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Digitalni celiļ ni telekomunikacijski sistem (faza 2+) ï Storitev govornega skupinskega klica (VGCS) ï Stopnja 2 (GSM 03.68, razliļ ica 5.2.1)

Digital cellular telecommunications system (Phase 2+) (GSM); Voice Group Call Service (VGCS); Stage 2 (GSM 03.68 version 5.2.1)

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS specifies the stage two description of the voice group call service (VGCS) within the digital cellular telecommunications system.

The contents of this ETS is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this ETS, it will be resubmitted for OAP by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

y the third digit is incremented when editorial only changes have been incorporated in the specification;

x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

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1 Scope

This European Telecommunication Standard (ETS) specifies the stage two description of the Voice Group Call Service (VGCS) which allows speech conversation of a predefined group of service subscribers in half duplex mode on the radio link taking into account multiple subscribers involved in the group call per cell.

2 Normative references

This ETS incorporates by dated and undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.68 (ETS 300 925): "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - stage 1".

[3] GSM 03.22 (ETS 300 930): "Digital cellular telecommunications system; Functions related to Mobile Station (MS) in idle mode".

[4] GSM 03.67 (ETS 300 932): "Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2".

[5] GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[6] GSM 05.08 (ETS 300 911): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[7] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[8] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

3 Definitions and abbreviations

3.1 Definitions

Definitions used in this ETS are also defined in GSM 02.68.

For the purposes of this ETS, the following definitions apply:

voice group call channel: Combined uplink/downlink to be allocated in a cell of the group call area for a particular voice group call. The uplink can be used by the presently talking service subscriber only. All mobile stations of the listening service subscribers in one cell shall listen to the common downlink.

group members: Service subscribers entitled to belong to a particular group classified by a certain group identification (group ID).

voice group call member: Any group member or dispatcher participating in an on going voice group call.

group call attributes: Group call area, dispatcher identities, acknowledgement destinations applying to a voice group call and the non-activity time which results in the release of the voice group call by the network.

Group Call Register (GCR): A functionality in the network containing the group call attributes.

group call anchor MSC: The MSC responsible for managing and maintaining a particular voice group call. The group call anchor MSC is determined as the one controlling the cells of the group call area. For voice group call services where the group call area exceeds one MSC area, the group call anchor MSC is predefined in the network.

group call relay MSC: MSC controlling cells of a group call area which are not under control of the group call anchor MSC for those voice group call services where the group call area exceeds one MSC area.

notification: Notifications are given on common control channels or dedicated channels in order to inform group members which are either in idle mode or in dedicated mode or participating in a voice group call or voice broadcast call on the existence of voice group calls.

Notification Channel (NCH): Common control channel on which the notifications are sent by the network (equivalent to a paging channel).

3.2 Abbreviations

Abbreviations used in this ETS are also listed in GSM 01.04.

For the purpose of this specification the following abbreviations apply:

eMLPP	enhanced Multi-Level Precedence and Pre-emption
GCR:	Group Call Register
NCH:	Notification Channel
VBS:	Voice Broadcast Service
VGCS:	Voice Group Call Service

4 Main concepts

4.1 Group definition

Service subscribers can become group members on a PLMN wide basis to one or more groups pre-defined in the network by a corresponding group identification (group ID). The membership enables them to initiate or receive voice group calls associated with that group ID. Certain dispatchers connected to external networks also require the capability to initiate or receive voice group calls.

In addition to subscriber details in the HLR, it is necessary for the mobile station to be aware of its group membership by storing details on the SIM. This is required because it shall respond to notification messages which include only the group ID (i.e. no IMSI or TMSI details).

Having become a group member, each service subscriber can set to active state or deactive state the group ID or any one out of his several group IDs on the SIM. In active state the subscriber can initiate voice group calls to that group. When in deactive state the subscriber can not make voice group calls to the group and the mobile station ignores any notification for that group.

4.2 Group conversations

4.2.1 Group call initiation

4.2.1.1 Normal operation with successful outcome

A group call area can be restricted to a single MSC area or can exceed one MSC area (implementation option).

A voice group call shall be initiated by a calling subscriber by a related MMI action for the service selection and the group ID dialled.

The MSC in which a voice group call is initiated obtains (by requesting the Group Call Register (GCR, see clause 5) the group call attributes.

When a calling subscriber initiates a voice group call, one voice group call channel shall be established in each cell of the group call area and notifications for that call shall be sent in each of these cells. As an alternative, voice group call channels may only be established in cells in reaction to responses received from mobile stations on the notifications. At the same time standard connections to dispatchers in the mobile network or in an external network shall be established.

A voice group call channel shall consist of a combined uplink/downlink. The uplink will be used exclusively by the presently talking service subscriber. All mobile stations of the listening service subscribers in one cell shall only listen to the same common downlink.

The calling subscriber shall have its dedicated standard uplink/downlink during call establishment and for the first period when he will be the talking service subscriber up to the time when the network decides that he shall join the voice group call channel. The mobile station of the calling subscriber shall then go to the voice group call channel and the dedicated standard uplink/downlink shall be released. From that moment on the calling subscriber shall be treated as all the other services subscribers.

Only one voice group call channel shall be established in each cell for any given voice group call, although there may be a number of simultaneous voice group calls within the same cell.

Service subscribers shall be notified on the voice group call in each cell. These voice group call notification messages shall be broadcast on the notification channel (NCH).

The notification messages use the group ID rather than individual TMSIs/IMSIs. Additionally, a group call area identification shall be included in order to enable a resolution in the case of overlapping group call areas. A service subscriber's mobile station needs to be able to recognise notification messages for those group IDs subscribed to and presently activated.

The network may also send messages on appropriate voice group call channel SACCHs or FACCHs, in order to notify group call members who may participate in other voice group calls. In addition, also paging information messages for standard calls may be sent in order to inform group call members on actually paged point-to-point calls.

Further the network may provide notification on the voice group call to service subscribers who have subscribed to the paged group ID and which are in dedicated mode. The process of broadcasting messages on NCHs is to be carried out throughout the call in order to provide the "late entry" facility whereby group members entering the area can join the call.

On receiving notification of a voice group call a group call member's mobile station shall adjust to the nominated channel to receive the voice group call if this channel was described in the notification message and receive the information on the downlink. Whilst receiving, the mobile station shall not transmit on the uplink SACCH. This group receive mode is different to the normal idle mode or dedicated mode. If no channel description was provided in the notification message, the mobile station shall establish a dedicated connection in order to respond to the notification. The network may then provide the mobile station with a channel description for the voice group call.

As a further mobile station option, the mobile station may read its paging subchannel in the current cell while in group receive mode or in group transmit mode in order to receive paging messages for mobile terminated calls.

4.2.1.2 Exceptional procedures

Completion of links into congested cells where pre-emption did not occur is required.

If the cell in which the calling service subscriber is located will be reset, the voice group call shall be released as long as the calling service subscriber has a dedicated link. After this instance the voice group call shall be maintained.

On receiving details of a voice group call the user may choose to move to the notified call or the mobile station may automatically move to the notified call if the new call is of higher priority than the existing call and automatic acceptance applies for this priority level.

4.2.2 On-going group calls

4.2.2.1 Normal operation with successful outcome

Within each voice group call starting from the instant where the calling subscriber first becomes a listening service subscriber, one service subscriber has the access at any one time to the uplink of the voice group call channel and his speech is then broadcast on all voice group call channel downlinks accordingly. The mobile station of the talking service subscriber shall mute the downlink speech to avoid non intelligible echos.

If more than one service subscriber apply to the uplink, contention resolution shall be performed in the network. Contention resolution shall be performed in the group call anchor MSC.

Additionally, in order to speed up the uplink access procedure, the BSS may grant the uplink prior to contention resolution being performed by the group call anchor MSC. This would mean that more than one service subscriber may access to the uplink and the respective speech may be combined in the group call bridge and broadcast onto all voice group call downlink channels during a transitional period. The anchor MSC shall then select one of the talking subscribers and pre-empt the uplink use of the other talking subscribers.

Dispatchers voice involved shall be broadcast on the voice group call channel downlink at any time. Mobile dispatchers are provided with a standard link and thus with an dedicated permanent uplink different from the voice group call channel.

All non-dispatcher group call members are provided with an indication on the voice group call channel of whether the uplink is in use. When the uplink is not in use, any non-dispatcher group call member can request access to the uplink. Any speech from dispatchers is combined with any speech from a talking service subscriber.