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Technical Specification

Universal Mobile Telecommunications System (UMTS); UTRAN Iu Interface Layer 1 (3G TS 25.411 version 3.1.0 Release 1999)

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Contents

Foreword

This Technical Specification has been produced by the 3GPP.

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1   Scope

The present document specifies the standards allowed to implement Layer 1 on the I_u interface.

The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

In the following 'Layer 1' and 'Physical Layer' are assumed to be synonymous.

2   References

[1]   ITU-T Rec. **I.432.2** (8/96) ISDN User-Network interfaces, Layer 1 Recommendations, 155 520 kbit/s and 622 080 kbit/s operation

[2]   ITU-T Rec. **I.432.3** (8/96) ISDN User-Network interfaces, Layer 1 Recommendations, 1544 kbit/s and 2048 kbit/s operation

[3]   ITU-T Rec. **G.703** (10/98) Physical/electrical characteristics of hierarchical digital interfaces

[4]   ITU-T Rec. **G.704** (10/98) Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

[5]   ITU-T Rec. **G.957** (7/95) Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

[6]   ITU-T Rec. **I.432.1** (8/96) ISDN User-Network interfaces, Layer 1 Recommendations, General characteristics

[7]   ITU-T Rec. **G.823** (3/93) The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

[8]   ITU-T Rec. **G.824** (3/93) The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy

[9]   ITU-T Rec. **G.825** (3/93) The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

[10]   ITU-T Rec. **G.826** (8/96) Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate

[11]   ITU-T rec. **I.361** (11/95) B-ISDN ATM layer specification

[12]   ATM Forum AF-PHY-0016.000 (9/94), "DS1 Physical Layer Specification"

[13]   ATM Forum AF-PHY-0064.000 (9/96), "E1 Physical Layer Interface Specification"

[14]   ATM Forum AF-PHY-0086.001 (2/99), "Inverse Multiplexing for ATM (IMA) Specification Version 1.1"

[15]   ITU-T Rec. **G.751** (11/88) Digital multiplex equipments operating at the third order bit rate of 34 368 kbit/s and the fourth order bit rate of 139 264 kbit/s and using positive justification

3 Definitions, symbols and abbreviations

3.1 Definitions

3.2 Symbols

3.3 Abbreviations

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

ATM	Asynchronous Transfer Mode
BER	Bit Error Rate
IMA	Inverse Multiplexing on ATM
PDH	Plesiochronous Digital Hierarchy
PMD	Physical Media Dependent
SDH	Synchronous Digital Hierarchy
SDU	Service Data Unit
TC	Transmission Convergence

4 I$_u$ Layer 1

4.1 Introduction

The main functions of Layer 1 are summarised in the following:

- Interface to physical medium

- Cell delineation

- Line clock extraction capability

- Layer 1 alarms extraction and generation

- In-sequence delivery

- Transmission quality control

4.2 Layer 1 Description

Layer 1 reference configuration shall be according to ITU-T Recommendation I.432.1 [6].

The physical layer is divided into:

- Physical Media Dependent (PMD) sublayer

- Transmission Convergence (TC) sublayer defined according to ITU-T Recommendation I.432.1 [6].

The PMD shall comply with at least one of the following standards:

- ETSI STM-4 (622 Mb/s) interface according to I.432.2 [1] with optical S-1.1 interface according to G.957 [5].

- SONET STS-12c (622 Mb/s) interface according to ANSI, T1.105-1995 with optical multimode.

- SONET STS-3c (155 Mb/s) interface according to ANSI, T1.105-1995 with optical multimode.

- ETSI STM-1 (155 Mb/s) interface according to I.432.2 [1] with electrical interface (CMI) to G.703 [3].

- ETSI STM-1 (155 Mb/s) interface according to I.432.2 [1] with optical S-1.1 interface according to G.957 [5].

- ITU STS-1 (51 Mb/s) interface according to ANSI, T1.105-1995 with electrical interface.

- ITU STM-0 (51 Mb/s) interface according to ETSI/TTC with electrical interface.

- ITU STM-0 (51 Mb/s) interface according to ETSI/TTC with optical S-1.1 interface according G.957 [5].

- J2, 6.3 Mb/s interface according to Japanese standard JT-G.703 [3] and JT-G.704 [4] (75 Ohm).

NOTE: J2 requires that the ATM cells be mapped into the physical layer according to HEC based mapping in G.804.

- E2, 8Mb/s according to ETSI/ITU G.703 [3] and G.704 [4] (75 Ohm).

- E3, 34 Mb/s interface according to ETSI/ITU G.751 [13] (75 Ohm).

- T3, 45 Mb/s interface according to ANSI/ITU G.703 [3] and G.704 [4] (75 Ohm).

- E1, 2Mb/s interface balanced 120 Ohm symmetrical according to ETS 300 420, ITU-T G.704 [4] and TBR 013 (G.703) [3], and AF-PHY-0064.000 [11]

- E1, 2Mb/s according to ETSI/ITU G.703 [3] and G.704 [4] (75 Ohm), and AF-PHY-0064.000 [13].

- J1, 1.5 Mb/s interface according to Jt-431-a (100 Ohm).

- J1, 1.5 Mb/s interface according to JT-G.703 [3] and JT-G.704 [4] (110 Ohm).

- T1, 1.5 Mb/s interface according to AF-PHY-0016.000 [10] and ANSI/ITU G.703 [3] and G.704 [4] (100 Ohm).

Services provided to the upper layer shall be independent from the used underlying technology.

The support of intervening transport networks – like PDH or SDH terrestrial links, Point-to-point or Point-to-Multipoint radio links – shall not be prevented.

Fractional use of the physical medium to terminate a multiple of n time slots shall not be prevented, in order to allow coexistence of this interface with other interfaces on the same physical medium.

When using E1, T1, or J1, it shall be possible to use inverse multiplexing of ATM (IMA) [14] within suitable subsets of the physical ports on the respective Exchange Termination (ET).

The clock stability required shall be according to G.823 [7] or G.824 [8] or G.825 [9] whichever is applicable.

The clock extracted from the I_u may be used as UTRAN reference clock.

Transmission quality control shall be provided according to ITU-T Recommendation G.826 [10].

4.3 Requirements from higher layer

No specific requirements beyond the ones listed in the introduction have been identified.

4.4 Services Provided by Layer 1

The physical layer provides services to the upper layer via the Physical Service Access Point (PHY-SAP) according to ITU-T I.361 [9], as described in the following figure:
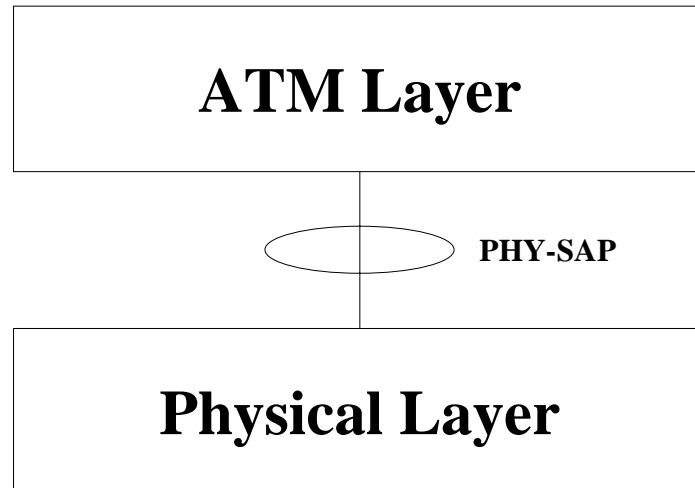
Figure 1: SAP between Physical Layer and ATM Layer

According to ITU-T I.361 [9], chapter 3.2, the following primitives are provided over PHY-SAP:

-    PHY-DATA request (PHY-SDU);

-    PHY-DATA indication (PHY-SDU).

The parameter PHY-SDU contains one ATM cell as defined in ITU-T I.361 [9] received or to be transferred over the physical medium.

4.5   Interface to Management Plane

The description of the interface towards Management Plane is out of scope of this document, anyhow at least the following O&M functions should be foreseen:

-    Performance Monitoring Functions

-    Alarm Status Reporting Functions

-    Synchronisation Source Management

Annex A (informative): Change History

<table>
<tr><th colspan="6">Change history</th></tr>
<tr><th>TSG RAN#</th><th>Version</th><th>CR</th><th>Tdoc RAN</th><th>New Version</th><th>Subject/Comment</th></tr>
<tr><td>RAN_04</td><td>-</td><td>-</td><td>-</td><td>3.0.0</td><td>Approved at TSG RAN #4 and placed under Change Control</td></tr>
<tr><td>RAN_06</td><td>3.0.0</td><td>001</td><td>RP-99742</td><td>3.1.0</td><td>Approved at TSG RAN #6</td></tr>
<tr><td>RAN_06</td><td>3.0.0</td><td>002</td><td>RP-99743</td><td>3.1.0</td><td>Approved at TSG RAN #6</td></tr>
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History

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