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**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Terminal Equipment to User Equipment (TE-UE)
multiplexer protocol
(3GPP TS 27.010 version 13.0.0 Release 13)**

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Contents

Foreword

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Introduction

The multiplexer protocol described in the present document operates between an UE and a TE and allows a number of simultaneous sessions over a normal serial asynchronous interface. Each session consists of a stream of bytes transferring various kinds of data; for instance, voice, fax, data, SMS, CBS, phonebook maintenance, battery status, GPRS, USSD etc. This permits, for example, SMS and CBS to be transferred to a TE when a data connection is in progress. Many other combinations are possible including digital voice. It is, for instance, possible to transfer digital voice in combination with SMS. The multiplexer allows a complete system to be partitioned in a flexible way between a UE and TE.

The design of the multiplexer is flexible and independent of UE/TE platforms, and allows existing applications to work without any modifications.

The multiplexer is designed, with special care for battery-powered devices, to include very important functionality such as power saving control and priorities. It is also specially designed to require minimum processing power and memory consumption.

The multiplexer is defined as a single mode with different options based on the ISO HDLC standard (ISO/IEC 13239) although the basic option is not in accordance with HDLC.

In the basic option, the multiplexer does not make use of any transparency mechanism or error recovery method. The advanced option uses the ISO HDLC standard transparency mechanism and gives the multiplexer an easy re-synchronisation method and the ability to operate over links which use DC1/DC3 (XON/XOFF) flow control. The advanced option also may include error-recovery for links subject to errors.

In its basic option, the multiplexer is intended for use in situations where the link between UE and TE is of a very good quality and where the HDLC transparency mechanism (byte stuffing) can not be implemented in the UE. If an UE supports the HDLC transparency mechanism, it shall be used by the multiplexer. The ISO HDLC transparency mechanism must be used if loss of synchronisation may occur caused by, for example, data over-runs or under-runs. The error-recovery option should be used in situations where the link is subject to errors.

The multiplexer is based on a control channel. On this channel, management information is exchanged, such as parameter negotiation, power saving control information, testing, flow control, close down etc.

The multiplexer is optional, but when supported, it is activated with the AT+CMUX command described in 3GPP TS 27.007 [4].

1 Scope

The scope of the present document is to define a multiplexing protocol between a UE and a TE. The multiplexing protocol can be used to send any data, for instance voice, SMS, USSD, fax etc.

The present document describes the protocol, but not the commands or data transported with it.

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.
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[1] Void.

[2] ISO/IEC 13239 (1997): "Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures".

[3] 3GPP TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[4] 3GPP TS 27.007: "AT command set for User Equipment (UE)".

[5] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[6] 3GPP TS 46.021: "Half rate speech; Substitution and muting of lost frames for half rate speech traffic channels".

[7] ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".

3 Abbreviations

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

ABM	Asynchronous Balanced Mode
DLC	Data Link Connection
DM	Disconnected Mode
ERM	Error-Recovery Mode
FCS	Frame Check Sequence
MSC	Modem Status Command
PSC	Power Saving Control
SABM	Set Asynchronous Balanced Mode
UAU	Unumbered Acknowledgement
UIH	Unnumbered Information with header Check
UI	Unnumbered Information

Additional abbreviations can be found in 3GPP TR 21.905 [5].