

# ETSI TS 123 202 V17.0.0 (2022-04)



**Digital cellular telecommunications system (Phase 2+) (GSM);  
Universal Mobile Telecommunications System (UMTS);  
Circuit switched data bearer services  
(3GPP TS 23.202 version 17.0.0 Release 17)**



---

**Reference**

RTS/TSGC-0323202vh00

---

**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 - APE 7112B  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° w061004871

---

**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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format at [www.etsi.org/deliver](http://www.etsi.org/deliver).

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

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

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>

If you find a security vulnerability in the present document, please report it through our  
Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

---

**Notice of disclaimer & limitation of liability**

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

---

**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.

© ETSI 2022.  
All rights reserved.

---

## Intellectual Property Rights

### Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are 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 Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, 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.

### Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

---

## Legal Notice

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. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 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
Legal Notice .....	2
Modal verbs terminology.....	2
Foreword.....	4
1 Scope .....	5
2 References .....	5
3 Definitions and abbreviations.....	6
3.1 Definitions .....	6
3.2 Abbreviations .....	6
4 General .....	6
4.1 Limited set of UTRAN Iu mode PLMN connection models.....	7
4.1.1 Transparent data.....	7
4.1.2 Non-transparent data.....	9
4.2 Limited set of GERAN Iu mode PLMN connection models.....	9
4.2.1 Transparent data.....	9
4.2.2 Non-transparent data.....	11
5 Bearer Capabilities for UMTS Data Services .....	11
5.1 Bearer Capabilities for UMTS Data Services.....	12
5.1.1 Transparent Data.....	12
5.1.2 Non-Transparent Fax .....	12
5.1.3 NT Data .....	12
5.1.4 Transparent Data for Support of Multimedia.....	12
5.2 BC-IE to RAB QoS Mapping.....	13
6 Iu and Nb User Plane.....	14
6.1 NT services.....	14
6.2 T services.....	14
7 RLC .....	14
8 Initial Synchronisation and resynchronisation .....	14
9 Call Control.....	14
10 Handover Issues .....	14
10.1 Signalling issues.....	14
10.2 User Plane .....	14
<b>Annex A (informative): Change history .....</b>	<b>15</b>
History .....	16

---

# Foreword

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

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.

---

# 1 Scope

The present document provides an overview of the architecture and issues related to the provision of Circuit Switched Bearer Services in a 3G mobile network (UMTS) operating in UTRAN or GERAN Iu mode. Handover to GERAN A/Gb mode is also considered.

NOTE: The Gb interface does not play any role in the scope of the present document although the term "A/Gb mode" is used.

---

# 2 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 TS 22.001: "Principles of circuit telecommunication services supported by a PLMN".
- [2] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [3] 3GPP TS 22.003: "Circuit Teleservices supported by a PLMN".
- [4] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [5] 3GPP TS 22.101: "Service principles".
- [6] 3GPP TS 22.105: "Services and service capabilities".
- [7] 3GPP TS 23.002: "Network architecture".
- [8] 3GPP TS 23.034: "High Speed Circuit Switched Data (HSCSD) -Stage 2".
- [9] 3GPP TS 23.101: "General UMTS architecture".
- [10] 3GPP TS 23.107: "Quality of Service (QoS), concept and architecture".
- [11] 3GPP TS 24.022: "Radio Link Protocol (RLP) for circuit switched bearer and teleservices".
- [12] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".
- [13] 3GPP TS 25.415: "UTRAN Iu Interface user plane protocols".
- [14] 3GPP TS 27.001: "General on Terminal Adaption Functions (TAF) for Mobile Station (MS)".
- [15] 3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [16] ITU-T Recommendation V.90 (09/98): "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".
- [17] ITU-T Recommendation T.30 "Procedures for document facsimile transmission in the general switched telephone network".
- [18] 3GPP TS 44.021: "Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".
- [19] 3GPP TS 48.020: "Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

- [20] ITU-T Recommendation I.366.1 (06/98): "Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2".
- [21] ITU-T Recommendation Q.2630.1 (12/99): "AAL type 2 signalling protocol (Capability Set 1)".
- [22] 3GPP TS 43.051: "GSM/EDGE Radio Access Network (GERAN) overall description, stage 2"
- [23] 3GPP TS 43.010: "GSM Public Land Mobile Network (PLMN) connection types"
- [24] 3GPP TS 29.415: "Core Network Nb Interface User Plane Protocols".
- [25] ITU-T Recommendation I.363.2: "B-ISDN ATM Adaptation Layer specification : Type 2 AAL".
- [26] ITU-T Recommendation I.460 (02/99): "Multiplexing, rate adaption and support of existing interfaces".
- [27] ITU-T Recommendation I.366.2: "AAL type 2 service specific convergence sublayer for narrow-band services".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

The term 'Mobile Station' (MS) in the present document is synonymous with the term 'User Equipment' (UE ) as defined in 3GPP TR 21.905 [2].

For the purposes of the present document the following terms and definitions given in 3GPP TS 21.905 [2] and the following apply:

**A/Gb mode:** indicates that the text applies only to a system or sub-system which operate in A/Gb mode of operation, i.e. with a functional division that is in accordance with the use of an A or a Gb interface between the radio access network and the core network

**Iu mode:** indicates that the text applies only to a system or a sub-system which operates in Iu mode of operation, i.e. with a functional division that is in accordance with the use of an Iu-CS or Iu-PS interface between the radio access network and the core network

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TS 21.905 [2] and the following apply.

BC	Bearer Capability
CE	Connection Element
CT	Circuit
GBR	Guaranteed Bitrate
MBR	Maximum Bitrate
RA	Rate Adaptation Functions
RNL	Radio Network Layer
S/C	Split/Combine Function
WAIUR	Wanted Air Interface User Rate

---

## 4 General

CS data services in UMTS are divided according to 3GPP TS 22.001 [1] into Bearer Services (3GPP TS 22.002 [4]) and end-to-end Teleservices (3GPP TS 22.003 [3]). These services are built on services provided by the Access Network. The Radio Access Bearer Services are invoked through the RNL-SAP provided by the Iu User Plane to the Non-access

stratum on the Core Network side, and the corresponding SAP provided by the RLC to the Non-access stratum on the Terminal side. Figure 1 shows the service architecture.

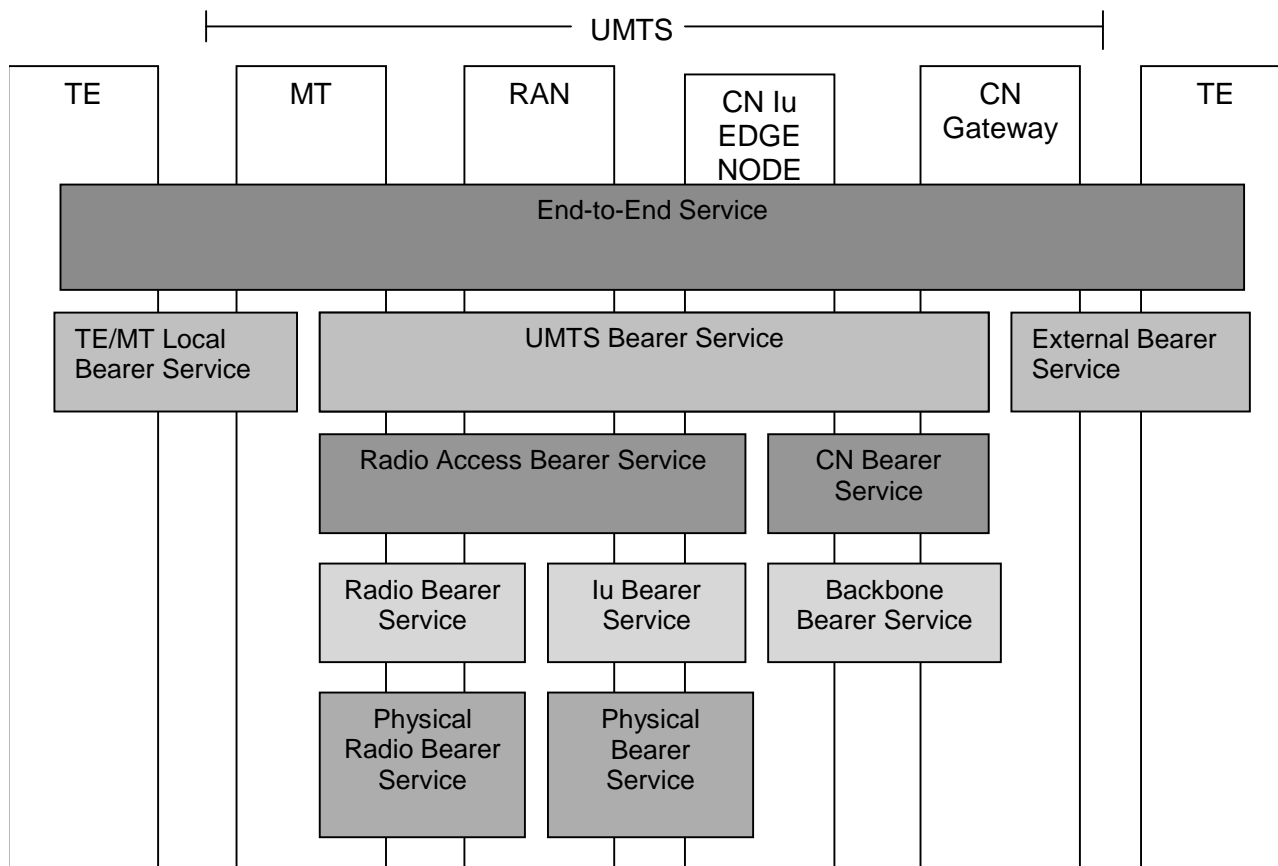


Figure 1: Service architecture

## 4.1 Limited set of UTRAN Iu mode PLMN connection models

### 4.1.1 Transparent data

Figure 2 shows the connection model for synchronous transparent CS data. In general all the user data bits are conveyed between the MT and the IWF as they are received from the TE. This implies that the RLC SDU/ Iu UP frame is transparent.

Figure 3 shows the connection model for asynchronous transparent CS data. The rate adaptation function RA0 from 3GPP TS 44.021 [18] (adapted to the RLC SDU size) is used for converting between asynchronous data and a synchronous bit stream. End-to-end flow control is not applicable in UTRAN Iu mode, thus no status bits are conveyed over RAN/UTRAN (see 3GPP TS 27.001 [14]).



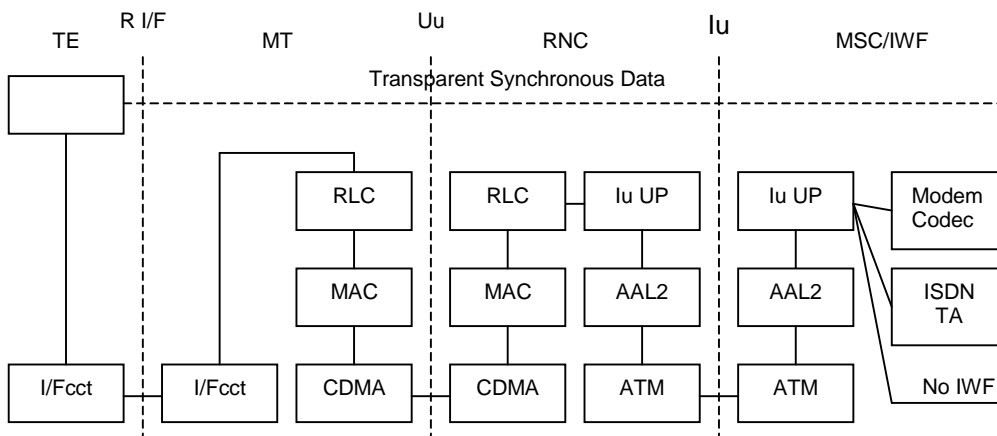


Figure 2: Connection model for Synchronous T CS data

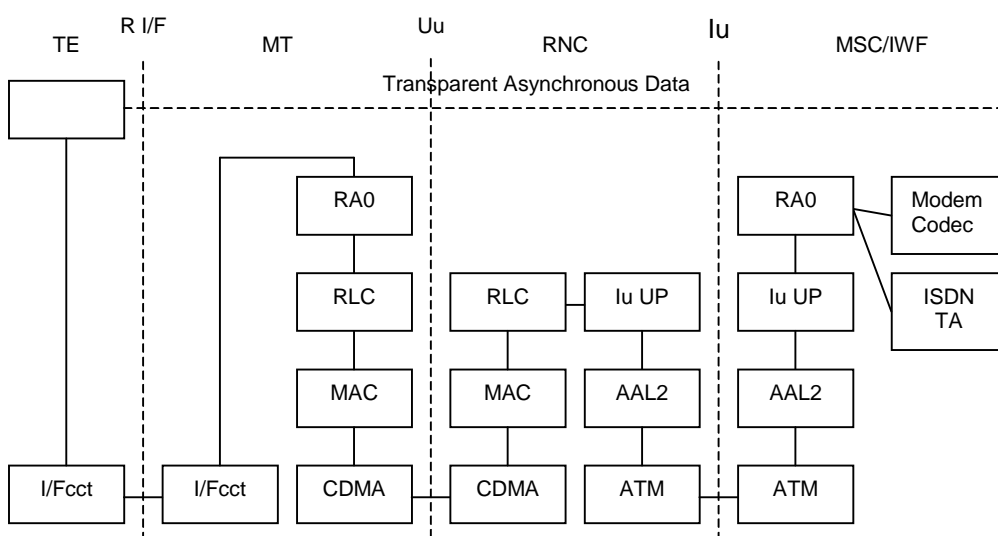


Figure 3: Connection model for Asynchronous T CS data

### 4.1.2 Non-transparent data

Figure 4 shows the connection model for asynchronous non-transparent CS data.

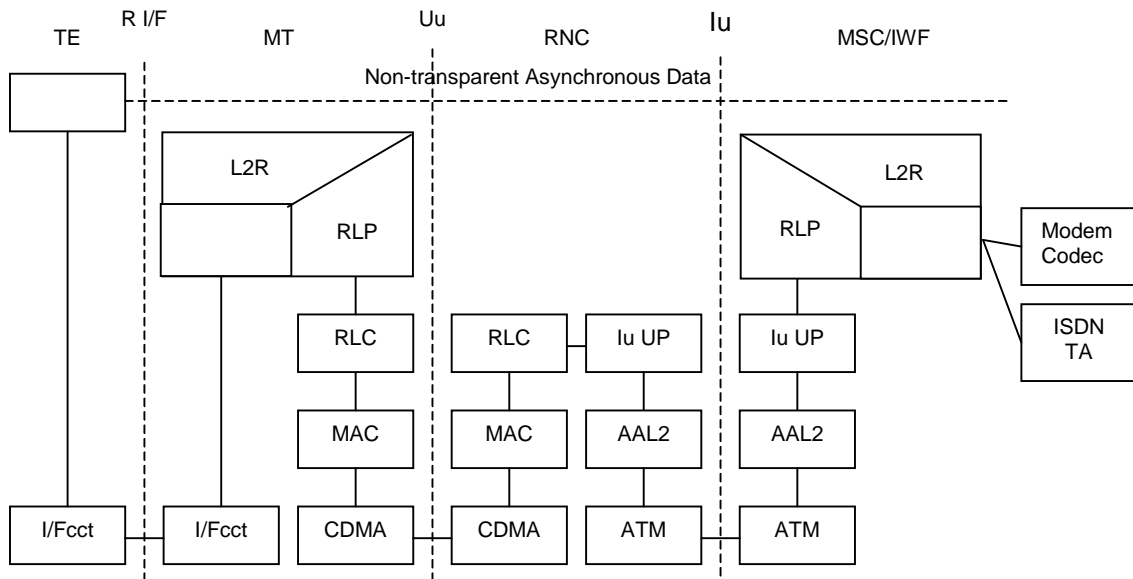


Figure 4: Connection model for Asynchronous NT CS data

## 4.2 Limited set of GERAN Iu mode PLMN connection models

This subclause gives an overall overview on the PLMN connection models for circuit switched data services in GERAN Iu mode. The stage 2 description is given in 3GPP TS 43.051 [22]. For details concerning the PLMN connection models refer to 3GPP TS 43.010 [23].

### 4.2.1 Transparent data

Figure 5 shows the connection model for synchronous transparent CS data. In general all the user data bits are conveyed between the MT and the IWF as they are received from the TE. This implies that the RLC SDU/ Iu UP frame is transparent.

Figure 6 shows the connection model for asynchronous transparent CS data. The rate adaptation function RA0 from 3GPP TS 44.021 [18] (adapted to the RLC SDU size) is used for converting between asynchronous data and a synchronous bit stream. End-to-end flow control is not applicable in GERAN Iu mode, thus no status bits are conveyed over RAN/GERAN (see 3GPP TS 27.001 [14]).

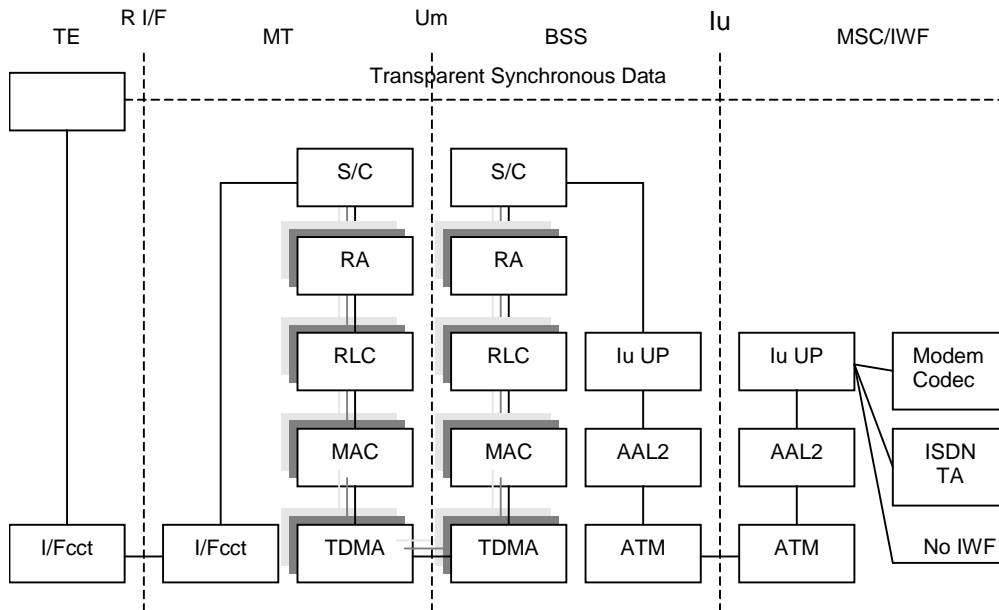


Figure 5: Connection model for Synchronous T CS data

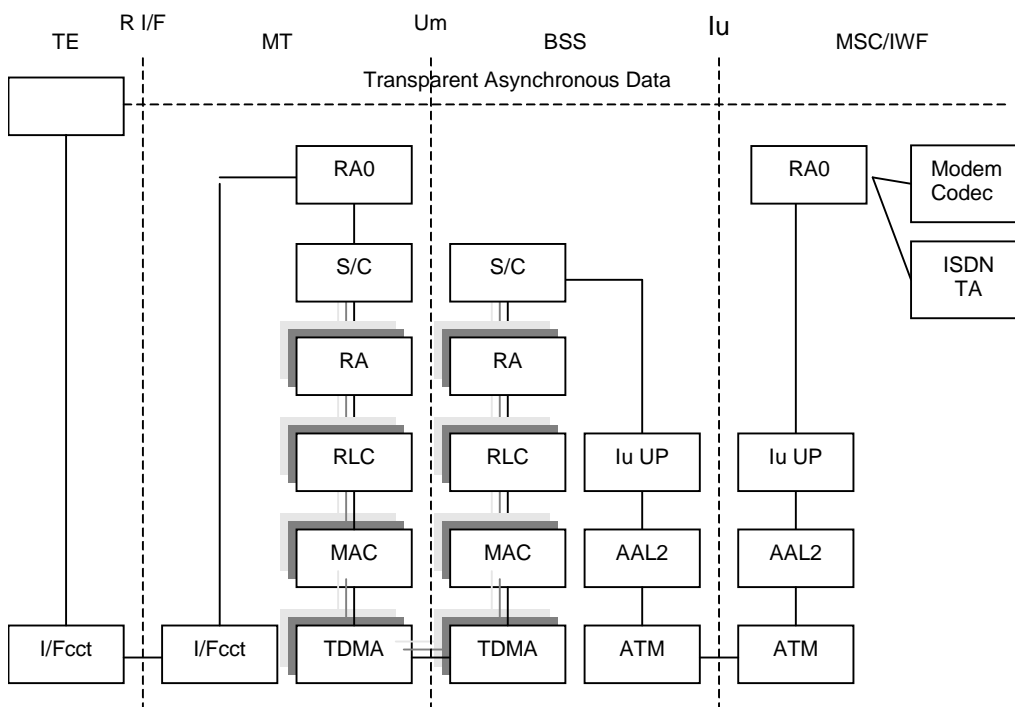


Figure 6: Connection model for Asynchronous T CS data

## 4.2.2 Non-transparent data

Figure 7 shows the connection model for asynchronous non-transparent CS data.

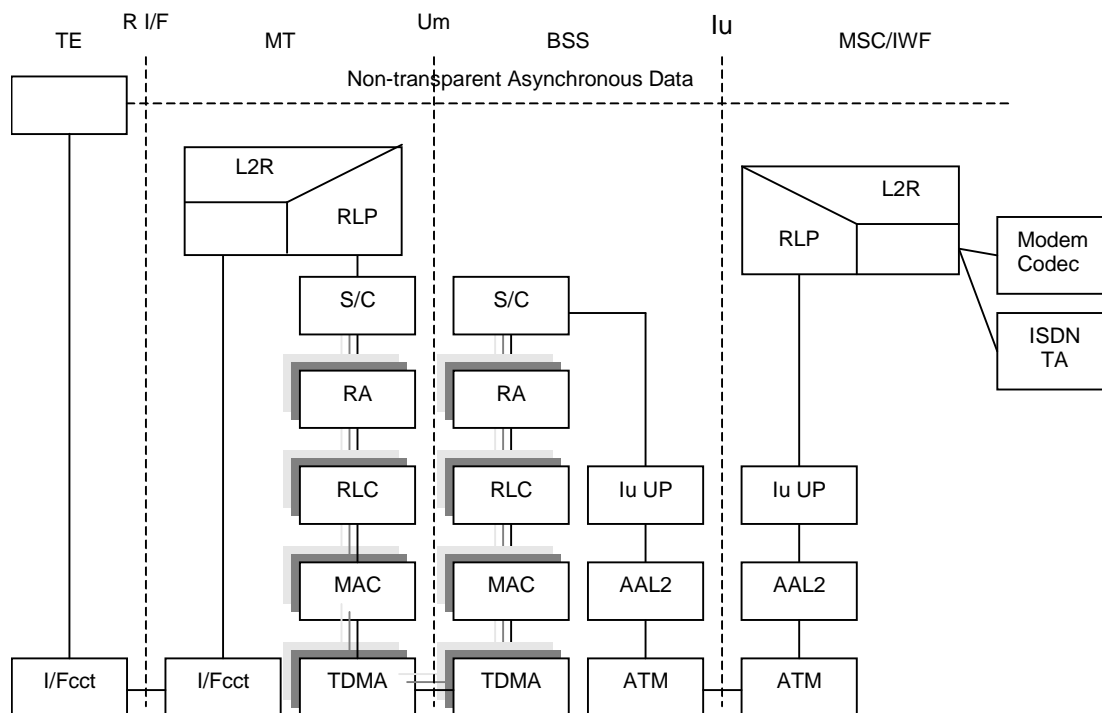


Figure 7: Connection model for Asynchronous NT CS data

## 5 Bearer Capabilities for UMTS Data Services

The UMTS bearer services are described by the PLMN BC-IE. Five services (or services categories) are currently distinguishable from the PLMN BC-IE in UTRAN Iu mode:

- Speech.
- Transparent Data for support of Multimedia.
- Transparent Data.
- Non-transparent Fax.
- Non-transparent data.

Four services (or services categories) are currently distinguishable from the PLMN BC-IE in GERAN Iu mode:

- Speech.
- Transparent Data for support of Multimedia.
- Transparent Data.
- Non-transparent data.

Speech is currently not in the scope of the present document.

Each UMTS bearer service is supported by a Radio Access Bearers (RAB). The RABs in turn are described by the QoS parameters. There may be one or several RAB candidates for supporting a UMTS bearer service. The possible candidates are described by a mapping of the BC-IE to RAB QoS described in subclause 5.2.

## 5.1 Bearer Capabilities for UMTS Data Services

### 5.1.1 Transparent Data

This service is distinguished by the following BC-IE parameters:

- ITC = UDI or 3.1 kHz audio or Other ITC = RDI.
- CE = transparent.

For this service the FNUR at the setup is restricted to:

- 64 kbit/s, in case ITC = UDI.
- 56 kbit/s in case ITC = UDI or Other ITC = RDI.
- 28,8 kbit/s, in case ITC = 3,1 kHz audio.

NOTE: ITU-T Recommendation V.90 [16] is not supported in transparent mode, because asymmetric user rates are not supported in transparent mode.

### 5.1.2 Non-Transparent Fax

This service is only applicable for UTRAN Iu mode. It is distinguished by the following BC-IE parameters:

- ITC = Fax Group 3 (ITU-T Recommendation T.30 [17]).
- CE = non-transparent.

WAIUR shall not be more than 28.8 kbit/s. The possible AIURs are limited to 14,4 kbit/s and 28,8 kbit/s.

### 5.1.3 NT Data

This service is distinguished by the following BC-IE parameters:

- ITC = UDI or 3.1 kHz audio or Other ITC = RDI.
- CE = non-transparent.

The possible AIURs in UTRAN Iu mode are limited to 14,4 kbit/s, 28,8 kbit/s and 57,6 kbit/s. For GERAN Iu mode the following AIURs are possible: 9,6 kbit/s, 14,4 kbit/s, 19,2 kbit/s, 28,8 kbit/s, 38,4 kbit/s, 43,2 kbit/s and 57,6 kbit/s.

### 5.1.4 Transparent Data for Support of Multimedia

This service is distinguished by the following BC-IE parameters:

- ITC = UDI or 3.1 kHz audio or Other ITC = RDI.
- CE = transparent.
- Other rate adaptation = H.223 and H.245.

For this service the FNUR at the setup is restricted to:

- 64 kbit/s, in case ITC = UDI.
- 56 kbit/s in case Other ITC = RDI.
- 33,6 kbit/s, in case ITC = 3,1 kHz audio.
- 32 kbit/s, in case ITC = UDI.
- 28,8 kbit/s, in case ITC = 3,1 kHz audio.

NOTE: Transmission rates 31.2 kbit/s and 28.8 kbit/s negotiated by the modems in a 3.1 kHz multimedia call may be used with a rate adaptation to 33.6 kbit/s between the UE and the IWF (see 3GPP TS 27.001 [14] and 3GPP TS 29.007 [15]). The negotiated values shall be provided by the MSC by way of a MODIFY message.

## 5.2 BC-IE to RAB QoS Mapping

Since UMTS bearer services are described by BC-IEs and RABs by QoS parameters, a mapping between the UMTS bearer services and the possible RABs that support them has to be specified. The QoS mapping is based on 3GPP TS 23.107 [10] and is specified in detail in 3GPP TS 27.001[14], annex B, subclause B.1.13.

---

## 6 Iu and Nb User Plane

### 6.1 NT services

The Iu and NB User Plane for NT services is described in Clause 11a.2 of 3GPP TS 29.007 [15].

### 6.2 T services

The Iu and NB User Plane for T services is described in Clause 11a.3 of 3GPP TS 29.007 [15].

---

## 7 RLC

The RLC shall be used in transparent mode for T and NT services.

---

## 8 Initial Synchronisation and resynchronisation

The initial synchronisation and actions on loss of synchronisation are specified in 3GPP TS 27.001 [14] and 3GPP TS 29.007 [15].

---

## 9 Call Control

BC-IE negotiation procedures and mapping to ISDN are specified in 3GPP TS 27.001 [14] and 3GPP TS 29.007 [15]. BC-IE parameter values shall be restricted as indicated in subclause 5.1. See also 3GPP TS 27.001 [14], annex B, table B.5a for further details on the validity of parameter values in A/Gb mode and Iu mode.

---

## 10 Handover Issues

### 10.1 Signalling issues

The handling of signalling during handover is described in Clause 11.0 of 3GPP TS 29.007 [15].

### 10.2 User Plane

The handling of the user plane during handover is described in clause 11 of 3GPP TS 29.007 [15].

## Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
12-2004	CN#26	NP-040607			"Technical Report" changed to "Technical Specification" in the foreword	1.0.1	6.0.0
03-2005	CN#27	NP-050110	1		References for Iu and Nb User Plane	6.0.0	6.1.0
06-2007	CT#36				Upgraded to Release 7	6.1.0	7.0.0
12-2008	CT#42				Upgraded to v8.0.0 due to simple upgrade without no technical change	7.0.0	8.0.0
12-2009	CT#46				Automatic upgrade from previous Release	8.0.0	9.0.0
09-2010	CT#49	CP-100549	2	1	Correcting unspecific external reference	9.0.0	9.1.0
03-2011	CT#51				Automatic upgrade from previous Release version 9.1.0	9.1.0	10.0.0
03-2011	CT#51				Correction of heading and numbering made by MCC	10.0.0	10.0.1
09-2012	CT#57				Automatic upgrade from previous Release version 10.0.1	10.0.1	11.0.0
10-2014					Automatic upgrade from previous Release	11.0.0	12.0.0
12-2015					Automatic upgrade from previous Release	12.0.0	13.0.0
Change history							
Date	TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	New
2017-03	CT#75					Automatic upgrade from previous Release	14.0.0
2018-06	-	-	-	-		Update to Rel-15 version (MCC)	15.0.0
2020-06	CT#88e					Update to Rel-16 version (MCC)	16.0.0
2022-03	SA#95e	-	-	-		Update to Rel-17 version (MCC)	17.0.0



---

# History

<b>Document history</b>		
V17.0.0	April 2022	Publication