Technical Specification Group Services and System Aspects
Meeting #13, Beijing, China, 24-27 September 2001

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Title: **CRs to 22.060 and 22.105 on Introduction of High Speed Downlink Packet Access**

Document for: **Approval**

Agenda Item: **7.1.3**

Doc-1st-Level	Spec	CR	Rev	Phase	Cat	Subject	Vers	Vers New	Doc-2nd-Level
SP-010442	22.060	021	1	Rel-5	B	Introduction of High Speed Downlink Packet Access	4.2.0	5.0.0	S1-010898
SP-010442	22.105	032	1	Rel-5	B	Introduction of High Speed Downlink Packet Access	4.2.0	5.0.0	S1-010897

TSG-SA WG 1 (Services) meeting #13
Lake Tahoe, USA, 9-13 July 2001

TSG S1 (01) 0898
Revision of 893

CR-Form-v4

CHANGE REQUEST

⌘ **22.060** **CR** **021** ⌘ ev **1** ⌘ Current version: **4.2.0** ⌘

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

Title:	⌘	Introduction of High Speed Downlink Packet Access
Source:	⌘	SA1
Work item code:	⌘	HSDPA
Date:	⌘	05/09/2001
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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C *(functional modification of feature)*
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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:	⌘	To include requirements for HSDPA
Summary of change:	⌘	Inclusion of HSDPA
Consequences if not approved:	⌘	Misalignment with RAN specifications.

Clauses affected:	⌘	3.2, 4, 5.5, 6.6		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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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.

3.2 Abbreviations

For the purposes of this TS the following definitions apply:

CLNP	Connectionless network protocol
CLNS	Connectionless network service
EGPRS	Enhanced GPRS
FFS	For further study
GPRS	General packet radio service
HSDPA	High Speed Downlink Packet Access
IP	Internet protocol
IP-M	Internet protocol multicast
NSDU	Network service data unit
PDP	Packet data protocol
PDU	Protocol data unit
PLMN	Public land mobile network
PTM	Point to multipoint
PTP	Point to point
QoS	Quality of service
SAP	Service access point
SVC	Switched virtual circuit
SDU	Service data unit
TBD	To be defined
TLLI	Temporary link level identity

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4 Main Concepts

The GPRS allows the service subscriber to send and receive data in an end-to-end packet transfer mode, without utilizing network resources in circuit switched mode.

GPRS enables the cost effective and efficient use of network resources for packet mode data applications e.g. for applications that exhibit one or more of the following characteristics:

- intermittent, non-periodic (i.e., bursty) data transmissions, where the time between successive transmissions greatly exceeds the average transfer delay;
- frequent transmissions of small volumes of data, for example transactions consisting of less than 500 octets of data occurring at a rate of up to several transactions per minute;
- infrequent transmission of larger volumes of data, for example transactions consisting of several kilobytes of data occurring at a rate of up to several transactions per hour.

Within the GPRS, two different bearer service types are defined. These are:

- Point-To-Point (PTP);
- Point-To-Multipoint (PTM).

Based on standardized network protocols supported by the GPRS bearer services, a GPRS network administration may offer (or support) a set of additional services. This is outside the scope of this specification, however, a number of possible PTP interactive teleservices include:

- retrieval services which provide the capability of accessing information stored in data base centres. The information is sent to the user on demand only. An example of one such service in the Internet's World Wide Web (WWW);

- messaging services which offer user-to-user communication between individual users via storage units with store-and-forward mailbox, and/or message handling (e.g., information editing, processing and conversion) functions;

- conversational services which provide bi-directional communication by means of real-time (no store-and-forward) end-to-end information transfer from user to user. An example of such a service is the Internet's Telnet application;

- tele-action services which are characterized by low data-volume (short) transactions, for example credit card validations, lottery transactions, utility meter readings and electronic monitoring and surveillance systems.

Some examples of teleservices which may be supported by a PTM bearer service include:

- distribution services which are characterized by the unidirectional flow of information from a given point in the network to other (multiple) locations. Examples may include news, weather and traffic reports, as well as product or service advertisements;

- dispatching services which are characterized by the bi-directional flow of information from a given point in the network (dispatcher) and other (multiple) users. Examples include taxi and public utility fleet services;

- conferencing services which provide multi-directional communication by means of real-time (no store-and-forward) information transfer between multiple users.

EGPRS is an enhancement of GPRS allowing higher data rates on the radio interface. The same set of services provided by GPRS is available in EGPRS.

HSDPA is an enhancement to Packet data services allowing higher data rates on the radio interface downlink. The same set of services provided by GPRS is available with GPRS using HSDPA.

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6.2 Subscriber roaming

GPRS shall provide the ability for subscribers to access the service while roaming between networks. This implies the pre-existence of an international signalling mechanism and a service agreement between the different network operators involved.

It shall be possible for GPRS subscribers to remain GPRS attached when moving from one PLMN to another.

HSDPA shall be supported when roaming providing a roaming agreement for the necessary transport/bearer service(s) is currently valid.

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6.6 Charging aspects

The charging information that the GPRS network collects for each MS shall be standardised. The information that the operator uses to generate a bill to a subscriber is operator specific. Billing aspects, e.g. a regular fee for a fixed period, are outside the scope of this specification.

The HPLMN Operator/Service Provider may be able to charge the GPRS subscriber for all costs incurred including those costs incurred in an external network be it a VPLMN or a data network.

The charging requirements of HSDPA shall be identical to the existing packet data services.

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CHANGE REQUEST

⌘ **22.105** **CR** **032** ⌘ ev **1** ⌘ Current version: **4.2.0** ⌘

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R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change:	⌘	To include requirements for HSDPA
Summary of change:	⌘	Inclusion of HSDPA in Clause 10
Consequences if not approved:	⌘	Misalignment with RAN specifications.

Clauses affected:	⌘	3.2, 5.3, 10
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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3.2 Abbreviations

For the purposes of this TS, the following abbreviations apply;

BER	Bit Error Rate
CAMEL	Customised Application for Mobile network Enhanced Logic
DTMF	Dual Tone Multiple Frequency
TR	Technical Report
TS	Technical Specification
ETSI	European Telecommunications Standards Institute
FAX	Facsimile
FER	Frame Erasure Rate
GSM	Global System for Mobile Communications
GERAN	GSM / EDGE Radio Access Network.
HE	Home Environment
HSDPA	High Speed Downlink Packet Access
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
LCS	Location Services
MExE	Mobile Execution Environment
MMI	Man Machine Interface
MO	Mobile Origination
MT	Mobile Termination
PC	Personal Computer
PIN	Personal Identity Number
PNP	Private Numbering Plan
POTS	Plain Old Telephony Service
QoS	Quality of Service
USIM	User Service Identity Module
SMS	Short Message Service
SAT	SIM Application Toolkit
SN	Serving Network
SoLSA	Support of Localised Service Area
UE	User Equipment

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5.3 Supported bit rates

It shall be possible for one application to specify its traffic requirements to the network by requesting a bearer service with any of the specified traffic type, traffic characteristics, maximum transfer delay, delay variation, bit error ratios & data rates. It shall be possible for the network to satisfy these requirements without wasting resources on the radio and network interfaces due to granularity limitations in bit rates.

It shall be possible for one mobile termination to have several active bearer services simultaneously, each of which could be connection oriented or connectionless.

The only limiting factor for satisfying application requirements shall be the cumulative bit rate per mobile termination at a given instant (i.e. when summing the bit rates of one mobile termination's simultaneous connection oriented and connectionless traffic, irrespective of the traffic being real time or non real time) in each radio environment:

- At least 144 kbits/s in satellite radio environment (Note 1).
- At least 144 kbits/s in rural outdoor radio environment.
- —At least 384 kbits/s in urban/suburban outdoor radio environments.
- Greater than 2 Mbits/s in urban/suburban outdoor radio environments (Note 2 and 3).
- —At least 2048 kbits/s in indoor/low range outdoor radio environment. (Note 2)
- Greater than 2 Mbits/s in indoor/low range outdoor radio environment (Note 2 and 3).

NOTE 1: This Peak Bit Rate may only be achieved in a nomadic operating mode.

NOTE 2: Not supported by GERAN.

NOTE 3: Peak instantaneous rate for UTRAN supporting HSDPA

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10 Access dependent services and features

This section describes the features that will be dependent on the mode of radio access.

In general different access networks provide different capabilities with different QoS.

- Multicall, as specified in TS 22.135 [11], is supported only via UTRAN.
- Packet switched traffic using GPRS over GERAN will have a maximum rate in the order of 384kb/sec.
- —Packet switched traffic using UTRAN will have a maximum rate in the order of 2Mb/sec.
- Packet switched traffic using HSDPA provides very high speed downlink packet access over the air interface supporting streaming, interactive and background packet data services etc. HSDPA will support packet data services in urban environments and indoor environments. However HSDPA service support is not be limited to these environments. HSDPA will be optimised at speeds typical of urban environments but shall apply at other speeds also. Full mobility will be supported, i.e., mobility should be supported for high-speed cases also, but optimisation should be for low-speed to medium-speed scenarios.
- ASCI teleservices, TS 22.003 [3] are only available in GERAN.
- SoLSA feature is only available in GERAN.
- The accuracy of the determination of location may differ between the various access technologies.
- At GERAN reception of CBS messages for a UE is not supported if it is connected in the CS domain or in the PS domain when data is currently transmitted.
- Transparent (T) mode of facsimile , as specified in TS 22.003 [3], is only supported by GERAN.
- Non-transparent (NT) mode of facsimile, as specified in TS 22.003 [3], is only supported by UTRAN.
- There are some differences at data rates and interworking scenarios between GERAN and UTRAN support of circuit bearer services . For further details see TS 22.002 [2].