

ETSI TS 122 001 V13.0.0 (2016-02)



TECHNICAL SPECIFICATION

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Principles of circuit telecommunication services supported by
a Public Land Mobile Network (PLMN)
(3GPP TS 22.001 version 13.0.0 Release 13)**

ETSI PREVIEW
https://standards.itsrc.org/standards/41093b5a-b325-4440-9346-392516847168/standards/41093b5a-b325-4440-9346-392516847168/v13.0.0-



Reference

RTS/TSGS-0122001vd00

Keywords

GSM,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	5
0 Scope	6
0.1 References	6
0.2 Abbreviations	6
1 Framework for the description of telecommunication services.....	7
1.1 The attribute method of characterization of circuit telecommunication services	7
2 Description of circuit telecommunication services by the attribute method	7
2.1 General	7
2.2 Categorisation of telecommunication services	7
3 Characterization of circuit telecommunication services.....	7
3.1 General	7
3.2 Bearer services	8
3.3 Teleservices	8
4 Provision of telecommunication services.....	8
4.1 Subscription checking for Basic Services	9
4.2 Subscription checking for Supplementary Services	10
Annex A (normative): List of definition of attributes and values used for bearer services.....	11
A.1 Information transfer attributes.....	11
A.1.1 Information transfer capability	11
A.1.2 Information transfer mode.....	11
A.1.3 Information transfer rate.....	11
A.1.4 Structure	11
A.1.5 Establishment of communication	12
A.1.6 Communication configuration.....	12
A.1.7 Symmetry	12
A.1.8 Data compression	13
A.2 Attributes describing the access at the user equipment	13
A.2.1 Signalling access	13
A.2.2 Information access.....	13
A.2.2.1 Rate	13
A.2.2.2 Interface	13
A.3 Interworking attribute.....	14
A.3.1 Type of terminating network.....	14
A.3.2 Terminal to terminating network interface	14
A.4 General attributes	14
A.4.1 Supplementary services provided.....	14
A.4.2 Quality of service	14
A.4.3 Commercial and operational.....	15
A.4.4 Service interworking	15
Annex B (normative): List of definitions of attributes and values used for teleservices	16
B.1 High layer attributes	16
B.1.1 Type of user information.....	16
B.1.2 Layer 4 protocol functions.....	16
B.1.3 Layer 5 protocol functions.....	16

B.1.4	Layer 6 protocol functions.....	16
B.1.5	Layer 7 protocol functions.....	16
B.2	Low layer attribute (bearer capabilities).....	16
B.3	General attributes	16
Annex C (normative): Definition of "busy" in a PLMN		17
C.1	Scope	17
C.2	Network Determined User Busy (NDUB) condition	17
C.3	User Determined User Busy (UDUB) condition.....	17
C.4	Mobile subscriber busy	17
Annex D (normative): Call set-up procedures.....		18
D.1	Scope	18
D.2	Mobile Originated Call Set-up	18
D.2.1	Called Party Address	18
D.2.2	Calling/Called Party Sub-address.....	18
D.2.3	Type of Number	18
D.2.4	Number Plan Indicator	18
D.2.5	Bearer Capability.....	19
D.2.6	Calling Line Indication Restriction Override	19
D.2.7	Action of the Network on Call Set-up.....	19
D.3	Mobile Terminated Call Set-up.....	19
D.3.1	Bearer Type	19
D.3.2	Response of the UE	20
D.3.3	Description of Call Re-establishment.....	20
Annex E (normative): Automatic calling repeat call attempt restrictions.....		21
Annex F(informative): Procedures for call progress indications.....		23
F.1	General	23
F.2	Supervisory tones	23
F.2.1	General	23
F.2.2	Method	23
F.2.3	Standard tones	23
F.2.4	Applicability.....	24
F.2.5	Comfort tones.....	24
F.3	Recorded announcements.....	25
F.4	Application of call control cause information elements to supervisory tones.....	26
Annex G (informative): Change history		27
History		28

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The present document defines the telecommunication services supported by a GSM PLMN within the digital cellular telecommunications system (Phase 2+).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/41c93b5a-b325-4440-9346-392e3fb84781/etsi-ts-122-001-v13.0.0-2016-02>

0 Scope

The present document covers the definition of the circuit telecommunication services supported by a PLMN. The purpose of the present document is to provide a method for the characterization and the description of these telecommunication services.

TS 22.101 describes overall service principles of a PLMN.

0.1 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] ITU-T Recommendation I.221: "Common specific characteristics of services".
- [3] ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic reference model: The basic model".
- [4] 3GPP TS 22.101: "Service Principles".
- [5] 3GPP TS 22.002: "Bearer services supported by a PLMN".
- [6] 3GPP TS 22.003: "Teleservices supported by a PLMN".
- [7] 3GPP TS 22.004: "General on Supplementary Services".
- [8] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [9] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User equipment (MS)".
- [10] 3GPP TS 22.081: "Line Identification Supplementary Services; Stage 1".
- [11] 3GPP TS 22.135: "Multicall; Stage 1".
- [12] 3GPP TS 24.008: " Mobile radio interface layer 3 specification".
- [13] 3GPP TS 22.011: "Service accessibility".
- [14] 3GPP TS 23.003: "Numbering, addressing and identification".

0.2 Abbreviations

Abbreviations used in the present document are listed in 3GPP TR 21.905 [1].

1 Framework for the description of telecommunication services

1.1 The attribute method of characterization of circuit telecommunication services

This characterization is made by using a set of attributes. A telecommunication service attribute is a specific characteristic of that service whose values distinguish it from other telecommunication services. Particular values are assigned to each attribute when a given telecommunication service is described and defined.

A list of definitions of attributes and values used for bearer services and teleservices is contained in, respectively, annex A and annex B.

2 Description of circuit telecommunication services by the attribute method

2.1 General

Telecommunication services are described by attributes which define service characteristics as they apply at a given reference point where the customer accesses the service. The description of a telecommunication service by the method of attributes is composed of:

- technical attributes as seen by the customer; and
- other attributes associated with the service provision, e.g. operational and commercial attributes.

2.2 Categorisation of telecommunication services

The concepts introduced in the present document are illustrated in table 1.

Table 1: Categorisation of telecommunication services

TELECOMMUNICATION SERVICES			
BEARER SERVICE		TELESERVICE	
Basic Bearer Service	Basic Bearer service + supplementary services	Basic Teleservice	Basic Teleservice + supplementary service

3 Characterization of circuit telecommunication services

3.1 General

A telecommunication service supported by a PLMN is characterized and described by service attributes.

There are two groups of service attributes applicable to user information flow:

- low layer attributes;
- high layer attributes.

Bearer services are characterized only by low layer attributes. Teleservices are characterized by both low layer attributes and high layer attributes.

The basic characteristics of a telecommunication service are described by the basic service attributes.

The additional characteristics associated with a supplementary service which modify or supplement a basic telecommunication service are described in Specification 3GPP TS 22.004 [7].

3.2 Bearer services

Bearer services are characterized by a set of low layer attributes in Specification 3GPP TS 22.002[5]. These attributes are classified into four categories:

- information transfer attributes;
- access attributes;
- interworking attributes;
- general attributes, including operational and commercial attributes.

The bearer capability defines the technical features of a bearer service as they appear to the user at the appropriate access point. For the time being, the bearer capability is characterized by information transfer, access and interworking attributes. A bearer capability is associated with every bearer service.

3.3 Teleservices

Circuit teleservices provide the full capacity for communication by means of terminals and network functions and possibly functions provided by dedicated centres.

Circuit teleservices are specified in 3GPP TS 22.003 [6]. Teleservices are characterized by a set of low layer attributes, a set of high layer attributes and operational and commercial attributes.

Low layer attributes are those used to characterize the bearer capability. High layer attributes are used in Specification 3GPP TS 22.003 [6] to describe high layer (i.e. layer 4-7) information transfer related characteristics. They refer to functions and protocols of layers 4-7 in the ITU-T Recommendation X.200 framework which are concerned with the transfer, storage and processing of user messages (provided by a subscriber's terminal, a retrieval centre or a network service centre).

Therefore, not all attributes can be applied directly at the user to terminal interface as they represent two kinds of features, the bearer capability and the terminal features, that are not directly perceived by the user.

4 Provision of telecommunication services

Specifications 3GPP TS 22.101[4] and 3GPP TS 22.011 [13] define some aspects of the provisions of telecommunication services by a 3GPP system.

The provision of telecommunication services implies:

- subscription of basic services and possibly subscription to supplementary services;
- registration into a service directory;
- compatibility between terminals;
- interworking capabilities (see 3GPP TS 29 series of specifications).

The user's subscription to a Basic or Supplementary service is normally verified by the network prior to completion of Call Establishment and/or Supplementary Service operation. This subscription checking shall be performed in accordance with the following subclauses.

4.1 Subscription checking for Basic Services

General

Subscription checking is the function/process to ascertain whether a subscriber has the authorization to use the particular Basic Service deduced from the call set-up parameters. It is the responsibility of the HPLMN to transfer, to the VPLMN, only the subscription data corresponding to those services a given subscriber is entitled to use in that VPLMN.

For mobile originated calls, subscription checking is performed in the VLR, whilst for mobile terminated calls it is performed in either the HLR or the VLR (determined as described below). The prerequisite for executing the subscription check is a successful deduction of a Basic Service from the Compatibility Information contained in the call set up, i.e. Bearer Capability Information Element and, in some cases, also the Low Layer and High Layer Compatibility Information elements.

For mobile originated calls an UE shall indicate the requested service by appropriate compatibility information elements according to 3GPP TS 27.001 [8]. This information is mapped to an individual Basic Service code (i.e. the MAP representation) by the MSC in order to be compared with the subscriber data available in the VLR.

An equivalent process is required in the HLR for mobile terminated calls, where the caller's requested service is indicated to the HLR (by the ISDN) by exhaustive compatibility information consisting of ISDN Bearer Capability Information Elements and in some cases - depending on the service requested - also of Low Layer and High layer Compatibility information elements. In case the compatibility information is not exhaustive, e.g. when the call is originated/transited by a PSTN, no Basic Service can be deduced and subscription checking cannot be performed in the "normal" way. Instead, rules for the Single and Multi Numbering Schemes apply.

In the Multi Numbering Scheme the Basic Service can be deduced by information stored in the HLR against the called number and hence an implicit subscription check is performed. In the Single Numbering Scheme, the Basic Service cannot be deduced until the UE has responded to the set up and therefore the HLR cannot perform subscription check. Instead, the VLR/MSC will perform the subscription check or calls are passed "unfiltered" (as regards subscription check), at the network operators' discretion.

Bearer Services

3GPP TS 22.002 [5] lists the Bearer Services, each of them with a specific "BS number". Single services defined independent of the fixed network user rate are called General Bearer Services. These distinct [numbered] services may individually be provided to a subscriber. Whichever the subscription arrangements are, all PLMNs (MSCs, VLRs and HLRs) shall be able to allow - as regards subscription checking - the use of individually subscribed-to Basic Services, within the range of services supported by the PLMN. That is, whenever it is possible to deduce the Basic Service from a call set up, subscription check shall be performed at the granularity of that particular Basic Service or the group to which it belongs.

TeleServices

3GPP TS 22.003 [6] lists the TeleServices, each of them with a specific "TS number". These may be provided to subscribers individually or combined, to the operators' discretion, however TS 12 (Emergency calls) and TS 23 (CBS) are not subscribable. But, as for Bearer Services, networks shall be able to handle subscription checking at the granularity of individual TeleServices.

Table 2 summarizes the basis on which a successful subscription checking will result. It also describes on which basis Supplementary Service handling for a given call set-up should be performed.