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**Digital cellular telecommunication system (Phase 2+) (GSM);
Mobile Station - Base Station System (MS - BSS)
Interface Channel Structures and Access Capabilities
(3GPP TS 44.003 version 13.0.0 Release 13)**

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Foreword

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1 Scope

The present document defines limited sets of channel types, access capabilities and channel configurations at reference point Um (radio interface).

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. 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] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".
- [3] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
- [4] 3GPP TS 45.002: "Multiplexing and Multiple Access on the Radio Path".

3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 apply.

4 General definitions

A channel represents a specified portion of the information-carrying capacity of an interface.

Channels are classified by channel types, which have common characteristics. Channel types appearing on the radio interface are specified in clauses 3 and 4.

At a given time, the complete interface between a Base Station and the set of Mobile Stations in relation corresponds to some interface structure. The interface structure may change in time. The number of possible different such interface structures can be large. The BS access capability is a description of all the possible interface structures of the considered BS. BS access capabilities are specified in sub-clause 8.

At a given moment, the channel configuration of a Mobile Station is the interface structure this Mobile Station actually uses to transmit information to or receive information from the Base Station. The channel configuration may change in time. A limited number of channel configurations are identified, and are specified in sub-clause 9.

A Mobile Station access capability is the description of the set of its possible channel configurations. MS access capabilities are specified in sub-clause 8.

5 Channel types and their use: Traffic channels and user channels

5.1 User channels

User channels are intended to carry a wide variety of user information streams. A distinguishing characteristic is that user channels do not carry signalling information for Connection Management (CM), Mobility Management (MM) or Radio Resource (RR) management. This signalling information is carried over other types of channels, namely the control channels.

User channels may be used to provide access to the PLMN and the networks it permits access to.

Different types of user channels are distinguished by their rates.

5.2 Bm Channel

A Bm channel is a bi-directional or uni-directional user channel able to carry:

- a 13 kbit/s rate bit stream with an error structure and a transmission delay compatible with some grade of service, intended to carry voice encoded according to Technical Specifications in 3GPP TS 06-series; or
- a bit stream at a rate of 14,5 kbit/s, 12 kbit/s, 6 kbit/s or 3,6 kbit/s, with an error structure and a transmission delay adapted to a wider range of services, including data transmission; or other kinds of bit stream adapted to a wider range of services (for further study).

User information streams are carried on the Bm channel on a dedicated, alternate (within one call or as separate calls), or simultaneous basis, consistent with the Bm channel carrying capability. The following are samples of user information streams:

- i) voice encoded at 13 kbit/s according to Technical Specifications in 3GPP TS 06-series; and
- ii) data information corresponding to circuit switching user classes of services at bit rates compatible with the channel capability.

A Bi-directional Bm Channel uses the radio resources referred to as TCH/F. Bi-directional downlink Bm Channel uses the radio resources referred to as TCH/FD. The Uni-directional Bm Channel is only defined in downlink direction. Traffic channels (TCH) are fixed physical gross rate channels, accompanied with timing (see 3GPP TS 45.002).

5.3 Lm Channels

A Lm channel is a user channel with a carrying capability lower than a Bm channel.

A Lm channel is a user channel able to carry:

- some bit stream to be defined with an error structure and a transmission delay compatible with some grade of service, intended to carry voice encoded according to a method to be defined;
- a bit stream at a rate of 6 kbit/s or 3,6 kbit/s, with an error structure and a transmission delay adapted to a wider range of services, including data transmission; or
- other kinds of bit stream adapted to a wider range of services (for further study).

User information streams are carried on a Lm channel on a dedicated, alternate (within one call or as separate calls), or simultaneous basis, consistent with the TCH/H channel carrying capability. The following are samples of user information streams:

- i) voice encoded at some rate according to a method to be specified in the future; and
- ii) data information corresponding to circuit switching user classes of services at bit rates compatible with the channel capability.

A Lm Channel uses the radio resources referred to as TCH/H. Traffic channels (TCH) are fixed physical gross rate channels, accompanied with timing (see 3GPP TS 45.002).

6 Channel types and their use: Packet data traffic channels

Packet data traffic channels are used to carry a wide variety of information streams, including user information and signalling information for, e.g. Session Management (SM) and Mobility Management (MM) in packet mode. A distinguishing characteristic is that a packet data traffic channel allows a plurality of information streams, associated with different users, to be multiplexed in a pre-emptive and dynamic fashion. Signalling functions between the MS and the BSS are carried out over other types of channels, namely the control channels.

Uni-directional information streams are carried on the packet data traffic channel on an alternate, or simultaneous basis, consistent with the packet data traffic channel carrying capability. The packet data traffic channel uses the radio resources referred to as PDTCH or Extended Coverage PDTCH (EC-PDTCH) (see 3GPP TS 45.002).

7 Channel types and their use: Control channels

NOTE: The term "Dm channel" may be used to refer to the controls channels used by a Mobile Station at a given moment, independently of their type. (The term "Dm channel" in conjunction with the packet control channels shall be avoided.)

Control channels are used to provide all active Mobile Stations with a continuous frame oriented means of communication across the MS-BS interface.

A Mobile Station Channel Configuration contains one or more control channels. These control channels may change in time, with the channel configuration. Access management signalling functions are used to insure the continuity when a change in the control channels occurs.

Control channels are classified by control channel types, which have common characteristics. These control channel types are specified in sub-clause 7.1.

The control channels are primarily intended to carry signalling information for Connection Management (CM), Mobility Management (MM) and Radio Resource (RR) management.

In addition to signalling information control channels may also be used to carry other data, including those relating to Short Message Services (SMS).

7.1 Control channel types

7.1.1 Broadcast Control Channel

A broadcast control channel is a point-to-multipoint uni-directional control channel, from the fixed sub-system to the Mobile Stations. Broadcast control channels are physically sub-divided into the Broadcast Control CHannel (BCCH), Packet Broadcast Control CHannel (PBCCH), Compact Packet Broadcast cControl CHannel (CPBCCH), and Extended Coverage Broadcast Control CHannel (EC-BCCH).

BCCH, PBCCH, CPBCCH and EC-BCCH are intended to broadcast a variety of information to MSs, including information necessary for MS to register in the system (e.g. synchronization data).

BCCH, PBCCH, CPBCCCH and EC-BCCH use a protocol specified in Technical Specifications in 3GPP TS 44-Series.

7.1.2 Common Control Channel

A common control channel is a point-to-multipoint bi-directional control channel. Common control channels are physically sub-divided into the Common Control CHannel (CCCH), the Packet Common Control CHannel (PCCCH), the Compact Packet Common Control CHannel (CPCCCH), and the Extended Coverage Common Control Channel (EC-CCCH)

CCCH, PCCCH, CPCCCH and EC-CCCH are primarily intended to carry signalling information necessary for access management functions (e.g., allocation of dedicated channels or radio resource on a packet data traffic channel). The CCCH can be used for other signalling purposes.

CCCH, PCCCH, CPCCCH and EC-CCCH use a layered protocol according to Technical Specifications in 3GPP TS 44-Series. In particular the multipoint to point management is achieved through random access techniques.

The following terms may be used when the context requires it:

- The RACH (Random Access CHannel) is the uplink (MS to network) part of the CCCH.
- The PRACH (Packet Random Access CHannel) is the uplink part of the PCCCH.
- The CPRACH (Compact Packet Random Access CHannel) is the uplink part of the CPCCCH.
- The EC-RACH (Extended Coverage Random Access CHannel) is the uplink part of the EC-CCCH.
- The AGCH (Access Grant CHannel) is the part of the downlink (network to MS) part of the CCCH reserved for assignment messages.
- The PAGCH (Packet Access Grant CHannel) is the part of the downlink part of the PCCCH used for assignment messages.
- The CPAGCH (Compact Packet Access Grant CHannel) is the part of the downlink part of the CPCCCH used for assignment messages.
- The EC-AGCH (Extended Coverage Access Grant CHannel) is the downlink part of the EC-CCCH used for assignment messages.
- The NCH (Notification CHannel) is the part of the downlink part of the CCCH reserved for voice group and/or voice broadcast calls notification messages.
- PCH (Paging CHannel) is the remaining part of the downlink part of the CCCH.
- PPCH (Packet Paging CHannel) is the remaining part of the downlink part of the PCCCH.
- CPPCH (Compact Packet Paging CHannel) is the remaining part of the downlink part of the CPCCCH.
- EC-PCH (Extended Coverage Paging CHannel) is the downlink part of the EC-CCCH used for paging messages.

7.1.3 Dedicated Control Channel (DCCH)

A Dedicated Control CHannel (DCCH) is a point-to-point bi-directional or uni-directional control channel.

DCCHs exist with a variety of bit rates.

DCCHs are further classified as follows according to some technical particularities:

A SDCCH (Stand-alone DCCH) is a bi-directional DCCH whose allocation is not linked to the allocation of a TCH. The bit rate of a SDCCH is 598/765 kbit/s.

A FACCH (Fast Associated DCCH) is a bi-directional DCCH obtained by pre-emptive dynamic multiplexing on respectively a TCH/F or a TCH/H channel. The allocation of a FACCH is obviously linked to the allocation of a TCH. The bit rate of a FACCH is 9 200 bit/s or 4 600 bit/s.