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TECHNICAL SPECIFICATION

Digital cellular telecommunications system (Phase 2+);
Base Station System -
Mobile-services Switching Centre (BSS - MSC) interface;
Interface principles
(3GPP TS 48.002 version 13.0.0 Release 13)

A GLOBAL INITIATIVE

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Contents

Foreword

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1 Scope

The present document gives the principles on which the detailed interface specifications in the rest of the 3GPP TS 48.0xx series of Technical Specifications are based.

The set of fixed equipment accessed from the MSC through one particular instance of the interface will be later referred to as a Base Station System (BSS). A BSS ensures the coverage of n cells, where n can be 1 or more.

The function of a BSS may be further subdivided into a control function, performed by one Base Station Controller (BSC) and a transceiving function, performed by "n" Base Transceiver Station equipments (BTS), one for each cell. However, the study of such a split is outside the scope of the 48.0xx series of Technical Specifications, where the BSS will be considered as a whole.

The BSS-MSC interface defined in the 3GPP TS 48 series of Technical Specifications is designed to support a wide range of possible architectures on both sides. Characteristics like location of the transcoders/rate adaptation to the MSS or inside the BSS (either physically integrated into the transceivers or very near to the MSC) or the use of traffic or signalling concentration at either side are left to the operators" choice. Annex A to the present document contains guidance information concerning the use of remote mobile switching units, which for the purposes of the present document are considered as part of the MSC.

The BSS-MSC interface is commonly called 'A-Interface'. It is subdivided into the Control Plane (signalling) and the User Plane (traffic). Throughout this document the term 'MSC' is used to reflect both planes of the Mobile Core Network, although in some architecture the Mobile Core Network is split into MSC-Server (MSC-S) and Media Gateway (MGW).

Direct connection between two BSSs is not supported by this A-Interface.

This A-Interface may be based on

- TDM using 1 or more 2 048 kbit/s digital transmission system interfaces. Each 2 048 kbit/s interface provides 31*64 kbit/s channels which can be used for traffic (User Plane) or signalling (Control Plane) as the operator requires, and/or
- IP supporting User Plane and/or Control Plane (SIGTRAN).The signalling is layered, terminology similar to that in the OSI reference model is used in this series, however the layers referred to are not identical to the equivalently named layer in the OSI model.

This A-Interface User Plane is defined at the boundary of the MSC and

- in case of TDM, it has a per channel bit rate of 64 kbit/s, but the net radio path traffic channel is at a rate of less than 16 kbit/s. A speech transcoder or data rate adapter function is thus needed for the rate conversion. The interface is designed such that the transcoding or rate adaptation function may be geographically situated at either the MSC site or the BSS site, however the transcoder is considered to be part of the BSS
- in case of IP, it has a flexible channel bit rate, adapted to the payload size. The speech transcoding function can be part of either the BSS or the Core Network or can be omitted (transcoding free operation), allowing e.g. for use of both, PCM encoded speech and compressed speech, over the A-Interface. The data rate adapter function is always located inside the BSS, using a 64kbit/s unrestricted digital interface (Clearmode) over IP.

The A-Interface has been designed around the aims of 3GPP TS 48.001 allowing each component and the system as a whole to evolve.

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.
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[1] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.009: "Handover procedures".

[3] 3GPP TS 23.910: "Circuit switched data bearer services".

[4] 3GPP TS 43.020: "Security related network functions".

[5] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[6] 3GPP TS 48.001: Base Station System - Mobile services Switching Centre (BSS - MSC) interface; General aspects".

[7] Void.

[8] 3GPP TS 48.006: "Signaling transport specification mechanism for the Base Station Subsystem – Mobile-services Switching Centre (BSS - MSC) interface".

[9] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC-BSS) interface; Layer 3 specification".

[10] Void.

[11] Void.

[12] Void.

[13] Void.

[14] Void.

[15] Void.

[16] Void.

[17] Void.

[18] 3GPP TS 52.001: "Common aspects of GSM Network Management (NM)".

[19] 3GPP TS 23.236: " Intra-domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes ".

3 Definitions and abbreviations

Abbreviations used in the present document are listed in 3GPP TS 21.905.

4 Functional division between Base Station System (BSS) and MSC

Table 4: Functional split

Item/Task	BSS	MSC,MGW,VLR,HLR
Terrestrial Channel Management		
channel allocation	X	X
blocking indication	X	X
Radio channel management		
Radio channel configuration management	X	
frequency hopping management	X	
idle channel observation	X	
power control	X	
TCH management		
channel allocation (choice)	X	
link supervision	X	
channel release	X	X (Invoked by MSC)
BCCH/CCCH management		
scheduling of messages	X	
DCCH management		
link supervision	X	
channel release	X	X (Invoked
DCCH allocation	X	by MSC
Radio resource indication		
report status of idle channels	X	
Channel coding decoding		MSC defines
on the basis of call type	X	call type
Speech Transcoding	X	X
Data rate adaptation	X	
Interworking Function (data calls)		X
Measurements		
reported from MS	X	
uplink	X	
traffic		X
Handover		
internal (within one cell){if provided}	X	MSC informed
internal (between cells) {if provided}	X	MSC informed
external recognition radio reason	X	
external recognition traffic reason	X	X
decision	X	X
execution		X
Mobility Management		
authentication		X
location updating		X
paging		X
DRX paging (scheduling)	X	
Call control		X
User data encryption	X	Key and permitted algorithms from MSC
Signalling element encryption	X	Key and permitted algorithms from MSC
NNSF (NAS Node Selection Function)	X	

4.1 Terrestrial channel management

4.1.1 Terrestrial channel allocation

Terrestrial channel allocation will be handled in the following manner.

In case of TDM links, the link between the MSC and the BSS will be considered by the BSS and the MSC as a route on "n" circuits. Within this route, certain of the circuits may not be able to support all types of traffic (e.g., data calls or half rate connections). This can be managed, according to the configuration, either by the MSC or by the BSS for a given route. The entity in charge of circuit allocation chooses the terrestrial circuit, whilst ensuring that the chosen circuit is able to support the type of connection needed.

In case of IP links, the IP-link for the User Plane traffic is negotiated between BSS and MSC by exchange of IP Transport Layer addresses and necessary User Plane information (e.g. Codec Type, Codec Configuration, RTP Redundancy, A-Interface Type).

If an IP based A-Interface User Plane is supported by the MSC and/or the BSS and a terrestrical circuit is needed, then always the MSC, never the BSS, shall provide the terrestrical circuit (CIC).

4.1.2 Blocking of terrestrial channels

The entity not allocating the circuits shall be able to remotely block the terrestrial channel and remove it from service. This is signalled across the BSS/MSC interface using the appropriate signalling exchange as defined in 3GPP TS 48.008.

Local blocking of terrestrial channels on the side allocating the circuits may be supported and will result in the concerned channels not being chosen, no information need flow across the interface in these cases.

Blocking for IP-links is not explicitly needed, because no fixed relation between both endpoints of an IP link exists.

4.2 Radio channel management

4.2.1 Channel configuration management

The channel configuration management will be controlled between BSS and maintenance centre, the MSC holding no direct data concerning the allocation of radio timeslots etc.

4.2.2 Radio TCH management

4.2.2.1 Radio channel allocation

The BSS shall choose the radio channel to be used on the appropriate cell, based on information received from the MSC, which defines the radio channel type, speech codec type (if necessary), channel coding and all other parameters relevant to defining channel type. The chosen radio channel shall be connected to the terrestrial channel in order to support the call. This connection mechanism is not further defined in these Technical Specifications, except the negotiation of the A-Interface Type (TDM or IP), defined in 3GPP TS 48.008.

4.2.2.2 TCH radio link supervision

Radio link supervision of dedicated radio resources shall be the responsibility of the BSS. If communication with the mobile is lost then the BSS can request that the call be cleared.

4.2.2.3 Frequency hopping management

Frequency hopping management shall be performed by the BSS. That is the BSS shall store and transmit all hopping parameters for the cell(s) that it controls, the hopping shall be performed such that it is not visible on the BSS/MSC interface.

4.2.2.4 Idle channel observation

The quality of idle radio channels shall be measured by the BSS and a condensed form of the information passed back to the MSC.