TSG-RAN Meeting #12
Stockholm, Sweden, 12 - 15 June 2001

TSGRP#12(01) 0373

Title: **Agreed CRs to TS 25.411**

Source: **TSG-RAN WG3**

Agenda item: **8.3.3/8.3.4**

Tdoc_Num	Specification	CR_Num	Revision_Num	CR_Subject	CR_Category	WG_Status	Cur_Ver_Num	New_Ver_Num	Workitem
R3-011341	25.411	005		Network Synchronisation aspects clarification	F	agreed	3.4.0	3.5.0	TEI
R3-011342	25.411	006		Network Synchronisation aspects clarification	A	agreed	4.0.0	4.1.0	TEI
R3-011637	25.411	007	1	Layer 1 references	F	agreed	3.5.0	3.6.0	TEI
R3-011638	25.411	008	1	Layer 1 references	A	agreed	4.0.0	4.1.0	TEI

CR-Form-v3

CHANGE REQUEST

⌘   **25.411** CR **005**   ⌘ rev **-** ⌘   Current version: **3.4.0** ⌘

For **HELP** *on using this form, see bottom of this page or look at the pop-up text over the* ⌘ *symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Network Synchronisation aspects clarification
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ May 2001
Category:	⌘ **F**	***Release:*** ⌘ R99

Use one of the following categories:
    F (essential correction)
    A (corresponds to a correction in an earlier release)
    B (Addition of feature),
    C (Functional modification of feature)
    D (Editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
    2   (GSM Phase 2)
    R96   (Release 1996)
    R97   (Release 1997)
    R98   (Release 1998)
    R99   (Release 1999)
    REL-4   (Release 4)
    REL-5   (Release 5)

Reason for change:	⌘	This contribution proposes some improvements and corrections in the TS 25.411, in order to better align the 3GPP standards with existing ITU-T, ANSI and ETSI standards dealing with network synchronisation.
		When designing the synchronisation networks, it is very likely that specifications as the TS 25.411 (and the TS 25.402), will be highly considered by the network synchronisation planner. In addition, these standards are of great interest also for the manufacturer of UTRAN network elements when it comes to designing network synchronisation characteristics.
		With the proposed improvements, it is our view that the task for the synchronisation network planner in the UTRAN and for the manufacturer of UTRAN equipment will be easier, when it comes to define the most suitable strategy in terms of network synchronisation.
Summary of change: ⌘		It is proposed to change the way the references to ITU-T G.823, ITU-T G.824 and ITU-T G.825.is done in present version of the TS. Reference to ITU-T G.811 is added.
Consequences if not approved:	⌘	If this CR is not approved the above described unclear references to Network Synchronisation will remain in the specification. Backward compatibility: the changes that are proposed are backward compatible with the previous version of the specification.

Clauses affected:	⌘	2, 4.2
Other specs	⌘ **X**	Other core specifications ⌘ CR 018 on TS 25.402 R99, CR 019 on TS 25.402 R4, CR 006 on TS 25.411 R4
affected:	☐	Test specifications
	☐	O&M Specifications
Other comments:	⌘	This CR has been approved in principle at last 3GPP TSG RAN WG3 #20

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Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

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- 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] ITU-T Recommendation 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 Recommendation I.432.3 (8/96): "ISDN User-Network interfaces, Layer 1 Recommendations, 1544 kbit/s and 2048 kbit/s operation".

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

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

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

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

[7] ITU-T Recommendation 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 Recommendation 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 Recommendation 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 Recommendation 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 Recommendation 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 Recommendation 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".

[16] ITU-T Recommendation G.811 (2/97): "Timing Characteristics of Primary Reference Clocks".

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).

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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.

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 jitter and wander performance requirements on the interface shall be in accordance with either Reference [7], [8] or [9], whichever is applicable.

The clock synchronisation reference extracted from the I_u may be used as UTRAN synchronisation reference clock. A general recommendation is to supply a traceable synchronisation reference according to reference [16].

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

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CHANGE REQUEST

| ⌘ | **25.411** CR **006** | ⌘ rev **-** | ⌘ Current version: | **4.0.0** ⌘ |

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Network Synchronisation aspects clarification	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ May 2001
Category: ⌘	**A**	***Release:*** ⌘ REL-4

Use <u>one</u> of the following categories:
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B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
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Clauses affected: ⌘	2, 4.2
Other specs affected: ⌘	**X** Other core specifications ⌘ CR 018 on TS 25.402 R99, CR 019 on TS 25.402 R4, CR 005 on TS 25.411 R99
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	This CR has been approved in principle at last 3GPP TSG RAN WG3 #20

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- 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.

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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.

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

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

3GPP TSG-RAN WG3 Meeting #21   *Tdoc R3-011637~~586~~*
Busan, Korea, 21st May – 25th May 2001

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CHANGE REQUEST

⌘   **25.411 CR 007**   ⌘ rev **1** ⌘ Current version: **3.<u>4</u>~~5~~.0** ⌘

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Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Layer 1 references	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	*Date:* ⌘ 15-05-2001
Category: ⌘ **F**		*Release:* ⌘ R99

Use one of the following categories:	Use one of the following releases:
F (essential correction)	2 (GSM Phase 2)
A (corresponds to a correction in an earlier release)	R96 (Release 1996)
B (Addition of feature),	R97 (Release 1997)
C (Functional modification of feature)	R98 (Release 1998)
D (Editorial modification)	R99 (Release 1999)
Detailed explanations of the above categories can	REL-4 (Release 4)
be found in 3GPP TR 21.900.	REL-5 (Release 5)

Reason for change: ⌘	Wrong references.
Summary of change: ⌘	References G.751, AF-PHY-0064.000, I361 correctly set.
Consequences if not approved: ⌘	Wrong specifications apply. This CR is backwards compatible.

Clauses affected: ⌘	4.
Other specs affected: ⌘	**X** Other core specifications ⌘ <u>25.411 CR008 REL-4</u> ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

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:

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-   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 [153] (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 [13~~1~~]

- 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.

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 [11~~9~~], as described in the following figure:
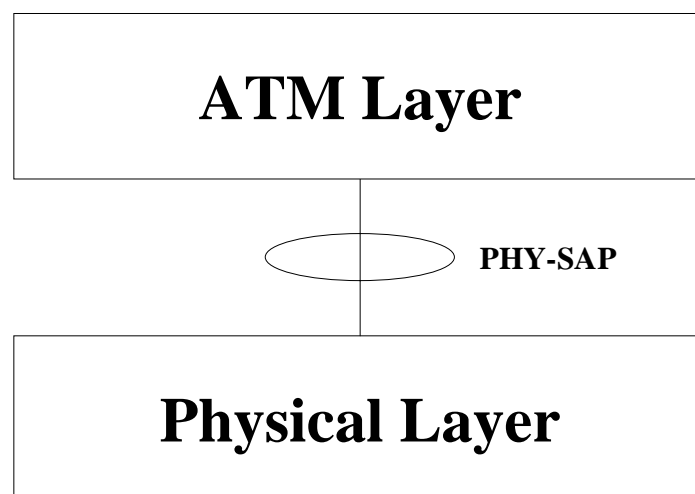

Figure 1: SAP between Physical Layer and ATM Layer

According to ITU-T I.361 [11~~9~~], subclause 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 [119] 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

Change history					
TSG RAN#	Version	CR	Tdoc RAN	New Version	Subject/Comment
RAN_04	-	-	-	3.0.0	Approved at TSG RAN #4 and placed under Change Control
RAN_06	3.0.0	001	RP-99742	3.1.0	Approved at TSG RAN #6
RAN_06	3.0.0	002	RP-99743	3.1.0	Approved at TSG RAN #6
RAN_07	3.1.0	-	-	3.2.0	Approved at TSG RAN #7
RAN_10	3.2.0	002	RP-000610	3.3.0	Approved at TSG RAN #10
RAN_11	3.3.0	004	RP-010109	3.4.0	Approved at TSG RAN #11

3GPP TSG-RAN WG3 Meeting #21 *Tdoc R3-011638587*
Busan, Korea, 21st May – 25th May 2001

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CHANGE REQUEST

⌘ **25.411 CR 008** ⌘ rev **1** ⌘ Current version: **4.0.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Layer 1 references	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 15-05-2001
Category: ⌘ **A**		***Release:*** ⌘ REL-4

Use *one* of the following categories:
  F *(essential correction)*
  A *(corresponds to a correction in an earlier release)*
  B *(Addition of feature),*
  C *(Functional modification of feature)*
  D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use *one* of the following releases:
  2   *(GSM Phase 2)*
  R96 *(Release 1996)*
  R97 *(Release 1997)*
  R98 *(Release 1998)*
  R99 *(Release 1999)*
  REL-4 *(Release 4)*
  REL-5 *(Release 5)*

Reason for change: ⌘	Wrong references.
Summary of change: ⌘	References G.751, AF-PHY-0064.000, I361 correctly set.
Consequences if not approved: ⌘	Wrong specifications apply. This CR is backwards compatible.

Clauses affected: ⌘	4.
Other specs affected: ⌘	**X** Other core specifications ⌘ 25.411 CR007 R99 ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

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 [153] (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 [13~~1~~]

- 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.

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 [11~~9~~], as described in the following figure:
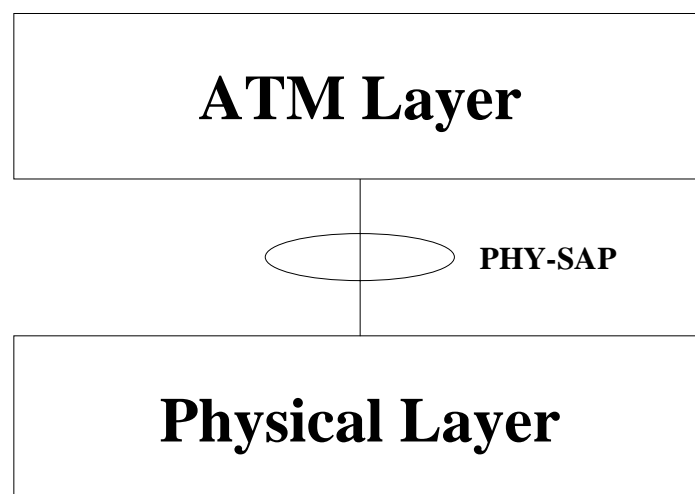

Figure 1: SAP between Physical Layer and ATM Layer

According to ITU-T I.361 [11~~9~~], subclause 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 [119] 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

Change history					
TSG RAN#	Version	CR	Tdoc RAN	New Version	Subject/Comment
RAN_04	-	-	-	3.0.0	Approved at TSG RAN #4 and placed under Change Control
RAN_06	3.0.0	001	RP-99742	3.1.0	Approved at TSG RAN #6
RAN_06	3.0.0	002	RP-99743	3.1.0	Approved at TSG RAN #6
RAN_07	3.1.0	-	-	3.2.0	Approved at TSG RAN #7
RAN_10	3.2.0	002	RP-000610	3.3.0	Approved at TSG RAN #10
RAN_11	3.3.0	004	RP-010109	3.4.0	Approved at TSG RAN #11