

# ETSI TS 123 053 V14.0.0 (2017-04)



**Digital cellular telecommunications system (Phase 2+) (GSM);  
Universal Mobile Telecommunications System (UMTS);  
Tandem Free Operation (TFO);  
Service description;  
Stage 2  
(3GPP TS 23.053 version 14.0.0 Release 14)**



---

Reference

RTS/TSGS-0423053ve00

---

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  
<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/CommiteeSupportStaff.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 2017.  
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 the ETSI 3<sup>rd</sup> 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.....	4
1 Scope .....	5
2 References .....	5
3 Definitions and abbreviations.....	6
3.1 Definitions .....	6
3.2 Abbreviations .....	6
4 Main Concepts.....	6
5 TFO Architecture and Transmission Mechanism.....	6
5.1 TFO Access Interfaces and Reference Points.....	6
5.2 General In-band Transmission Mechanism for TFO.....	7
5.3 High-Level Functions Required for TFO .....	7
6 Model of operation .....	8
6.1 Overview .....	8
6.2 TFO establishment phase .....	8
6.2.1 Sending of TFO_REQ message by a BSS .....	8
6.2.2 Monitoring of TFO_REQ by a BSS.....	9
6.3 Transparency of transmission equipments .....	9
6.3.1 Local disabling.....	9
6.3.2 Transparency to TFO negotiation messages .....	9
6.3.3 Transparency to TFO speech frames .....	9
6.4 Modification of speech codec.....	10
6.4.1 Introduction.....	10
6.4.2 Exchanged parameters .....	10
6.4.3 Change of speech codec configuration in the BSS .....	10
6.5 TFO operation .....	10
6.5.1 End to end delay .....	10
6.5.2 Synchronisation between TRAUs.....	10
6.5.3 Monitoring in TFO operation.....	11
6.5.4 DTX aspects.....	11
6.5.5 Error concealment.....	11
6.5.6 Management of UFE bit .....	11
6.5.7 Handover management .....	11
6.5.8 Other issues.....	12
7 Compatibility Issues .....	12
8 Interactions with Other Services .....	12
8.1 General .....	12
8.2 Support of DTMF.....	13
9 Operational Aspects .....	13
<b>Annex A (informative): Change history .....</b>	<b>14</b>
History .....	15

---

# Foreword

This Technical Specification (TS) has been produced by ETSI 3rd 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 defines the stage 2 service description for Tandem Free Operation (TFO) in and between GSM and UMTS. Tandem Free Operation applies only to speech calls.

NOTE: The TFO principles are built so that they could be used as well by other systems other than GSM and UMTS.

In analogy with ITU-T Recommendations I.130 [2] and with reference to ITU-T Recommendations Q.65 VI.1 (Stage 2 of the method for the characterisation of services supported by an ISDN), the second stage of the following three-level structure is derived from a stage 1 service description.

- Stage 1 is an overall service description, from the service subscriber's and user's standpoints, that views the network as a single entity which provides services to the user.
- Stage 2 identifies the functional capabilities and information flows needed to support the service described in stage 1. Furthermore, it identifies various possible physical locations for the functional capabilities. The output of Stage 2, which is signalling system independent, is used as an input to Stage 3, the design of signalling system and switching Recommendations.
- Stage 3 defines the signalling system protocols and switching functions needed to implement the service described in stage 2.

---

# 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 TR 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] ITU-T Recommendations I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [3] 3GPP TS 22.053: "Tandem Free Operation (TFO); Service Description - Stage 1".
- [4] 3GPP TS 48.060: "Digital cellular telecommunications system (Phase 2+); In-band control of remote transcoders and rate adaptors for full rate traffic channels".
- [5] 3GPP TS 48.061: "Digital cellular telecommunications system (Phase 2+); In-band control of remote transcoders and rate adaptors for half rate traffic channels".