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Technical Specification

Digital cellular telecommunications system (Phase 2+);
Voice Broadcast Service (VBS) - Stage 1
(3GPP TS 43.069 version 4.1.0 Release 4)

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

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1 Scope

The present document specifies the stage one description of the Voice Broadcast Service (VBS) which allows the distribution of speech (or other signals which can be transmitted via the speech codec), generated by a service subscriber, into a predefined geographical area to all or a group of service subscribers located in this area.

The Voice Broadcast Service (VBS) is applicable to all mobile stations in a certain network and area which have the technical capability and the respective subscription to receive a VBS call.

NOTE: It is not considered as requirement that normal GSM Phase 2 mobile stations will be able to be used for this service.

The service is described from the service subscriber's and user's point of view; in particular:

- the procedure for normal operation with successful outcome;
- the action to be taken in exceptional circumstances;
- the interaction with other GSM services and features.

The present document does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate Global System for Mobile communications (GSM) specifications.

The present document defines a teleservice of the digital cellular telecommunication system GSM. Any interaction with other services and/or networks not dealt within clauses 8 or 9 are outside the scope of the present document.

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] 3G TR 41.004: "3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Abbreviations and acronyms".

[2] 3G TS 22.067: "3rd Generation Partnership Project; Technical Specification Group Services and system Aspects; enhanced Multi-Level Precedence and Pre-emption service (eMLPP) – Stage 1".

[3] 3G TS 32.005: "3rd Generation Partnership Project; Technical Specification Group Services and system Aspects; Telecommunications Management; Charging and billing; GSM call and event data for the Circuit Switched (CS) domain".

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

network operator: Entity which provides the network operating elements and resources for the execution of the VBS.

service provider: Entity which offers the VBS for subscription. The network operator may be the service provider.

service subscriber: Mobile subscriber which subscribes to the VBS.

voice broadcast call: An instance of the VBS initiated by a VBS subscriber. This term is used synonymously with the term "VBS call".

group identification (group ID): A numerical classification. The maximum number of group IDs which can be defined in one PLMN depends on the maximum number of group call areas defined in this PLMN. The maximum number of group IDs and group call areas shall be 10^8, Service subscriber shall be provided with one or up to 50 group IDs.

dispatcher: Particular fixed line or mobile users are identified within the network as dispatchers. Dispatchers shall receive all voice broadcast calls to a certain group ID in a group call area (this shall be done automatically by the network). In addition they can initiate voice broadcast calls to a group ID in a group call area.

> Dispatchers shall be connected to a voice broadcast call by means of standard links via radio or via an ISDN. They shall be called by their ISDN or MSISDN number, respectively. When dispatchers initiate voice broadcast calls, they shall call a particular MSISDN number which is related to a group ID and group call area. Dispatchers using the GSM network can be located outside of this group call area.
>
> The identities of the dispatchers are exclusively predefined in the network by the service provider. There will be none or up to five dispatchers involved in a particular voice broadcast call.

destination subscriber: Service subscriber or dispatcher to which the VBS call is directed.

calling subscriber: Service subscriber or dispatcher which invokes the VBS call.

group call area: Predefined area composed of one or a cluster of cells, to which a particular VBS call is distributed. The maximum number of group call area IDs which can be defined in one PLMN depends on the maximum number of group IDs defined in this PLMN. The maximum number of group IDs and group call areas combined shall be 10^8, The composition of a group call area is predefined in the network by the service provider. Changing of cell allocations in the network due to operational reasons will need an adaptation of the group call area definition. The group call area may include cells of more then one MSC area and cells of more than one PLMN.

Originator-to-dispatcher information: Information sent by the service subscriber originating a voice group call to the network during call setup for distribution to the dispatchers to be attached to the group call during call setup.

3.2 Abbreviations

Abbreviations used in the present document are listed in GSM 01.04.

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4 Description

The VBS is defined in the following. Figure 1 gives an explanation of the logical concept of the VBS.

a) The VBS enables a calling subscriber to send speech unidirectional and simultaneously to all entitled dispatchers and to destination subscribers belonging to a predefined group call area who have a subscription to the applicable group ID.

b) The calling subscriber may be any service subscriber which has subscribed to the related group ID and is entitled to establish a voice broadcast call by his subscription or any dispatcher who is entitled for it by his identity which shall be registered in the network.

   The destination subscriber may be any service subscriber which has subscribed to the related group ID or any dispatcher who is entitled for it by his identity which is registered in the network.

c) The broadcast call shall be established in a group call area which is comprised of one or a cluster of cells. Group call areas shall be predefined in the network by the service provider, co-ordinated by the network operator.

   In case of a service subscriber initiating a VBS call, the group call area is uniquely identified by the actual cell in which the service subscriber resides at the moment of VBS call initialization and by the called group ID.

   A dispatcher initiating a VBS call will be connected to a related predefined group call area. The entitlement of the dispatcher is checked by the network element responsible for the voice broadcast call management by verification of the calling identity. Since a dispatcher may be registered to more than one group call area and group ID an indication of the wanted group call area and group ID has to be given in form of a dedicated address called by the dispatcher.

d) Destination subscribers are all service subscribers or a group of service subscribers identified by the called group ID which have their present location in the group call area, and preregistered dispatchers. Destination service subscribers shall be notified with the group ID, not by paging the service subscriber individually. Dispatchers shall be called individually with their identity.

   Service subscribers which leave the group call area during an on going VBS call cease to be destination subscribers. Service subscribers which enter the group call area during an on going VBS call shall become destination subscribers within 500 ms after reception of the first notification message related to the VBS call.

e) The calling subscriber shall remain within the voice broadcast call until she terminates the call, loses contact with the network or leaves the group call area. The latter case does not apply to calling subscribers who are dispatchers. The VBS call shall be terminated by the network as soon as the network has determined that the calling subscriber has left the VBS call area.

f) The calling subscriber shall be informed by the network with a suitable indication about the successful establishment of the voice broadcast call so that he can start to speak .

NOTE: A successful establishment means that all broadcast downlink channels are allocated, with the restrictions mentioned in clause 6, whether somebody is listening or not, and the related dispatchers are alerted.

g) Authentication is mandatory at GSM call set up. To allow fast call set up in VBS authentification of the calling subscriber at invocation may optionally be delayed.

   Authentication of the destination subscriber, who have no uplink connection, is not required.

   Confidentiality on the radio path is optional.

h) Different levels of priority and pre-emption shall be applied as defined in the corresponding stage 1 description on the enhanced Multi-Level Precedence and Pre-emption service (eMLPP), GSM 02.67.

i) A number of voice broadcast calls may exist simultaneously intended for different groups of destination subscribers in the same group call area.

   Parallel voice broadcast calls are possible to the same group of destination subscribers in different, possibly overlapping group call areas.

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j) VBS shall also be provided in case of roaming. For this, certain group IDs shall be defined as supra-PLMN group IDs which have to be co-ordinated between the network operators and which shall be known in the networks and in the SIM. A service subscriber which is entitled by his subscription to establish voice broadcast calls while roaming shall only be able to use supra-PLMN group IDs in case of roaming.

k) For certain levels of priorities an acknowledgement of receipt of a voice broadcast call can be required as an application option (e.g. for railway emergency calls) from all or from nominated destination subscribers (the nomination is recorded on the SIM). The acknowledgement itself shall be performed at the end of the voice broadcast call. The acknowledgement shall indicate the time the reception started and the time the reception terminated. The acknowledgement has to be given to a predefined recipient.

l) It shall be possible for a service subscriber to activate or deactivate the voice broadcast reception for different group IDs. The selection list is stored on the SIM corresponding to the subscribed group IDs. It shall be possible to prohibit the deactivation of group IDs used for high priority voice broadcast calls.

   Dispatcher which are registered for a certain voice broadcast call and which have also a subscription for VBS with the same group ID as the voice broadcast call for which they are dispatcher shall deactivate this group ID when they are located in the corresponding group call area in order to avoid conflicts between paging for the dispatcher and notifications for the group ID.

m) The calling subscriber may specify, at call setup, information to be presented at call setup to the dispatchers. This information is sent as originator-to-dispatcher information to the network, and sent as UUS1 by the network to the dispatchers in the message for call setup. For normal call setup, the information is subject to the same constraints as UUS1 information in the setup of a point-to-point call. For fast setup, the information is restricted to 12 digits (with leading zeros); inclusion of originator-to-dispatcher information at fast setup is only possible if the mobile station has a valid TMSI. It is a network option to support originator-to-dispatcher information, or to ignore it. The inclusion of originator-to-dispatcher information in the VBS call setup is not subject to provision or withdrawal.

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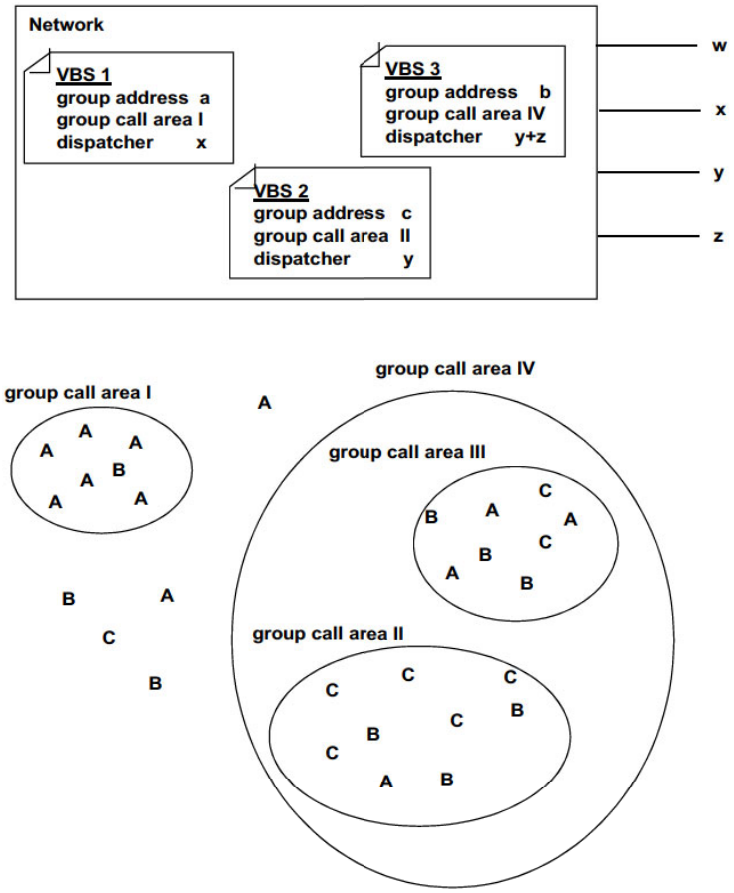

NOTE: VBS1, VBS2, VBS3 = particular voice broadcast calls with the attributes preregistered in the network.
A, B, C, D = service subscriber with group ID a, b, c or d, respectively.

I. II, III, IV = group call areas.

w, x, y, z = dispatchers connected via normal GSM links or external networks.

Figure 1: Logical concept of the VBS

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5 Normal operation with successful outcome

5.1 Provision

The VBS is provided to be used by a service subscriber after prior arrangements with the service provider. The provision includes the assignment of group IDs to the service subscriber. A subscription shall not provide more than 50 group IDs to the service subscriber.

The service can be offered with two subscription options:

Subscription option	Value
- subscriber has the capability of initiating voice broadcast calls	No
	Yes;
- subscriber has the capability to initiate voice broadcast calls in case of roaming	No
	Yes.

5.2 Withdrawal

The VBS is withdrawn at the service provider's request or for administrative reasons.

5.3 Network related service configuration

The network related service configuration defines the attributes of a particular voice broadcast call which shall be pre-registered in the network by the service provider. This is not related to one specific service subscriber.

The attributes of a particular broadcast call are group ID, group call area composition, a list of dispatcher identities to be connected to this area, a list of dispatchers allowed to initiate voice broadcast calls to this area, the broadcast call reference identity which shall be used in case of COLP (see subclause 7.3) and dispatcher identities to which an optional acknowledgement can be routed. Changes to the group call area composition shall be co-ordinated with the network operator.

5.4 Normal operation for voice broadcast call establishment

The VBS service shall be automatically initiated by the network when a service subscriber or dispatcher dials a particular short code or address at call set-up.

On successful initiation of the VBS, the voice broadcast call shall be established between the calling subscriber and the destination subscribers. The destination subscribers are:

- all service subscribers at any time during the voice broadcast call with the corresponding active group ID when located in the group call area, where the group call area is uniquely defined by:
  - the location (radio cell) of the calling subscriber at invocation and group ID if the calling subscriber is a service subscriber;
  - the addressed group call area if the calling subscriber is a dispatcher;
- the preregistered dispatchers related to that group call area and group ID.

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The calling subscriber shall be informed by the network with a suitable indication about the successful establishment of the voice broadcast call so that the user can start to speak.

The call can be released by the calling subscriber or by the network (e.g. in case of a higher priority call) or by dispatchers predefined in the network.

Destination subscribers leaving the voice broadcast call for any reason shall not release the on going voice broadcast call.

5.5 Charging requirements

Normal event data according to GSM 12.05 shall be recorded as a network option related to calling subscriber or related to all VBS calls to one group ID in a specific group call area. . In addition data to be passed to the anchor MSC for charging purposes is the resources (i.e. cell identities) used during a call.

6 Exceptional procedures or unsuccessful outcome

If a service subscriber wants to establish a voice broadcast call while not subscribed to the service or the network cannot provide the service for some reason, an indication shall be provided to the calling subscriber to notify him with the reason of failure.

If a dispatcher wants to establish a voice broadcast call while not entitled to do it or the network cannot provide the service for some reason, the call shall be rejected. The network shall give an appropriate indication to dispatchers who are GSM subscribers.

If a voice broadcast call cannot be established to all cells and dispatchers in a pre-set time, the call shall be considered established provided that at least the originated cell in case of a service subscriber originated broadcast call or any one cell within the group call area in case of a dispatcher originated broadcast call has been included within this time.

If a cell is excluded from the group call area because of pre-emption, the voice broadcast call is maintained as long as the calling subscriber is not pre-empted.

7 Interaction with GSM services and features

7.1 Calling Line Identification Presentation (CLIP)

If CLIP is applied, the broadcast call reference - including the group call area ID and the group ID - shall be presented to the dispatchers. In addition the subaddress field of the calling party may be used to identify the calling subscriber to the dispatchers.

The receiving mobile stations of the destination subscribers shall display the paged group ID regardless the destination subscribers have a subscription to CLIP.

7.2 Calling Line Identification Restriction (CLIR)

CLIR shall be supported.

The network shall have the possibility to override CLIR or reject the request to establish a voice broadcast call for a calling subscriber who has CLIR actived.

7.3 Connected Line Identification Presentation (COLP)

If COLP is applied, the broadcast call reference - including the group call area ID and the group ID - shall be presented to the calling subscriber. No destination subscriber identities will be presented.

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7.4 Connected Line Identification Restriction (COLR)

COLR shall be supported. The network shall have the possibility to override COLR in case of voice broadcast calls.

7.5 Call Forwarding Unconditional (CFU)

CFU is not applicable to voice broadcast calls of service subscribers when activate and operative, i.e. CFU shall be ignored.

CFU is applicable for dispatchers, i.e. voice broadcast calls are forwarded by CFU.

7.6 Call Forwarding on mobile subscriber Busy (CFB)

CFB is not applicable to voice broadcast calls of service subscribers with CFB active and operative.

CFB is applicable for dispatchers if the voice broadcast call does not have a higher priority than the present call.

7.7 Call Forwarding on No Reply (CFNRy)

CFNRy is not applicable to voice broadcast calls of service subscribers with CFNRy active and operative.

CFNRy is applicable for dispatchers, i.e. voice broadcast calls are forwarded by CFNRy.

7.8 Call Forwarding on mobile subscriber Not Reachable (CFNRc)

CFNRc is not applicable to voice broadcast calls of service subscribers with CFNRc active and operative.

CFNRc is applicable for dispatchers, i.e. voice broadcast calls are forwarded by CFNRc.

7.9 Call Waiting (CW)

CW is not applicable for service subscriber. Instead, as a network option, a notification of paging for other calls shall be given to the service subscribers involved in the voice broadcast call.

CW is applicable for dispatchers.

7.10 Call Hold (HOLD)

Call hold is not applicable for service subscribers. For handling of parallel voice broadcast calls to the same destination subscriber see item i) of clause 4.

A calling service subscriber cannot leave the voice broadcast call without releasing the call.

The acceptance of a voice broadcast call by a service subscriber while being in a point-to-point call shall release the point-to-point call. The release will be invoked by the mobile station.

If a voice broadcast call is requested by a service subscriber while being in a point-to-point call, the point-to-point call shall be released. The release will be invoked by the mobile station.

Call hold is applicable for dispatchers.

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7.11 Multi-party Service (MPTY)

MPTY is not applicable for service subscribers.

MPTY is applicable for dispatchers.

7.12 Closed User Group (CUG)

CUG is not applicable. Being a member of a CUG has no impact on receiving voice broadcast calls.

7.13 Advice of Charge (AoC)

AoC can be provided to the calling subscriber as network option.

7.14 Barring of All Outgoing Calls (BAOC)

BAOC is applicable, if subscribed to, with the possible exception of high priority voice broadcast calls.

7.15 Barring of Outgoing International Calls (BOIC)

BOIC is not applicable for voice broadcast calls of service subscribers.

BOIC is applicable for dispatchers.

7.16 Barring of Outgoing International Calls except those directed to the Home PLMN country (BOIC-exHC)

BOIC-exHC is not applicable for voice broadcast calls of service subscriber.

BOIC-exHC is applicable for dispatchers.

7.17 Barring of All Incoming Calls (BAIC)

BAIC is not applicable for voice broadcast calls to service subscribers.

BAIC is applicable for dispatchers.

7.18 Barring of Incoming Calls when Roaming outside the home PLMN country (BIC-Roam)

BIC-Roam is not applicable for voice broadcast calls to service subscribers.

BIC-Roam is applicable for dispatchers.

7.19 Explicit Call Transfer (ECT)

ECT is not applicable for service subscribers.

ECT is applicable for dispatchers.

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7.20 enhanced Multi-Level Precedence and Pre-emption service (eMLPP)

Different priorities with corresponding set-up procedures are applicable as defined in the stage 1 description on eMLPP in GSM 02.67.

7.21 Short Message Service (SMS)

Sending and reception of short messages is not possible for destination service subscribers.

7.22 Operator Determined Barring (ODB)

Same as for subscriber controlled barring.

7.23 Completion of Calls to Busy Subscribers (CCBS)

The CCBS supplementary service is only applicable for dispatchers and not for VBS service subscribers.

If a new terminating p-t-p call is set up to a dispatcher who is busy because of an active VBS call, it shall be possible to allow the calling party to apply the CCBS service. If the dispatcher initiates a VBS call and the called broadcast ID has been active, then the dispatcher shall be connected to the ongoing VBS call..

8 Interworking considerations

No specific requirements are identified.

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Annex A (informative): Change History

TSG#	TSG doc	WG doc	Spec	CR	Rev	Ph	Cat	Title	Old vers	New vers	WI
S#28		May 2000	02.69			R99		Specification upgrade to Release 1999 version 8.0.0	7.0.0	8.0.0	
S#32		June 1999	02.69	A014		R00		Introduction of Originator-to-dispatcher information into VBS	8.0.0	9.0.0	
			02.69 / 42.069					Conversion to 3GPP TS format	02.69 v9.0.0	42.069 v4.0.0	-
SP-10	SP-000550		42.069	001		Rel-4	A	Correction of implementation of Clarification of interaction with CCBS service	4.0.1	4.1.0	Correct

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