS, the following abbreviations apply:

3.2.1 % ott

percent of the time

3.2.2 ADP

Application Data Protocol, i.e. a message set for a telematics service

3.2.3 AM

Acknowledge Message

3.2.4 ASN.1

Abstract Syntax Notation

3.2.5 BC

Broadcast

3.2.6 BCS

Broadcast Service

3.2.7 CA

Conditional Access

3.2.8 CAS

Conditional Access and Security

3.2.9 CB

Cellular Broadcast

3.2.10 CBC

Cipher Block Chaining

3.2.11 CLI

Calling Line Identification

3.2.12 CRM

Calling Request Message

3.2.13 CSD

Circuit Switched Data

3.2.14 DES

Data Encryption Standard: symmetrical encryption procedure

3.2.15 DRM

Digital Road Map

3.2.16 DSC

Data Service Centre: depending on the mobile communication network

3.2.17 ELB

Extended Location Block

3.2.18 FCD

Floating Car Data

3.2.19 FCDGM

FCD General Message

3.2.20 FCDPM

FCD Parameter Message

3.2.21 FCDNSM

FCD Notification Set-up Message

3.2.22 FCDRM

FCD Revoke Message

3.2.23 FCDVDSUM

FCD Virtual Detection Site Update Message

3.2.24 GATS

Global Automotive Telematics Standard

3.2.25 GEM

General Error Message

3.2.26 GPS

Global Positioning System NAVSTAR GPS

3.2.27 GSM

Global System for Mobile Communication

3.2.28 IE

Information Element

3.2.29 IEG

Information Element Group

3.2.30 ICV

Initial Chaining Value

3.2.31 L_max

Max. length of transferable data in **one** data transaction

3.2.32 MAC

Message Authentication Code

3.2.33 MNA

Mobile Network Address

3.2.34 MF

Mandatory Fixed

3.2.35 MO

Mobile Originated Message

3.2.36 MT

Mobile Terminated Message

3.2.37 MV

Mandatory Variable

3.2.38 N_min

Minimum number of ELB waypoints

3.2.39 OBU

Onboard Unit, synonymously used : telematics device, telematics terminal

3.2.40 OD

Origin/Destination

3.2.41 OF

Optional Fixed

3.2.42 OV

Optional Variable

3.2.43 PDU

Protocol Data Unit

3.2.44 PFA

Probability of false alarm (i.e. estimated error is too large)

3.2.45 PMD

Probability of missed detection (i.e. estimated error is too small)

3.2.46 Ptp

Point to point

3.2.47 RSA

Asymmetrical encryption procedure by Rivest, Shamir and Adleman

3.2.48 SAE

Society of Automotive Engineers, Inc.

3.2.49 SDI

Data Item

3.2.50 SMS

Short Message Service

3.2.51 SMSC

SMS Centre

3.2.52 SV

Space Vehicle

3.2.53 TD

Terminal Device

3.2.54 TEG

Telematics Expert Group – Group within the WAP-Forum Ltd.

3.2.55 TINFO

Traffic Information Report

3.2.56 TOC

Telematics Operator Code

3.2.57 TRP

Transport Protocol

3.2.58 TT

Traffic Telematics

3.2.59 TTI

Traffic and Traveller Information

3.2.60 TTFF

Time to First Fix

3.2.61 UTC

Universal Time Co-ordinated

3.2.62 VDS

Virtual Detection Site

3.2.63 VDSTAB

Virtual Detection Site Table

3.2.64 vel, V

Velocity

3.2.65 VIN

Vehicle Identification Number

3.2.66 WAP

Wireless Application Protocol

3.2.67 WGS84

World Geodetic System 84

4. Specification of Emergency Service and Breakdown Assistance

4.1 Introduction

The following services are included within this specification:

- Emergency Service
- Breakdown Assistance
- Call for Help (the procedures are identical to the Breakdown Assistance)

The services are distinguished within the service center using the application ID. This information is detailed within the Call Type of the AssistanceMessage. In case of an emergency, this Assistance Message (generic term) is called "Emergency Call Message", in case of a breakdown, it is called "Breakdown Assistance Message".

The availability of the Emergency Call and Breakdown Call services depends on the service authorisation as well as the mobile network in which the vehicle is located. The administration of the means of access is described in CEN/TS 14821-5. If access is not possible, the Emergency Call service can only be used in a limited form, both nationally and internationally (Mobile Network Emergency Call structure without data communication).

4.1.1 Breakdown Assistance

The aim of the Breakdown Assistance is to improve existing assistance both for the customer and the assistance provider, whilst including the "traditional" operating partners (Breakdown Assistances). The task offered is to process the information submitted with the breakdown alarm and to optimize the assistance, taking into account prearranged action plans.

The service is designed to be carried out automatically as far as possible, using data communication between customer and traffic telematics service center/provider as well as traffic telematics service center/provider and assistance provider. An operator is used as fall back and to handle unforeseen constellations.

The benefit to the user is an increased efficiency in organising the assistance:

- Alarm given directly from vehicle; no extra time loss before alarm
- More rapid and efficient assistance through precise and robust location of vehicle and transmission of additional information

which is closely related to the advantages for the assistance provider:

- Exact information on position of customer
- Vehicle information
- Automatic breakdown diagnosis (depending on manufacturer), if available/necessary

4.1.2 Emergency Service

The aim of the emergency service is to improve existing assistance both for the customer and emergency services or the police.

The service incorporates an operator and uses both data and voice communication between customer and traffic telematics service provider as well as traffic telematics service provider and assistance provider.

The benefit to the user is a more rapid and more effective assistance:

- Alarm given directly from vehicle
- No time loss until alarm is submitted
- More rapid and efficient assistance through precise and robust location of vehicle and transmission of additional information (e.g. medical hazards)
- Automatic triggering of emergency call, if necessary and available

- The users benefit is closely related to the advantages offered to the police / emergency service:
- Exact information on position

Information on vehicle and driver

Automatic emergency call diagnosis, if necessary

Check for preliminary diagnosis of triggered emergency calls with regard to abuse/accidental triggering by an operator before forwarding emergency calls to the police/emergency service.

4.1.3 Call for Help

This kind of Service is used for terminals, which do not meet the requirements of the emergency service, especially according to the quality of the positioning function as specified in CEN/TS 14821-7.

In cases of medical requests, after accidents or attacks help- or service-organizations can be called. Due to the character of service and process delays, caused by the operator based acknowledgement of the position, this service can not be recommended for real emergencies and rapid responses, it is predominant an interactive information service. It can not be triggered automatically.

The emphasis of benefit to the user is depending on the performance of the service-center. Other advantages are:

- Alarm given directly from the vehicle
- Efficient assistance through rough vehicle location and transmission of additional information
- Vehicle information which is related to improved response and to the performance of the service center.

4.2 General Procedures

4.2.1 Time-control of communication processes

The following timers are relevant for the security service procedures. The depositing and updating of the timers in the terminal device are described in CEN/TS 14821-5.

Parameter ID	Designation	Function	Default value [s]	Max. value [s]	Effect during processing in Service Center	Effect on terminal device during processing
1	BD1ACK	Maximum time, in the event of a breakdown call/call for help, up to the first Acknowledge from the Service Center	90	600	Timer only effective at terminal device	Termination of service
2	BD2ACK	Maximum time, in the event of a breakdown call/call for help, between the first Acknowledge and the next Acknowledge/Calling Request from the Service Center	600	3200	Timer only effective at terminal device	Termination of service
3	TXTtoACK	Maximum time between a Text Message from the Service Center with an expected active Acknowledge and a positive Acknowledge message from the customer	300	3200	Service procedure in acc. with 4.3.2.6	See 4.3.2.6
4	EC1ACK	Maximum time, in the event of an Emergency Call, between the transmission of the Emergency Call Message and the 1 st	90	600	Service Center attempts to process service	Termination of service

		Acknowledge from the Service Center			via telephone	
5	EC1xACK	Time, in the event of an Emergency Call, between the 1 st Acknowledge and the last Acknowledge from the Service Center	600	3200	Service Center attempts to process service via telephone	Termination of service
6	C2FALLBACK	Time, between triggering the service and dialing a fallback number if there are any problems with telephony In the event of an Emergency, dialing the MNEC applies, in the event of a Breakdown, dialing the service backup number applies.	60	600	Service Center cannot operate via telephone	Termination of service Dial Fallback number

The minimum value of every timer is 0. The interval length should be at most +/-10% of the default value which is also a requirement for the exactness of a clock of the terminal device. The values themselves are transmitted as unsigned integer values. The scaling factor for the timer values received via Configuration Update is 1 sec.

Parameters exceeding the maximum values given in column 5 of the table above shall be ignored by the terminal if received via Configuration Update.

The default values given in column 4 shall be setup by the terminal whenever the terminal is resetted to the „No operator assignment“ state (see CEN/TS 14821-5) Each parameter value can be changed by the Service Center via Configuration Update.

Update of parameters in the terminal device:

If the default values are used in the terminal device and the menu „update“ is executed, this shall be signalized during a **ConfigurationRequest** by setting **Parameter-Version=0**.

All parameter will be transmitted from the service center to the onboard unit as absolute values, without any scaling or offset. In the table the given scaling factors, min. and max. values might be used in the onboard unit for compressed data storage, since the parameter update will be carried out with fixed IE-lengths for each parameter. For details on parameter update, see CEN/TS 14821-5.

4.2.2 Conditional Access and Security

4.2.2.1 Encryption

At least all messages for the emergency service are expected to be transmitted unencrypted. Encryption might be necessary in cases of authorization proof, especially telematics service roaming.

4.2.2.2 Master Data

The terminal device shall offer the option of depositing the following master data in the terminal device (for coding, see CEN/TS 14821-3). The following conditions shall be observed for depositing and transmitting data:

Information Element	Coding
Colour of Vehicle	See CEN/TS 14821-3
Chassis Number	max. 18 characters Text ISO 8859-1
Vehicle Model	max. 9 characters

	Text ISO 8859-1
Year of Construction	2 characters Text ISO 8859-1
License Plate	max. 11 characters Text ISO 8859-1

4.2.2.3 Administration of Communication Addresses

4.2.2.3.1 Breakdown Assistance and Call for Help

Two primary addresses (the Mobile Network Address MNA) and a service center destination address (Destination), if needed in addition to the primary address, shall be stored in the terminal device for the breakdown and the call for help service.

4.2.2.3.2 Emergency Call

Two primary addresses (one default, one backup number), two call numbers (one default, one backup number) and a service center destination address, if needed in addition to the primary address, shall be stored in the terminal device for the Emergency service.

Both primary addresses can be used. If there any communication faults with one of the primary two MNA numbers, a retry using another number is recommended.

The depositing and updating of service addresses in the terminal device is described in CEN/TS 14821-5.

4.2.3 Service-Specific Definitions with Respect to the Application Data Protocol

4.2.3.1 Assistance Message

The Assistance Message is a generic term for a mobile originated message that normally is used to initiate one of the services "Emergency Service", "Breakdown Assistance" or "Call for Help". In case of Emergency Service, this type of message is called „Emergency Call Message“, in case of a Breakdown Assistance, it is called " Breakdown Assistance Message".

The Breakdown Reasons Type field indicates in cases of an Emergency Service the presence of information about a crash.

In the event of a breakdown, zero should be entered in the Breakdown Reasons Type field, in case damage selection is not possible at the terminal device. The Breakdown Reasons field is then omitted.

If the terminal device offers the option of damage selection, the values 1, 2 or 3 should be entered in the Breakdown Reasons Type field.

Filling the Extended Location Block for an Emergency Call Message is dependent on the variable length of other IE. Therefore the following mandatory regulations apply:

The Emergency Call Message shall be filled according to the priority listed below. It shall be ensured by the terminal the maximum length of an Emergency Call Message including the necessary application-independent protocols never exceeds the maximum length $L_{\max}$ of the transferable data in **one** data transaction:

$L_{\max} = \text{length}(\text{TRP}) + \text{length}(\text{CAS}) + \text{length}(\text{ADP})$.

$L_{\max}$ is dependent on the type of mobile network service used.

- highest priority: localization data with $N_{\min}$ ELB-waypoints (excluding GPS raw data) coded according to the definition of Extended Location Block
- Master Data
- Loads (if applicable)
- lowest priority: GPS raw data, if space allows

If the remaining space in the data telegram is large enough to transmit the satellite raw data for the DGPS, the *Extended Location Block* is filled with the raw data in accordance with the coding of the Extended Location Block. Here, the GPS Raw Data Present flag shall be set to 1.

4.2.3.2 Text Message from Service Center to Vehicle

The Status field within the Text Message is coded as follows.

Value	Direction	Text Message Type
0		Reserved
1	Center Customer	Text Message with expected reply
2	Center Customer	Information on position
3	Center Customer	Display text only
4	Center Customer	Display text only and set back timer BD2ACK and EC1ACK
5 - 255		Reserved

4.2.3.3 Acknowledge Message

The Status field within the Acknowledge Message is coded as follows:

Value	Direction	Acknowledge Type
0		Reserved
1	Center Customer	Receipt acknowledgement for the Assistance Message
2	Center Customer	Last Acknowledge Message within any service procedure
4	Customer Center	Acknowledge from the terminal device to the Service Center, with which the customer is signalling that he accepts/does not accept the operating partner
5 - 255		Reserved

4.2.3.4 Calling Request Message

The address format applies to the *Assistance Partner Address*. It shall be given as international number for mobile network speech.

4.2.4 Execution of system tests

Authorised persons can initiate a test scenario (with an extra application ID) at the terminal device (test mode). It is left to the service provider to define the test procedures and access control.

4.3 Description of services

4.3.1 Description of procedures

4.3.1.1 Breakdown assistance (Individual driver)

On concluding an agreement with the Service Center, the customer states his desired Breakdown Assistance organisation (the customer can also designate several Breakdown Assistance organisations, which are stored in a plan of action. If the first Breakdown Assistance organisation is unable to accept the order, the order is sent to the next Breakdown Assistance organisation in the plan of action). This data is stored at the Service Center. If, in the event of a breakdown, the customer selects the menu "Breakdown" (or presses the breakdown button), the data telegram is prepared by the terminal device, in order that the designated Breakdown Assistance organisation can be activated. In the event of a breakdown, the terminal device takes the type of damage into consideration, in accordance with 4.2.3.1. The vehicle position is calculated and sent

to the Service Center, together with the previously compiled data, as a data telegram (*Breakdown Assistance Message, coded according to the Assistance Message*).

After the access authorisation for this service has been checked and the contents of the telegram successfully read, confirmation of receipt of the order is sent to the customer within the BD1ACK time (**Positive Acknowledge Message**). The timer is triggered by positive notification.

The current position of the vehicle is determined in the Service Center by means of map-matching, using the location data. The aim is to use destination routing systems with a map integrated into the vehicle (e.g. navigators) as a supplement for transmitting street-related location data. The processed set of data, which is supplemented by certain master data, is transmitted to the relevant Breakdown Assistance organisation (**Assistance Link Message**). The latter sends confirmation of acceptance of the order (**Positive Acknowledge Message**) to the Service Center. This order acceptance may contain other information on breakdown assistance which is relevant for the customer. Depending on the procedure agreed upon with the operating partner, the Service Center sends a data telegram to the terminal device, which sets up a voice connection from the terminal device to the operating partner (**Calling Request Message with the corresponding field entry "Trigger call automatically" or "Trigger call following confirmation from customer"**) [see 4.3.2.1] or informs the customer of the impending return call from the operating partner (**Positive Acknowledge Message**) [see 4.3.2.2]. The reply to the terminal device takes place within the BD2ACK time. The service is then concluded as far as the terminal device is concerned. The messages from the Center may contain, in accordance with the ADP, the name of the designated company and the time of the expected arrival of the breakdown assistance.

If the operating partner designated by the customer cannot be activated or the customer has not specified any breakdown assistance organisation, the customer is asked if the partner from the Service Center is acceptable instead (**Text Message with expected active acknowledgement in accordance with the status bytes**). On receipt of the active acknowledgement of this by the customer (**Positive Acknowledge Message**), the partner of the Service Center is contacted and the service concluded, as mentioned above (**Positive Acknowledge Message or Calling Request Message**) [see 4.3.2.3 and 4.3.2.5]. If the customer rejects this or the TXTtoACK time available for replying runs out (**Negative Acknowledge Message / time-out**), the customer is informed of the termination of the service and receives information, within the text field of the **Negative Acknowledge Message** from the Service Center to the terminal device, on a separately priced operator service from the Service Center (Customer Care) which may then be of further help [see 4.3.2.6].

Moreover, the Service Center can transmit additional texts (e.g. "Please be patient") at any time. The **Text Messages** used for this show in their status bytes (see 4.2.3.2) that the contents of the telegram should be displayed and the BD2ACK timer set back, and that no reply is expected.

Once the message has been sent, the customer has the chance to inform the operator of the cancellation of the order during subsequent verbal communication. The service center confirms this cancellation (**Negative Acknowledge Message** from the service Center) and the terminal device is restored to a neutral status on receipt of this Negative Acknowledge Message, i.e. the reporting process is terminated. There is no **Order Cancellation Message** from the customer.

The Breakdown Assistance service is concluded either by a timer running out (BD1ACK, BD2ACK or TXTtoACK) or with one of the following messages in the terminal device:

- **Calling Request Message**
- **Acknowledge Message** with the value 2 in the status field
- **Negative Acknowledge Message** with the value 2 in the status field

As far as the terminal device is concerned, avoid triggering a second breakdown message until the BD1ACK, BD2ACK and TXTtoACK timers have run out and final confirmation has been received from the Service Center. The same applies if the ignition is switched off for a short time and switched on again whilst the BD1ACK, BD2ACK and TXTtoACK timers are running.

4.3.1.2 Breakdown assistance (Fleet customers)

Even in the fleet sector, customer-related plans of action are usually stored at the Service Center, to be used in the event of a breakdown. These also include breakdown assistances (e.g. tyre service) and the fleet

control center as possible operating partners. The latter is either just informed of the breakdown and confirms processing of the plan of action, or provides assistance/arranges for assistance at the breakdown location. In the event of a breakdown, additional information, in the case of fleet vehicles, on the vehicle and cause of the breakdown can be held and transmitted as an option.

In other cases, the procedure for the Breakdown Assistance for fleet customers is identical to that of the Breakdown Assistance for individual drivers.

4.3.1.3 Call for Help

The procedures of the Call for Help are identical to the Breakdown Assistance for individual customers except for the following difference:

The service organisation is chosen by the service center and cannot be chosen individually by the user. Therefore the proposal and acknowledgement procedure for the choice of the service organisation does not apply.

4.3.1.4 Emergency call

As with a breakdown, the vehicle ID and location data are transmitted to the Service Center by data telegram (**Emergency Call Message**, coded according to the Assistance Message). Vehicle and driver-related data is gathered in the Service Center from the master data, in accordance with the vehicle ID. A description of the current location is taken from the location data by means of map-matching. This description is sent in text form to the terminal device within the EC1ACK time and with the first **Acknowledge Message**. It is intended that, where the position is not yet fully clear, a plain text message with an improved description of the location shall be sent to the terminal device (**Text Message**).

As planned for the Breakdown Assistance, destination routing systems for processing emergency calls are to be used in the vehicle in future as a supplement to the localisation system.

The vehicle position as well as all relevant master data are passed on to the responsible police station/emergency service (either orally or via an **Emergency Call Assistance Message**). Driver-related data comprises, for example, medical data which gives warning of certain risks. The Service Center receives confirmation from the police station that the data has arrived (orally or via an **Acknowledge Message**) and that the necessary action will be taken.

The customer then receives within the EC1xACK time further confirmation that the emergency services have been alarmed (**Acknowledge Message**). As far as the terminal device is concerned, the service is now concluded.

If the customer accidentally presses the emergency call button, he informs the voice operator. In this case, the voice operator sends a cancellation message to the terminal device (**Negative Acknowledge Message**).

A cancellation from the terminal device is not possible.

Parallel to the transmission of data, a voice connection between the driver and the Service Center is set up. If necessary, the Service Center connects the call with the relevant police station/emergency services.

Note: For mobile networks, where parallel set-up of data transmission and voice call is impossible, the data should be transmitted prior to the establishment of a voice connection.

Until all police and emergency services authorities have been equipped with the relevant infrastructure, it is necessary to pass on information orally, in the form of a telephone conference call (customer, Service Center, police/emergency services staff)

If the relevant infrastructure is available, the vehicle, customer and location data can be transmitted in electronic form to the relevant authority. If necessary, the voice connection between the customer and Service Center can be subsequently linked up to this authority in the form of a conference call.

If the service cannot be carried out by the Service Center, the terminal device dials MNEC after the C2FALLBACK time stored in the terminal device has expired. Here, the current position - if available, is displayed in text or coordinate form. MNEC is triggered when the telephone connection between the terminal device and the Service Center fails.

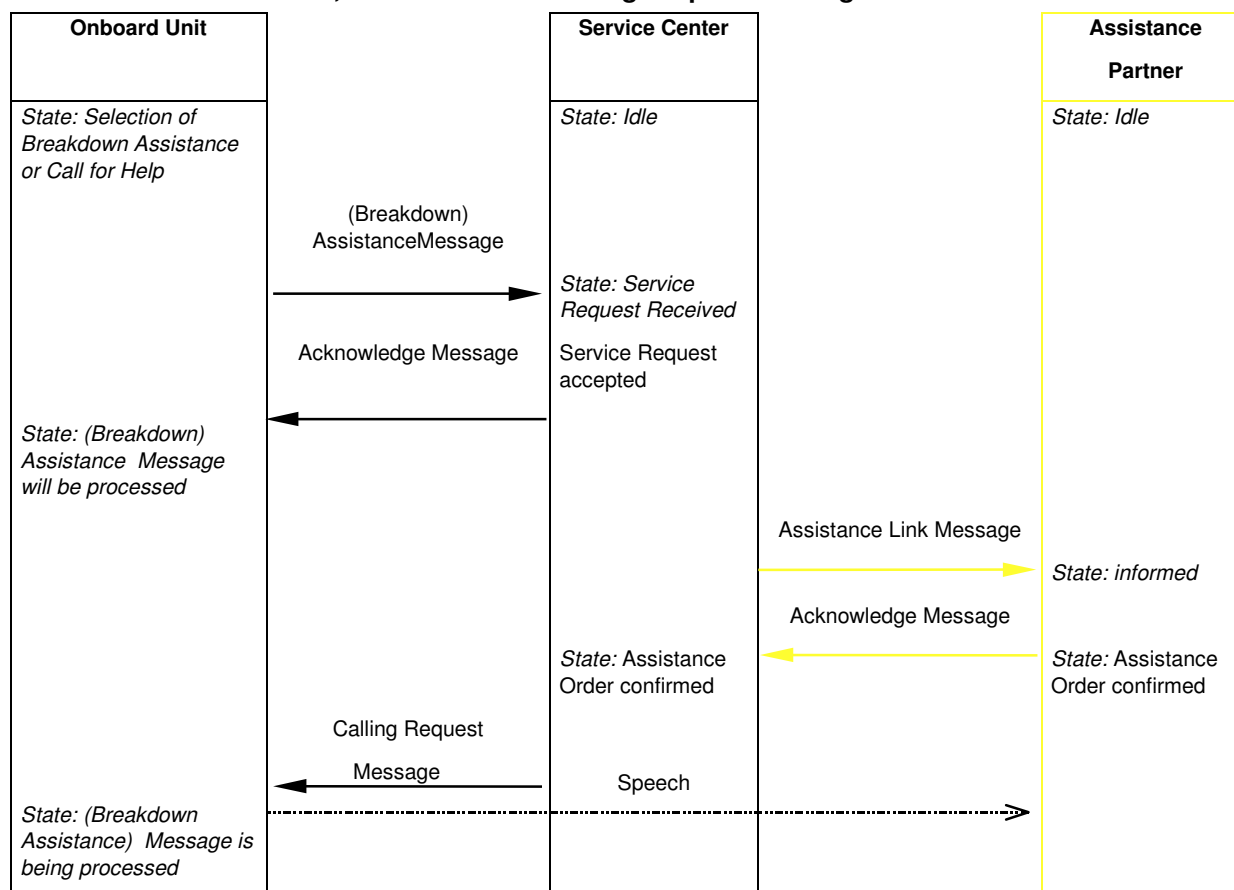
Note: Although the emergency call via MNEC is a standardized priority-service in mobile networks, few mobile network operators do not supports this service. The Emergency Call service is concluded either when the EC1ACK, EC1xACK or C2FALLBACK timer runs out or by one of the following messages at the terminal device:

Acknowledge **Message** from the Service Center

Negative Acknowledge Message from the Service Center

4.3.2 Diagrams

4.3.2.1 Breakdown order, concluded with Calling Request Message



Note: The detailed wired link interactions between service center and assistance partner (and possibly further instances) are not part of this CEN/TS.

The figures behind the data telegrams from the service center to the vehicle serves the purpose of being able to clearly allocate the contents of the data telegram. The contents of the message and the effect of the message on the terminal device are shown again in 4.4.3.1. The contents in this section can be used for depositing screen texts or voice modules which are triggered by a message.

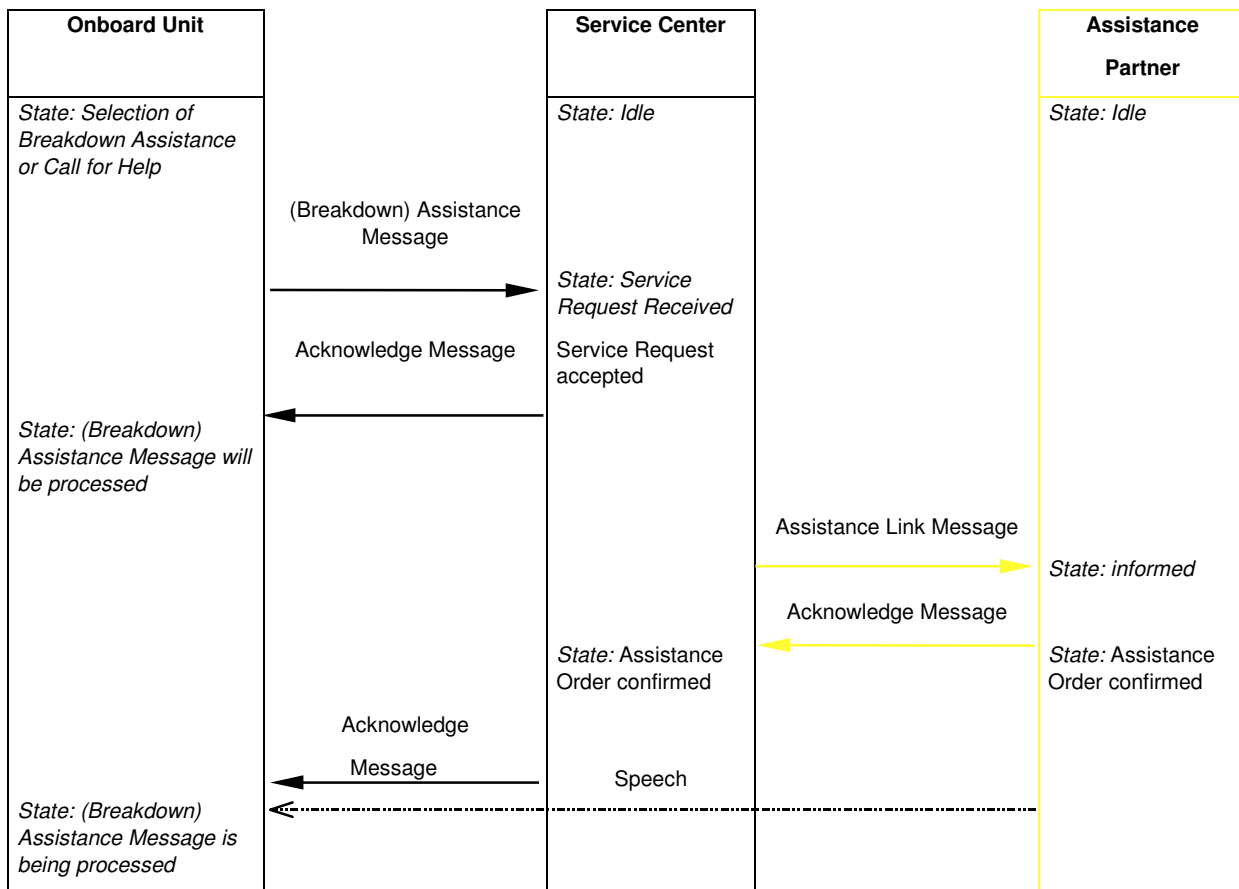
The following procedure applies:

- The voice channel is set up from the vehicle initiated by the Calling Request Message. After receiving the Calling Request Message the primary call number (depends on country of residence, if the occasion arises) is dialed, the Timer C2FALLBACK will be started. The call establishment will be repeated with the primary call number, if necessary.

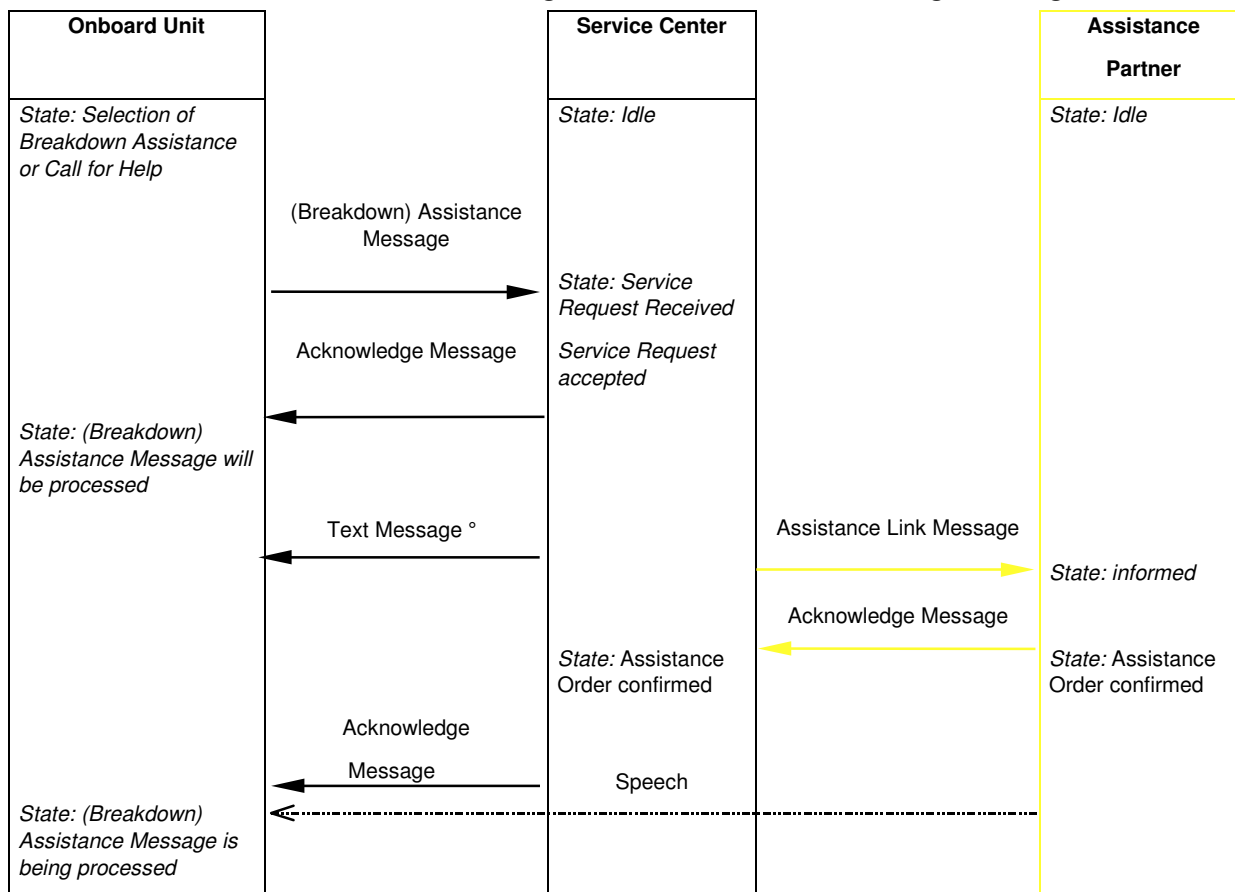
Note: The failure of call establishment is indicated to the cellular phone in a mobile network by signaling (from the network) "disconnect without connect".

- If no speech call could be established until the C2FALLBACK expires (for example when the cellular network is very busy or the other party is occupied), the secondary call number will be dialed, if there exists a secondary call number for breakdown assistance in the OBU.
- The timer C2FALLBACK will be restarted, if necessary.
The call establishment will be repeated with the secondary call number, if necessary. The secondary call number is variable, too, and depends on the country of residence.
- If no speech call to the secondary call number could be established, the customer shall be informed by the OBU, that no call establishment was possible. In this case the service center will try to establish a call, which is only possible, if the mobile telephone in the OBU is not used by the customer at this moment.

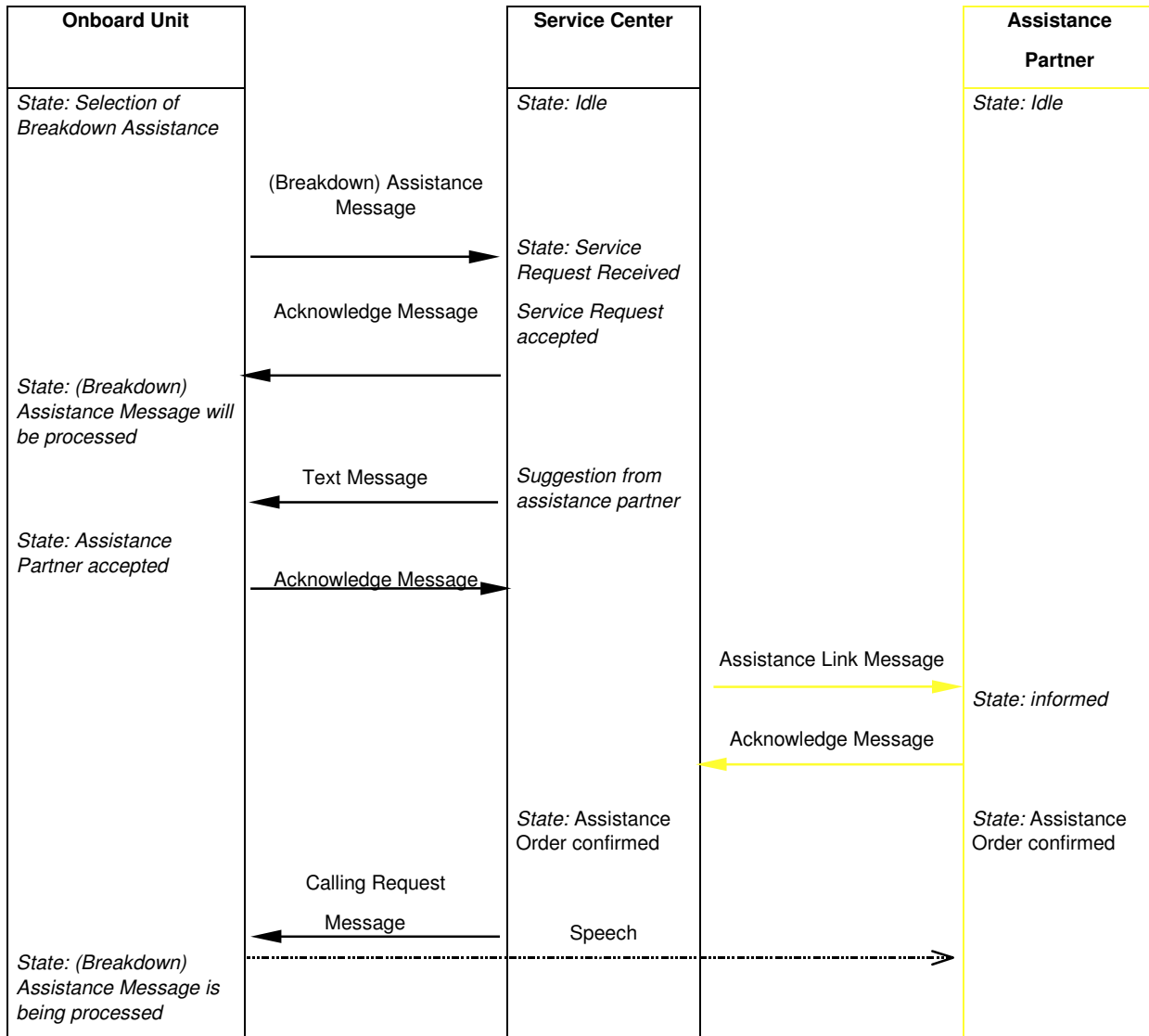
4.3.2.2 Breakdown order, concluded with Acknowledge Message



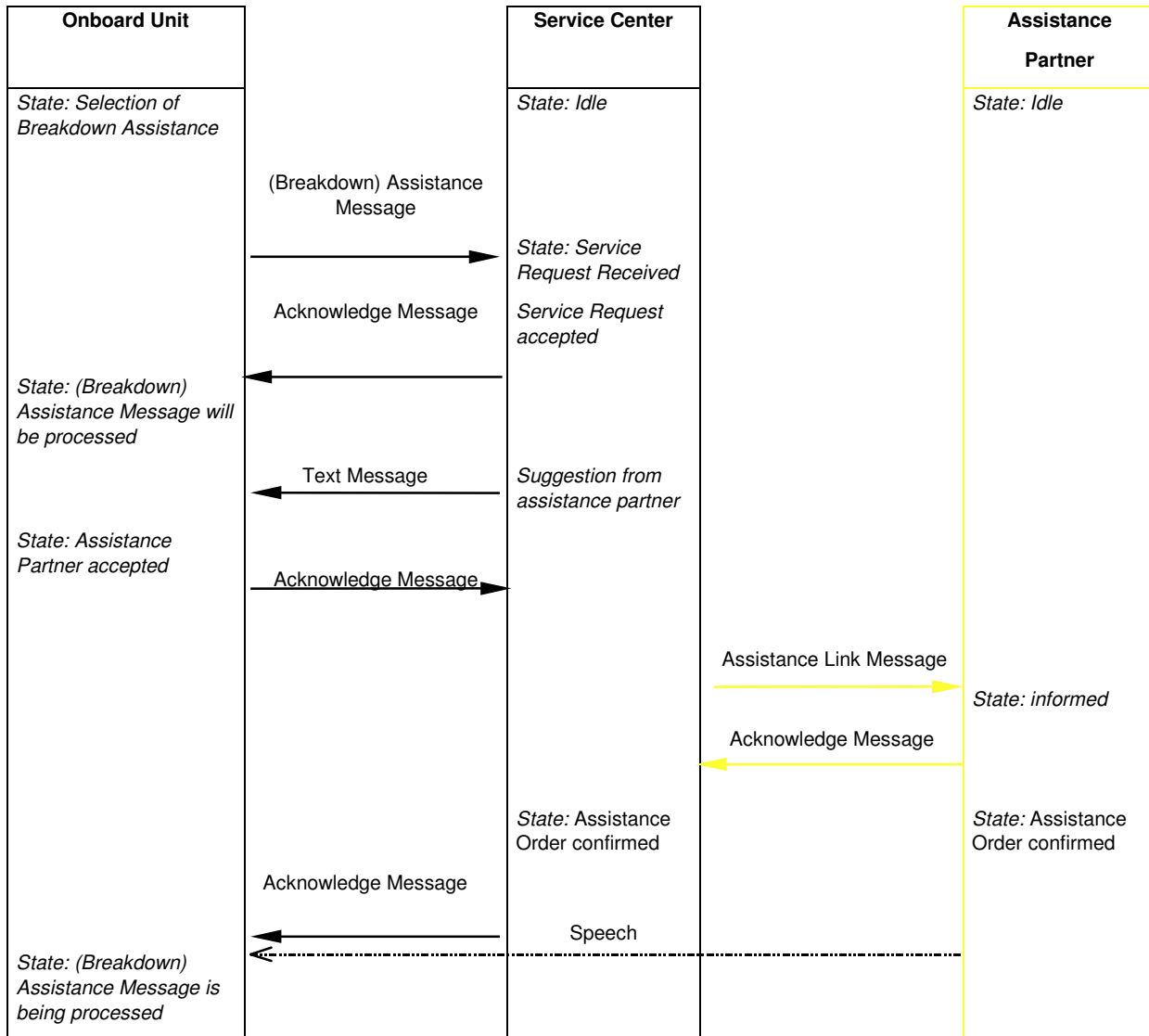
4.3.2.3 Breakdown order with wait message, concluded with Acknowledge Message



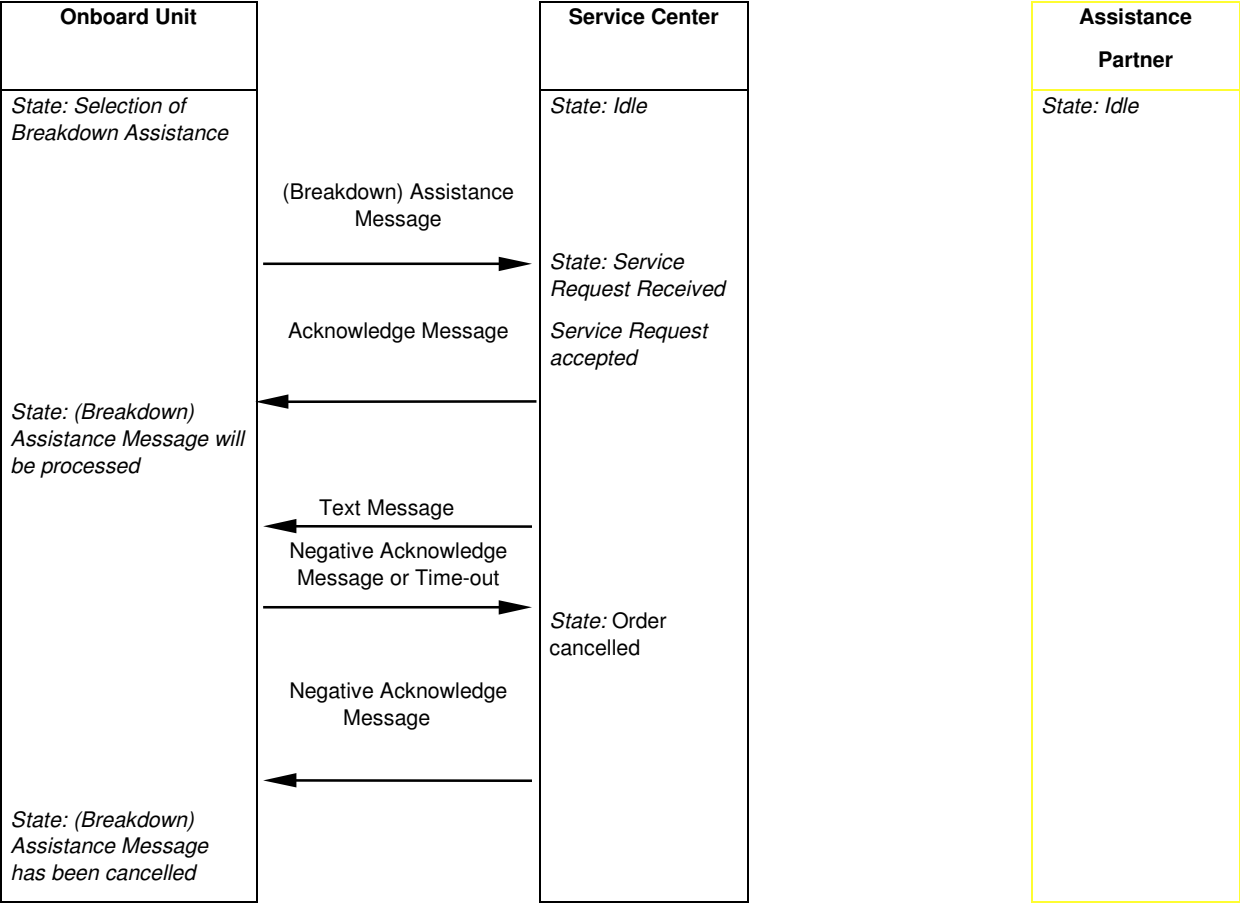
4.3.2.4 Breakdown order with query, concluded with Calling Request



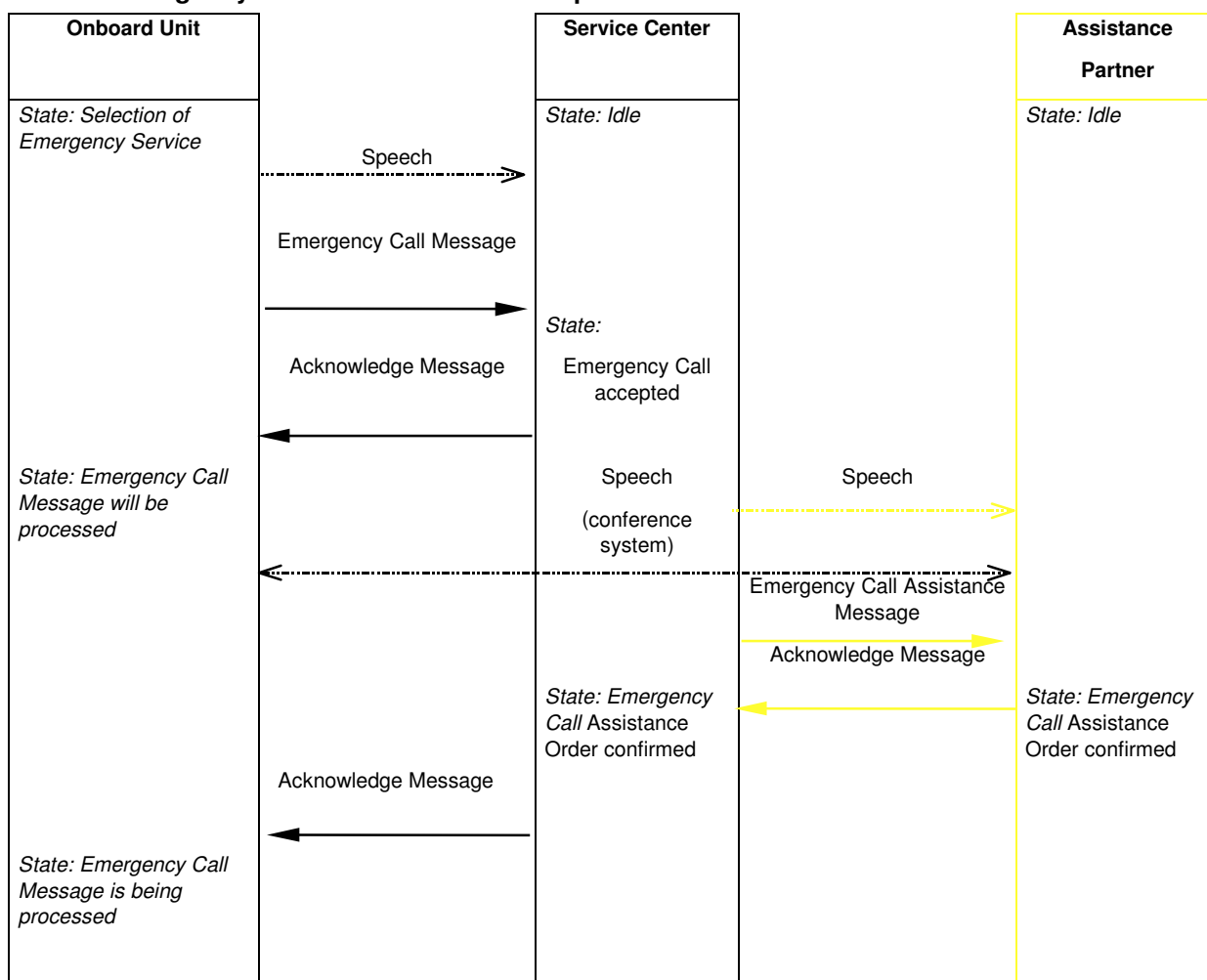
4.3.2.5 Breakdown order with query, concluded with Acknowledge Message



4.3.2.6 Breakdown order with query, concluded with Negative Acknowledge



4.3.2.7 Emergency order with location description



The voice channel from the vehicle to the Service Center is set up parallel to the transmission of the Emergency Call Message to the Service Center.

Note: for mobile networks, where parallel set-up of data transmission and voice call is impossible, the data should be transmitted prior to the establishment of a voice connection.

Following procedure applies:

- After triggering the Emergency Call the primary call number (depends on country of residence, if the occasion arises) is dialed, the Timer C2FALLBACK will be started. The call establishment will be repeated with the primary call number, if necessary.
- If no speech call could be established until the C2FALLBACK expires, the secondary call number will be dialed.
- The Timer C2FALLBACK may be restarted, if necessary. The call establishment will be repeated with the secondary call number, if necessary. The secondary call number is variable, too, and depends on the country of residence.
- If no speech call to the secondary call number can be established, a MNEC will be established. The establishment will be repeated twice, if necessary, then an error message appears. The call number of the MNEC is programmed permanently.

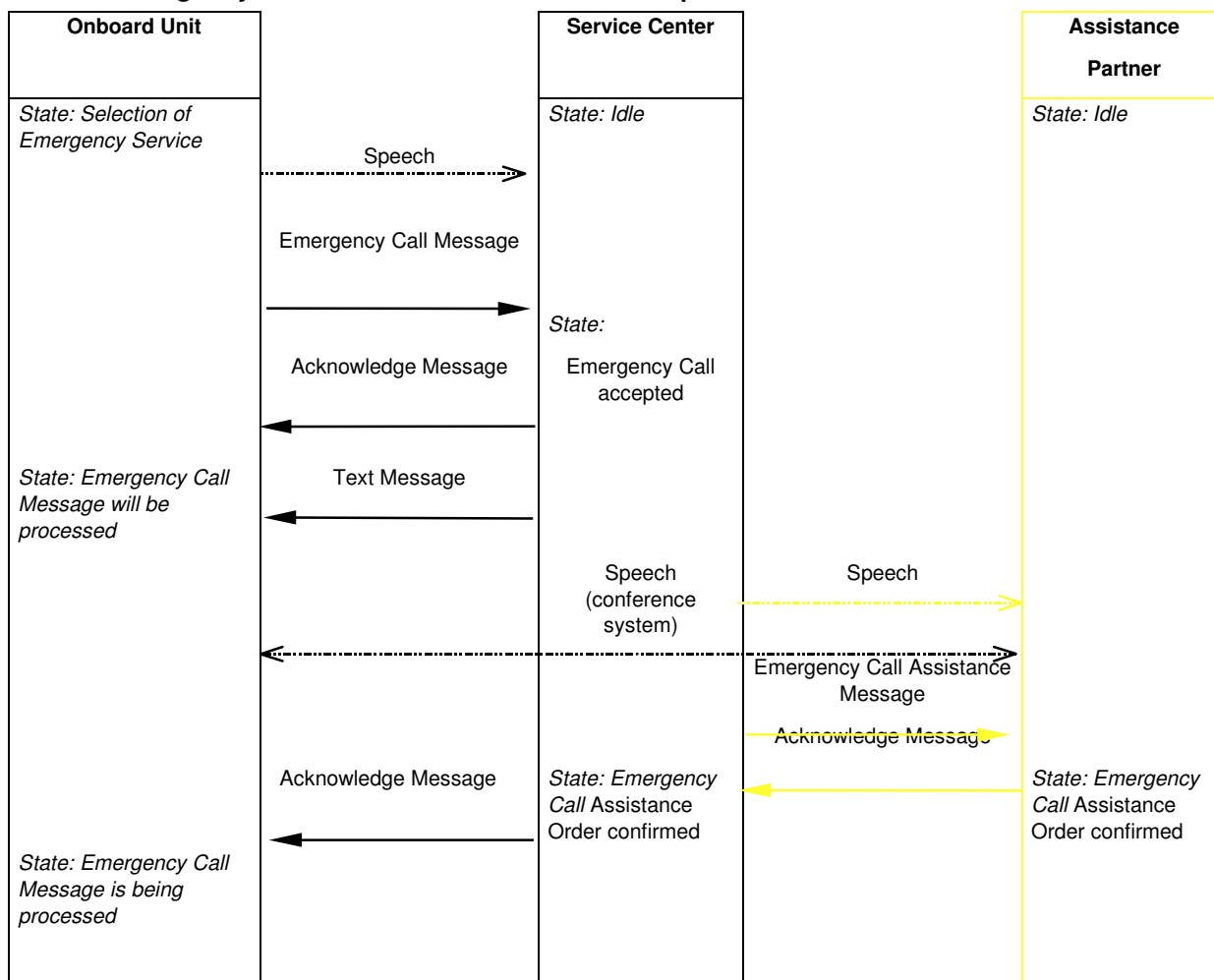
If a terminal has not been activated (no first access), the mobile phone is not able to register for the valid network or no table of services has been configured for the corresponding country, a MNEC shall be established on triggering the GATS Emergency Call. It shall be guaranteed, that on actuating the Emergency

Call button at least a “minimum emergency call” to MNEC is performed, if, due to any reasons, the GATS Emergency Call is not available.

It is possible that the Emergency Call Message arrives at the Service Center before the voice channel has been set up.

The location description refer to the first Acknowledge Message transferred from the service center to the terminal.

4.3.2.8 Emergency call order with two location descriptions



In case of corrections of the localization results after the first Acknowledge Message transferred from the service center to the terminal, an additional location description might be transferred from the service center to the vehicle via text message.

4.4 Terminal Requirements

4.4.1 Minimum requirements concerning service quality

The following requirements shall be met in respect of the first generation of devices:

Mandatory quality parameter towards accuracy, availability, integrity and continuity are specified in CEN/TS 14821-7.

Coverage in urban and rural areas within Europe.

The above-mentioned quality requirements shall also be satisfied for speeds less than 5km/h.

The time it takes for the terminal device to react to inputs and for messages to be displayed once they have been received shall be below 1 second.

Accidental triggering of an emergency call shall be avoided, and this can be achieved, for example, by having to press a button twice to confirm (triggering and confirming customer's query) or by installing mechanical protective devices.

All other services are interrupted when an emergency call is activated.

Location data shall be recorded by the terminal device as soon as the vehicle is in motion - even if the display unit of the terminal device is not switched on - in order that data which is as up-to-date as possible can be transmitted in the event of an alarm.

The location data shall remain stored in the terminal device, even after the vehicle ignition has been switched off.

Data on at least the last five recorded locations shall be stored in the terminal device

All terminal device shall have the *Calling Request* feature. That is, the dialling procedure at the terminal devices shall be able to be triggered by the Service Center.

4.4.2 Hardware features (recommended)

- Separate emergency call button and / or crash sensor
- EEPROM for storing Individual Flags/Settings und Extended Location Block.
- GPS receiver + Dead Reckoning (e.g. direction sensor and tachosignal recording).
- Recording of location data as soon as ignition is switched on P
GPS receiver with short re/acquisition times (TTFF typically 10-20 sec warm start), raw data output (pseudo-range und range rate), non-volatile memory for Almanac and Ephemeris.
- If there is a power failure in the vehicle, the master data stored in the terminal device is made known to the customer with an enquiry being made as to whether the data in question is up-to-date.
- It is recommended that the emergency call button function be linked to the ON/OFF switch, in order that an emergency call can be sent at any time when the telephone has been booked into the network.
- Self-supporting power supply, i.e. security services function independently of the car battery.
- Chip card reader or suitable MMI (keys, display, voice input/output etc.)
- optional:
- Connection to accident data memory
- Connection to other sensors (inclination sensor, heat sensor)

4.4.3 Software features (recommended)

- Self-diagnosis tool
- Location tool with integrity check

4.4.3.1 Effect of Server-side Messages on Processes in the Terminal Device

Number	Contents	Effect
	Confirmation of receipt of a breakdown order from the Service Center	The BD1ACK timer is stopped
	A telephone call is initiated from the terminal device on receipt of this message	The BD2ACK timer is stopped After a telephone conversation has been successfully set up, the service is considered to be finished
	Last confirmation from the Service Center in the event of a breakdown order	The BD2ACK timer is stopped After confirmation has been received, the service is considered to be finished
	Text Message from the Service Center with expected acknowledge receipt from terminal device	The BD2ACK timer is restarted The TXTtoACK timer is started The customer shall confirm breakdown partner within TXTtoACK time
°	Text Message from Service Center, requesting that the customer be patient	The BD2ACK timer is restarted
	Confirmation from the Service Center that the customer has rejected the proposed operating partner	The TXTtoACK timer is stopped The service is considered to be finished
	Confirmation of receipt of an emergency call order from the Service Center	The EC1ACK timer is stopped
	Last confirmation from the Service Center in the event of an emergency call order	The EC1xACK timer is stopped After confirmation has been received, the service is considered to be finished

5. ADP for Emergency Services and Breakdown Assistance

5.1 Assistance Message

5.1.1 Call Type

The call type IE describes what kind of emergency exists. It is coded as a binary number in 4 bits according to Table 2-1. In case of car breakdown the breakdown reason type IE is present.

Table 5-1: Coding Format for the Call Type

Value	Code	Call Type
0	0 0 0 0	Emergency Call (manually released)
1	0 0 0 1	Emergency Call (automatically released)
2	0 0 1 0	Car Breakdown
3	0 0 1 1	Medical Assistance
4	0 1 0 0	Attack Alarm
5 - 15	0101 - 1111	reserved

5.1.2 Generation Time

Exact time at which the Emergency Call was generated.

5.1.3 Breakdown Reason Type

The Breakdown Reason Type describes the type of the Breakdown Reason code according to Table 5-2.

Table 5-2: Coding Format for the Breakdown Reason Type

Code	Breakdown Reason Type
0	no information (IE „Breakdown Reason“ not present)
1	Breakdown Code
2	user defined binary data
3	Text
4	Crash Data
5 - 7	Reserved

5.1.4 Breakdown Reason

This IE describes the code from the car/truck manufacturer or alternatively from the service center for breakdown reasons. The coding and presence depends on the IE „Breakdown Reasons Type“:

Breakdown Code: Code formed of two hexadecimal digits, see CEN/TS 14821-4.

User defined binary data: User defined code from the car/truck manufacturer (i.e. definition is not part of the ADP); coding see CEN/TS 14821-4.

Text: coding see CEN/TS 14821-4.

This IE is only present if the IE „Breakdown Reason Type“ has a value not equal to 0 and not equal to 4.

5.1.5 Crash Data

This IE describes the activation of security components.

Information Element	Type	Length [bits]	Comment
Crash intensity	OF	4	coded as binary data, 0 lowest, 15 highest crash intensity
Crash sensors	OF	4	bitswitch according to the activation of security components at different locations, see Table below

Table 5-3: bitswitch for Crash Sensors

bit	Crash Sensor
0 (LSB)	Front
1	Rear
2	Side
3 (MSB)	Rollover

This IE is only present if the IE „Breakdown Reason Type“ is set to the value four.

5.1.6 Load

The load IE describes the kind of load, especially for hazardous goods. It may contain text or binary data; in the latter case the format is beyond the scope of this CEN/TS.

Coding of the IE is done according to CEN/TS 14821-4. The IE is mandatory but it may have a text length of zero.

5.1.7 Number of Passengers Type

The Number of Passengers Type describes the type of the Number of Passengers according to Table 5-4.

Table 5-4: Coding Format for the Number of Passengers Type

0	no information (P IE „Number of Passengers“ not present)
1	number of seats
2	number of passengers (manually detected)
3	number of passengers (automatically detected)

5.1.8 Number of Passengers

The Number of Passengers is given as unsigned binary number with a transmitted number of

0: reserved

63: indicating „number of passengers > 62“

The IE is only present if the IE Number of Passengers Type is not zero.

5.1.9 Extended Location Block

The IE provides information for the location of the vehicle. It contains a series of positions of the last traveled distance and some additional information.

5.2 Text Message

The Text Message is specified as service-independent Message Type (see CEN/TS 14821-4).

In the context of emergency or breakdown services the status IE has the following assignments. It is used for specifying the function of the text message within the service procedure order to allow a differentiation. This IE also specifies whether the Text Message shall be acknowledged.

Table 5-5: Coding Format for the Status IE

Value	Status	Text Message Type
0	0 0 0 0 0 0 0 0	Not used
1	0 0 0 0 0 0 0 1	Request for the Customer's Ack concerning the selected Assistance Partner
2	0 0 0 0 0 0 1 0	Position Information
3	0 0 0 0 0 0 1 1	Message to vehicle without influence to procedure of services
4	0 0 0 0 0 1 0 0	Timer Reset
5 - 255	00000101 - 11111111	reserved

5.3 Acknowledge Message

The Acknowledge Message is specified as service-independent Message Type (see CEN/TS 14821-4).

In the context of emergency or breakdown services the status IE is used for specifying the type of acknowledgement. It has the following assignments:

Table 5-6: Assignments for the Status IE

Value	Status	Acknowledge Type
0	0 0 0 0 0 0 0 0	Not used
1	0 0 0 0 0 0 0 1	Receipt Ack concerning an Emergency Call Message or a Breakdown Assistance Message
2	0 0 0 0 0 0 1 0	Final Ack concerning an Emergency Call Message or a Breakdown Assistance Message
3	0 0 0 0 0 0 1 1	Ack concerning an Emergency Call Assistance Message or a Breakdown Assistance Message
4	0 0 0 0 0 1 0 0	Customer's Ack for the Selection of the Assistance Partner
5 - 255	00000101 - 11111111	reserved

The IE „Additional Information“ in the Acknowledge Message (see CEN/TS 14821-4) may be used either in the mode text or binary data. In case of binary data the IE its format is:

hh:mm_<service partner or instructed company>

hh:mm gives the estimated time of assistance. The time is local time (daylight saving time if applicable).

The name of the service partner called is submitted as text.

Both parts are separated by a blank, indicated here as „_“.

The character set is ISO 8859-1 with 8 bit/character.

5.4 Calling Request Message

5.4.1 Automatic Calling Mode

This mode indicates what the onboard unit shall do with the registered communication address (phone number) of the assistance partner (see CEN/TS 14821-4).

5.4.2 Presence of Assistance Partner Address

This flag controls the presence of the IE „Assistance Partner Address“.

0	IE not present
1	IE present

5.4.3 Spare

Spare to allow byte alignment of the following IE's; the bit shall be set to zero.

5.4.4 Assistance Partner Address

This IE contains the communication address (phone number) of an assistance partner, which the customer may call for help.

5.4.5 Assistance Partner Name

This IE contains a text with informations like name of the assistance partner, estimated time until assistance partner probably will arrive at the location (local time).

Format (mode binary code):

„hh:mm_<name of assistance partner or instructed company>“

hh:mm gives the estimated time of assistance. The time is local time (daylight saving time if applicable).

The name of the service partner called is submitted as text.

Both parts are separated by a blank, indicated here as „_“.

The character set is ISO 8859-1 with 8 bit/character.

5.4.6 Additional Information

As additional information either text or binary data of variable length may be transmitted. The IE is mandatory. If no additional information is available, this is indicated within this text IE.

5.5 Specification in ASN.1

```
Adp-Emergency-And-Breakdown-Services DEFINITIONS ::=
```

```
BEGIN
```

```
EXPORTS Ebs-assistance-message, Ebs-calling-request-message, Ebs-text-message-status, Ebs-acknowledge-message-status;
```

```
IMPORTS Num-adp-message-header FROM Adp-Message-Header
```

```
Bis-absolute-time, Bis-master-data, Bis-extended-location-block, Bis-breakdown-reasons, Bis-text-and-data, Bis-communication-address FROM Basic-Information-Elements;
```

```
-- common used typereferences
```

```
Bitstring1 ::= BIT STRING SIZE(1)
```

```
Bitstring2 ::= BIT STRING SIZE(2)
```

```
Bitstring3 ::= BIT STRING SIZE(3)
```

```
Bitstring4 ::= BIT STRING SIZE(4)
```

```
Bitstring6 ::= BIT STRING SIZE(6)
```

```
Octetstring1 ::= OCTET STRING SIZE(1)
```

```
-- 5 Assistance Message
```

```
Ebs-assistance-message ::= SEQUENCE
```

```
-- see 5
```

```
eam-message-header
```

```
Num-adp-message-header,
```

```
-- see CEN/TS 14821-2
```

```
eam-call-type
```

```
INTEGER(0..4),
```

```
-- Bitstring4, see 5.1.1
```

```
eam-generation-time
```

```
Bis-absolute-time,
```

```
-- see 5.1.2
```

```
eam-master-data
```

```
Bis-master-data,
```

```
-- see CEN/TS 14821-3
```

CEN/TS 14821-6:2003 (E)

```

    eam-breakdown-reasons-type      INTEGER(0..4),           -- Bitstring3, see 5.1.3
    eam-breakdown-reasons           [0] Ebs-breakdown-reasons OPTIONAL, -- see 5.1.4
    eam-crash-data                   [1] Ebs-crash-data OPTIONAL,       -- see 5.1.5
    eam-load                         [2] Bis-text-and-data,              -- see 5.1.6
    eam-number-of-passengers-type    INTEGER(0..4),           -- Bitstring2, see 5.1.7
    eam-number-of-passengers         [3] INTEGER(0..63) OPTIONAL,        -- Bitstring6, see 5.1.8
    eam-extended-location-block      [4] Bis-extended-location-block     -- see 5.1.9
}

Ebs-breakdown-reasons ::= CHOICE                                     -- see 5.1.4
{
    ebr-breakdown-reasons          Bis-breakdown-reasons,
    ebr-user-definition            Bis-text-and-data              -- see CEN/TS 14821-3
}

Ebs-crash-data ::= SEQUENCE                                         -- see 5.1.5
{
    ecd-crash-intensity            INTEGER(0..15),               -- Bitstring4
    ecd-crash-sensor-rollover      BOOLEAN,                      -- MSB
    ecd-crash-sensor-side          BOOLEAN,
    ecd-crash-sensor-rear          BOOLEAN,
    ecd-crash-sensor-front         BOOLEAN                       -- LSB
}

```

5.2 Text Message

```

Ebs-text-message-status ::= Octetstring1                          -- see 5.2

```

-- 5.3 Acknowledge Message

Ebs-acknowledge-message-status ::= Octetstring1 -- see 5.3

-- 5.4 Calling Request Message (Emergency & Breakdown)

Ebs-calling-request-message ::= SEQUENCE -- see 5.4

```
{
    ecm-message-header          Num-adp-message-header,
    ecm-automatic-calling-mode   Bitstring2,                -- see 5.4.1
    ecm-presence-of-assistance-partner BOOLEAN,              -- see 5.4.2
    ecm-spare                    Bitstring1,                  -- see 5.4.3
    ecm-assistance-partner-address [0] Bis-communication-address OPTIONAL, -- see 5.4.4
    ecm-assistance-partner-name   [1] Bis-text-and-data,      -- see 5.4.5
    ecm-additional-information    Bis-text-and-data           -- see 5.4.6
}
```

END

6. Specification of Interactive Traffic Information Services

6.1 Introduction

Traffic information services (TINFO services) offers users to select from their vehicles reliable and up-to-date information on traffic conditions which is tailored to their individual needs.

The basic traffic information services comprise different selection criteria and allow for single requests (with the possibility of periodic requests triggered by the terminal) or automatic updates by the service center. The selection criteria form three categories:

1. traffic information to a specific geometrical selection area (circle, sector, etc.)
2. route related traffic information (tour, specific roads)
3. regional traffic information (metropolitan area)

The information is presented in the vehicle in visible and/or audible form by means of suitable output media.

Furthermore the following additional services are specified:

- bypass information concerning a traffic event
- support services for text requests and code translation

Traffic information services are available in two specific variants:

1. **Interactive Traffic Information Services (ITIS)** (via point-to-point data telegram and speech)
2. **Broadcast Traffic Information Services (BTIS)**

The interactive traffic information service and the broadcast traffic information service are described in this CEN/TS.

6.2 General Handling Sequences

This section describes the handling sequences that cover all the services required to carry out the Traffic Information Services.

6.2.1 Administration of Service Parameters and Control Flags

The following communications addresses, timers and parameters as well as procedure control flags are required in the onboard unit to control the services. During the initialisation of the onboard unit these addresses, parameters and flags are transmitted to the onboard unit by the internal services (see CEN/TS 14821-5).

The following addresses are used for the TINFO service:

- *MNA* and *Backup MNA*
- *Destination address* and *Backup Destination address*

6.2.1.1 Timer and Parameters

All the service parameters are summarized in the following table, together with their Parameter Ids. All the interactive traffic information services run with this set of parameters so that the onboard unit should have one parameter memory.

Parameter ID	Parameter	Meaning	Default	Min	Max	Resolution
1	ltis_t109	Maximum waiting time for a reply from the Service Centre	90 s	0 s	620 s	20 s
2	ltis_t112	Maximum storage time for a Traffic Information Report received via the interactive traffic information service	30 min	0 min	150 min	10 min
3	ltis_t113	Maximum waiting time after receiving the first of several data telegrams of a <i>Traffic Information Message</i> reply by the onboard unit	20 s	0 s	310 s	10 s
4	ltis_t114	Minimum waiting time after receiving the first of several replies to a TINFO Request Message	3 s	0 s	31 s	1 s
5	itis250_circle_max	Maximum radius of an item of circle information	250 km	100 km	500 km	10 km
6	itis250_dist_max	Maximum range of an item of sector information, road information.	250 km	100 km	500 km	10 km
7	itis250_phi_max	Maximum opening angle of an item of sector information, road information.	180°	90°	360°	5°
8	itis250_phi_min	Minimum opening angle of an item of sector information, road information.	5°	5°	90°	5°
9	itis250_r_max	Maximum radius of an item of sector information, road information.	20 km	20 km	50 km	5 km
10	itis250_street_max	Maximum number of roads for which a query can be made for an item of road information.	5	0	15	1
11	itissup_text_max	Maximum number of Traffic Information Reports that can be translated into plain text per <i>TINFO Text Message</i> .	5	1	8	1
12	itissup_bypass_max	Maximum number of Bypass descriptions that can be requested per <i>Bypass Request Message</i> .	3	3	15	1
13	itisspeech_k01	Maximum time for which the Service Centre will hold Speech Reports for the onboard unit.	5 min	0 min	15 min	1 min
14	itisspeech_k02	Timeout interval for termination of the speech connection by the service center (after completion of the last report without having received a control tone)	4 s	0 s	15 s	1 s

Parameter ID	Parameter	Meaning	Default	Min	Max	Resolution
15	itisspeech_k03	Interval over which two sequential DTMF tones can be recognised as a sequence.	1 s	0 s	7 s	1 s
16	itisspeech_k04	Time between point of establishment of speech connection and begin of first Speech Report (salutation text)	10 s	0 s	63 s	1 s
17	itis_dtmf_next	DTMF command: Jump to the next Speech Report:	FFFF	BCD digits		16 bits
18	itis_dtmf_previous	DTMF command: Jump to the beginning of the previous Speech Report	FFFF	BCD digits		16 bits
19	itis_dtmf_repeat	DTMF command: Jump to the beginning of the current Speech Report	FFFF	BCD digits		16 bits
20	itis_dtmf_nth	Jump to the <i>n</i> th Speech Report. Here <i>n</i> is the index in the list of Speech Reports, which is equivalent to the sequence in the <i>TINFO Speech Message</i> .	FFFF	BCD digits		16 bits
21-63	reserved	reserved				

All parameter will be transmitted from the service center to the onboard unit as absolute values, without any scaling or offset. In the table the given scaling factors, min. and max. values might be used in the onboard unit for compressed data storage, since the parameter update will be carried out with fixed IE-lengths for each parameter. For details on parameter update, see CEN/TS 14821-5.

6.2.1.2 Service identification

The identification of the traffic information service and its sub-services (i. e. circle, road) is defined by the Application IDs that take the form of unique address identifications issued by the Service Centre for routing between the communication interface and the applications. These are transmitted in the Information Element *Application ID* in the transport layer.

The Application IDs are defined in CEN/TS 14821-2.

6.2.2 Procedures for Basic Traffic Information Services

The onboard unit sends a request message to the Service Centre and sets the expiration time for all stored Traffic Information Reports to the predefined time *itis_t112* to prevent them from being automatically deleted. The validity of traffic information reports containing a duration block is set to the time interval specified within this block (see 6.2.4.3).

After the request message has been received by the service centre, it summarises all Traffic Information Reports worthy of comment for the given selection criteria. The service centre matches the actual traffic situation to the known Traffic Information Reports reported by the onboard unit and generates Traffic Information Reports for new and amended traffic events. If stored Traffic Information Reports reported by the onboard unit do no longer exist, the service centre will advise the terminal to delete them from the memory.

It is not permissible to send any further request messages within the TINFO service to the Service Centre within the predefined time *itis_t109*. After receiving the first data telegram of a reply of the Service Centre there is a time-out of *itis_t113* for waiting to receive each further packet of the reply. If a complete message has been received it will be processed by the service module. If a time-out occurred and no reply has been received, the terminal shall indicate this to the user.

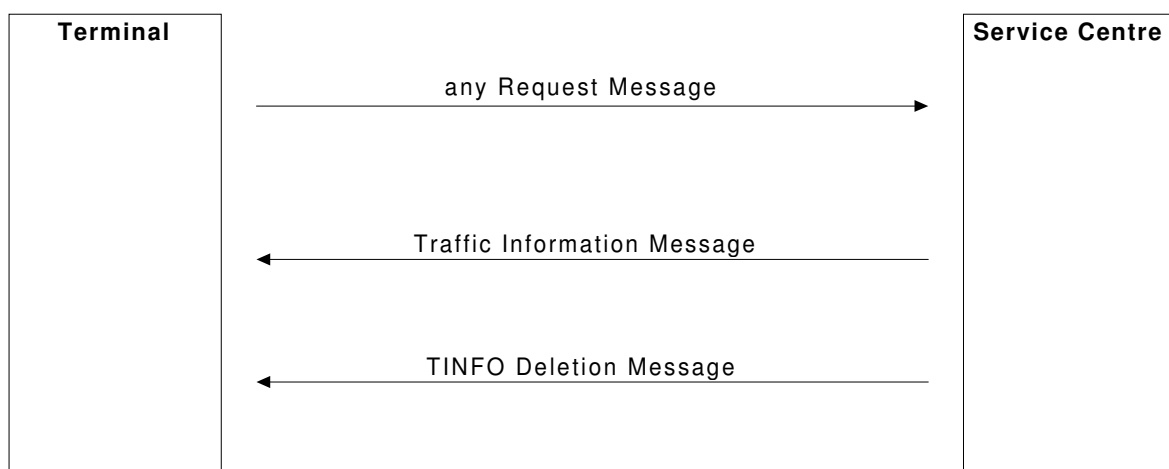
For presentation of Traffic Information Reports three output modes exist. The 0 to 6.2.2.3 explain the procedures in case new or changed Traffic Information Reports are available. If the traffic situation has not altered, the procedures are described in 6.2.2.4.

Request messages by the onboard unit may ask for a single reply or for automatic update. The procedures in update mode are described in 6.2.2.5. The procedures for download of Traffic Information Reports are identical in both cases.

6.2.2.1 Output Mode: Data

6.2.2.1.1 *Change in the traffic situation*

Transaction 6-1: any Request Message: IE *Output Mode=Data*



The onboard unit sends a request message to the Service Centre with Information Element *Output Mode = Data*.

The reply of the service center consists of a *Traffic Information Message* and/or a *TINFO Deletion Message*.

- The *Traffic Information Message* submits information on all new or amended traffic events selected by the filter criteria submitted within the request message.

All the Traffic Information Reports included shall be added to the onboard memory. The expiration time for all Traffic Information Reports in the onboard memory is reset according to the predefined time period *itis_t112* (see parameter definitions).

- The *TINFO Deletion Message* advises the terminal to delete all stored Traffic Information Reports, listed within this message. This comprises all events no longer present and all events that do not match the submitted filter criteria.

6.2.2.1.2 *Presentation of Traffic Information Reports*

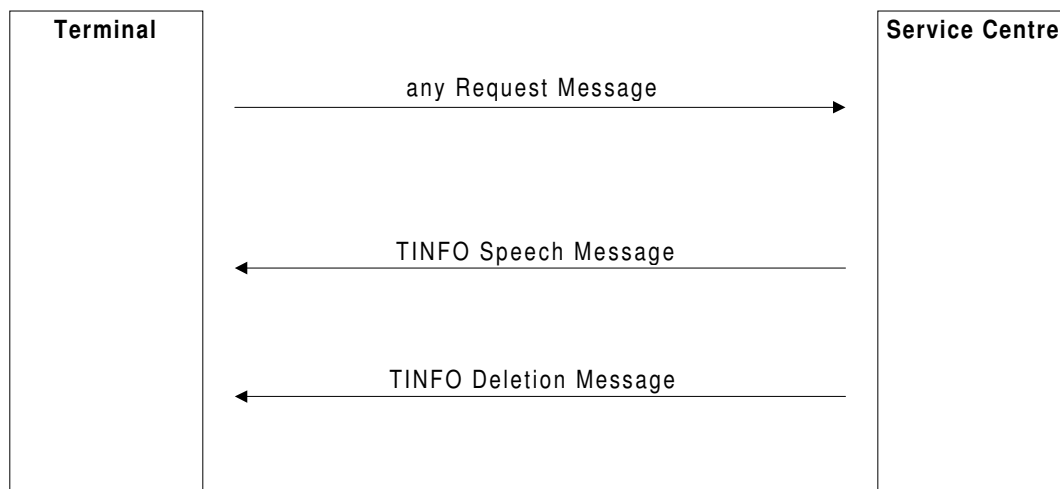
Depending on the MMI concept within the terminal it may be desirable to process all reported changes (i.e. possibly both *Traffic Information Message* and *TINFO Deletion Message*) before presentation. In this case the onboard unit waits at least for the time period *itis_t114* before presenting the current Traffic Information Reports. If the timer *itis_t114* is expired and no other reply is received by the onboard unit the currently stored Traffic Information Reports are displayed.

Despite this, Traffic Information Reports with highest priority 3 have to be displayed directly after the reception of the *Traffic Information Message*.

6.2.2.2 Output Mode: Voice

6.2.2.2.1 *Change in the traffic situation*

Transaction 6-2: any Request Message: IE *Output Mode* =Speech



The onboard unit sends a request message to the Service Centre with Information Element *Output Mode* = Speech.

The Service Centre replies with a *TINFO Speech Message*. All the Traffic Information Reports included in this message are available for a maximum of *itisspeech_k01* minutes in the Service Centre. The speech length of the sound files are submitted within the *TINFO Speech Message*.

The *TINFO Speech Message* is limited to 30 Traffic Information Reports if the same context number is used. This is due to the limitations of the transport protocol. If the service centre intends to submit more than 30 reports, it sends the *TINFO Speech Message* with another context number (as initiative message).

For output of the Speech Reports the terminal sets up a voice channel to the service center. Call address is the default TINFO calling number or, if present, by calling number given within the *TINFO Speech Message*.

The Speech Reports are output after the Speech Connection is established and the salutation text has been played. The length of the salutation text is given by the parameter *itisspeech_k04*.

The ordering of the sound files corresponds to the sequence in the *TINFO Speech Message*.

The speech system terminates the connection when the final Speech Report has been dealt with and the terminal has not sent a control tone within *itisspeech_k02* seconds, see below.

The deletion procedure for outdated or irrelevant traffic events via the *TINFO Deletion Message* is identical to the digital scenario described in 6.2.2.1.

Control of Voice Output

It is possible to control the voice output by sending DTMF tones while the speech connection exists. The following commands are supported, and for each command a sequence of DTMF tones is stored within the parameter list (see 6.2.1.1):

Table 6-1: DTMF Commands

Command	Parameter
Jump to the next Speech Report	itis_dtmf_next
Jump to the beginning of the previous Speech Report	itis_dtmf_previous
Jump to the beginning of the current Speech Report	itis_dtmf_repeat
Jump to the n th Speech Report. Here n is the index in the list of Speech Reports, which is equivalent to the sequence in the <i>TINFO Speech Message</i> . The first report gets the index 1.	itis_dtmf_nth

If the sound files do not exist or problems with the creation of the sound files occur, a Speech- Report with the length 0 will be sent.

Each DTMF sequence is stored as a sequence of BCD digits with a maximum of 4 tones. The 4 leading bits specify the first tone. In case the length of the sequence is less than 4 tones, hexadecimal F is used to indicate empty tones. Empty tones are submitted in least significant digits.

The mapping of BCD digits to DTMF tones is according to the following table:

BCD Digit	DTMF Tone
0 9	0 9
A	*
B	#
C	digit of n , identifying the index in the list of speech reports. The number of digits are indicated by repetition of C's (example: CC corresponds to DTMF sequence 01 ... 99)
F	Empty, (rest of sequence shall be ignored)

Example 1: DTMF sequence „#1“ is coded as B1FF.

Example 2: Jump to 15th report using the sequence „15“ is coded as CCFF

Example 3: Jump to 15th report using the sequence „#15“ is coded as BCCF

Note: A parameter setting of FFFF indicates that the command is not supported.

6.2.2.3 Output Mode: Voice and Data

6.2.2.3.1 *Change in the traffic situation*

Transaction 6-3: Request Message: IE *Output Mode* =Data and Speech



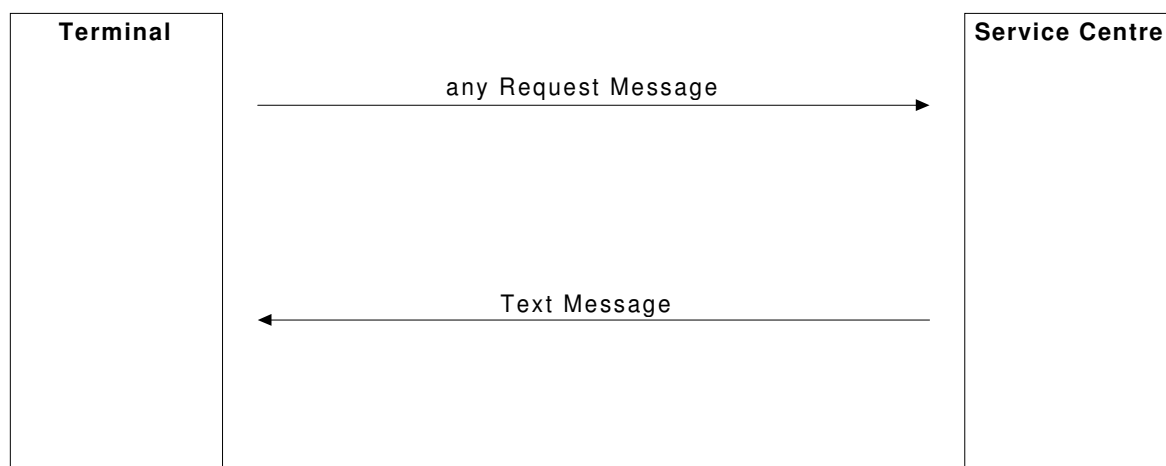
The onboard unit sends a request message to the Service Centre with Information Element *Output Mode* = Data and Speech. Both reply mechanisms for voice output and display are combined (see 6.2.2.1 and 6.2.2.2)

The update of the onboard memory is done using the digital reply (*Traffic Information Message* and/or *TINFO Deletion Message*).

The ordering of the sound files corresponds to the sequence in the *TINFO Speech Message*. Therefore the onboard unit is able to synchronise the voice and the data output by ordering the reports for display output as given in the sequence in the *TINFO Speech Message*.

6.2.2.4 No change in the traffic situation/no traffic news

Transaction 6-4: any Request Message: no change in the traffic situation/no traffic news



If there are no changes to the traffic situation or if there exist no traffic news in the selection area, the Service Centre sends a *Text Message* with the status set as *IE Status*.

Status	Operation	Meaning
0x03	Null operator	No Traffic News
0x04	Null operator	No change in traffic situation

If no change in the traffic situation is reported, the expiration times of all stored Traffic Information Reports are reset according to the predefined time interval *itis_t112* (see parameter definitions).

6.2.2.4.1 **Optional Repetition of Speech Output**

In case of speech output (an speech+data) the service center may send a *TINFO Speech Message* additionally to the *Text Message* to indicate the actual ordering of the Speech Reports. If submitted the user may listen to the sound files again.

6.2.2.5 **Update of Traffic Information**

6.2.2.5.1 **Periodical requests for traffic information by the onboard unit**

If the user has chosen the update mode, the onboard unit periodically transmits requests by the corresponding TINFO Request Message. The requests contains the current vehicle position as well as the current selection criteria of the user. The IE Request Mode is set to 0 (no automatic update, initiated by the Service Center). The Service Centre responds once to each request with the corresponding response message.

6.2.2.5.2 **Update Mode**

The update mode offers to the user to be informed immediately after arrival of prioritised traffic events in its selection area, initiated by the Service Centre.

The IE RequestMode in the corresponding request message is set to 1 (automatic update, initiated by the Service Center). The request is registered for a certain registration time in the Service Centre. In case of occurrence of a prioritised traffic event the Service Centre initially sends a response message with this Traffic Information Report to the onboard unit.

After the expiration of the registration time the request is deleted in the Service Centre.

The update mode can be combined with the periodical requests for traffic information (see 6.2.2.5.1). In this case the onboard unit periodically sends requests messages with IE Request Mode = 1. In addition to the transition of direct response messages the request is registered in the Service Centre and the user is informed about prioritised traffic events initiated by the Service Centre.

6.2.3 **General Request Parameters**

The individual Request Messages support some blocks that can be used by the terminal to control the reply format as well as the content requested. These blocks will be introduced briefly. TINFO Type 1 is mandatory, all other TINFO Types are optional.

- **Block: Output Format**
Controls how the Service Centre shall encode the Traffic Information Report (i.e. which codes shall be used) for digital replies.
- **Block: Output mode**
Controls which output mode (data, voice or voice + data) is requested (see 6.2.2). This implicitly determines the service procedures.
- **Block: Language**
It is possible to control the language of any text fields within the ADP message header. The IE Language within the request messages is left for compatibility reasons only it is overridden by the language field within the ADP message header.
- **Block: Street Selection Type**
In order to reduce the amount of Traffic Information Reports, the onboard unit can limit the road classes traffic information shall be transmitted for. The following types of road can be selected:
 - all streets (no restriction)
 - motorways
 - only federal and country roads
- **Block: Request Mode**
This block specifies whether the onboard unit requests an automatic update of traffic information, initiated by the service centre.
- **Block: Known Traffic Information (IE Number of TINFOs, TINFO Version x)**
This block forms a terminator for all Traffic Request Messages concerning the traffic situation. The block

includes the Traffic Information Reports known by the onboard unit, uniquely referenced by its *TINFO Version*.

6.2.4 Traffic Information Message

The *Traffic Information Message* describes all Traffic Information Reports (=events) worthy of comment within the requested selection area and in the broadcasting area.

Traffic Information Reports that are referred to in the following section, are encoded as *TINFO Type 1*.

6.2.4.1 Content

The basic idea behind the illustration of a traffic situation is to depict it through a number of Traffic Information Reports. A Traffic Information Report describes a traffic event or incident, its location and, optional, further information of the event like causes, hints, etc. The total set of Traffic Information Reports constitutes Traffic Information. In order to be able to manage this Traffic Information, three operations related to it are supported:

1. Addition,
2. Deletion,
3. Null Operator.

A number of examples should make it clear how these operations work and how one receives up to date Traffic Information as a result.

The Request Message for a traffic situation always consists of a geographical selected area for which a query is to be made concerning the traffic situation, and the current Traffic Information Reports that is known by the onboard unit.

Traffic Information Reports have a fixed structure. They first include the location description and event description, optionally followed by causes and hints. Optionally, this can be followed by a Bypass Recommendation which gives the vehicle driver an opportunity to bypass the hold-up, and optionally, the period of validity, meaning the expected duration of the hold-up.

Example 1:

A52

from Düsseldorf in the direction of Essen

between AS Essen-Bergerhausen and the motorway merging point Essen-Ost

25 km slow-moving traffic coming to a standstill due to the large amount of traffic.

Drivers familiar with the area are requested to follow the orange arrows after Essen Rüttenscheid.

Example 2:

A1

from Dortmund in the direction of Bremen

between AS Köln-Niehl and AS Köln Bocklemünd

3 km traffic jam due to construction work

The end of the traffic jam is on a bend.

Example 3:

In the Düsseldorf area

Fog with visibility less than 30 m

The structure described above is determined by the location block, event description (including events, causes and hints), Bypass Description and period of validity. The details of the blocks imply the sequence in which a Traffic Message is output. Each block is marked by attributes, which are described below.