

# 3G TS 26.115 V0.0.1 (2000-01)

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*Technical Specification*

**3rd Generation Partnership Project;  
TSG-SA Codec Working Group;  
Transmission Delay and Echo Control Planning For Speech  
and Multi-Media Services.  
(3G TS 26.115 version 0.0.1)**



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Reference

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## Foreword

This Technical Specification has been produced by the 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 this TS, 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 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 specification;

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## Introduction

The present document specifies minimum performance requirements for the transmission planning aspects of 3G speech and multi-media services.

The objective is to reach a quality as close as possible to ITU-T standards for PSTN circuits. However, due to technical and economic factors, there cannot be full compliance with the general characteristics of international telephone connections and circuits recommended by the ITU-T.

The performance requirements are specified the main body of the text; the test methods and considerations are described in [tbd].

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## 1 Scope

The present document specifies minimum performance requirements for the transmission delay and echo planning of 3G speech and multi-media services. The present document is applicable to any speech telephony or multimedia service.

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## 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-T Recommendation G.114 (1998): "Delay".

[2] ITU-T Recommendation G.168 (1998): "Echo Cancellers".

[3] ITU-T Recommendation G.131 (1998): "Echo".

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## 3 Definitions, symbols and abbreviations

### Abbreviations

For the purposes of the present document, the following abbreviations apply:

|      |                                      |
|------|--------------------------------------|
| ADC  | Analogue to Digital Converter        |
| DAC  | Digital to Analogue Converter        |
| DAI  | Digital Audio Interface              |
| DTX  | Discontinuous Transmission           |
| EC   | Echo Cancellor                       |
| ERL  | Echo Return Loss                     |
| ERLE | Echo Return Loss Enhancement         |
| EEC  | Electrical Echo Control              |
| EL   | Echo Loss                            |
| PCM  | Pulse Code Modulation                |
| POI  | Point of Interconnection (with PSTN) |
| PSTN | Public Switched Telephone Network    |

|       |                              |
|-------|------------------------------|
| TCL   | Terminal Coupling Loss       |
| TX    | Transmission                 |
| UPCMI | 13-bit Uniform PCM Interface |



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## 4 Interfaces

The interfaces required to define the delay budget from the terminal acoustic interface to the POI for narrowband telephony are shown in figure 1. These are the air interface, the point of interconnect (POI), and a 13-bit uniform PCM interface (UPCMI). Other reference interfaces exist in the 3G system. These include the lu, lur and lub interfaces.

The Air Interface is specified by the 3G 25 series specifications and is required to achieve UE transportability. Analogue measurements can be made at this point using a system simulator (SS) comprising the appropriate radio terminal equipment and speech transcoder. The losses and gains introduced by the test speech transcoder will need to be specified.

The POI with the public switched telephone network (PSTN) will generally be at the 2 048 kbits/ level at an interface in accordance with ITU-T Recommendation G.703/G.704 or STM1 155Mbit/s. At this point, which is considered to have a relative level of 0 dBr, the analogue signals will be represented by 8-bit A-law, according to ITU-T Recommendation G.711. Analogue measurements may be made at this point using a standard send and receive side, as defined in ITU-T Recommendations.

The UPCMI is introduced for design purposes in order to separate the speech transcoder impairments from the basic audio impairments of the UE. The UPCMI interface is also referred to as the digital audio interface (DAI).

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## 5 Transmission Plan,

### 5.1 Delay Budget

#### 5.1.1 General

An international connection involving a 3G network and the PSTN should meet the overall delay limit in ITU-T Recommendation G.114.

***Note : The actual delay budget from the UE through the UTRAN and on through the core network require input from 3GPP TSG RAN , CN and SA2. Until this information is provided this section is for further study.***

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## 6 Narrow Band Speech Telephony Network Echo Control

### 6.1 GSTN Network Echo Cancellation.

Narrow band speech calls from the 3G mobile system to the public GSTN are terminated on local switch line cards where two to four wire conversion takes place. The hybrid used to carry out this function is never perfect and echo is generated which degrades the speech call quality for the 3G mobile user. To overcome this situation an echo cancellation device should be used at the gateway from the 3G mobile network to the GSTN. This echo control device shall conform to ITU-T G.168.

### 6.2 Acoustic Echo Control

Narrow band speech calls from the 3G mobile network to the public GSTN involve a high delay. The only echo path that is audible to the GSTN user is the acoustic echo path in the UE. To overcome this echo, and acoustic echo loss or Terminal Coupling Loss (TCL) of 46dB should be achieved by the terminal. This provides adequate echo protection for calls up to a delay of 300ms as defined by ITU-T Recommendation G.131.

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## History

| Document history |              |               |
|------------------|--------------|---------------|
| 0.0.1            | January 2000 | Initial draft |
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