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Broadcast/Multicast Services – Stage 1

Revision A

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Revision History

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Wireless Features Description:
Broadcast/Multicast Services Functional Characteristics and Requirements

1 Contents

2 Scope

The objective is to define and to standardize the functionality of Broadcast/Multicast Services that can be incorporated into the operations of cdma2000®[1] based wireless telecommunications networks. This document defines the functional characteristics and requirements of Broadcast/Multicast Services.

3 References

3.1 Normative Reference

None

3.2 Informative References

None

4 Abbreviations

BCMCS	Broadcast/Multicast Service
RF	Radio Frequency

5 Definitions

- **Broadcast/Multicast Service (BCMCS)** – The broadcast/multicast service provides the ability to transmit the same information stream to multiple users simultaneously.
- **BCMCS Program** – The logical content transmitted using the BCMCS capabilities. The BCMCS Program is composed of one or more IP flows.
- **Transmission Territory** – Area of wireless network coverage where transmission of a BCMCS program may occur. The transmission territory is defined by a set of cells/sectors that may transmit a BCMCS program. The transmission territory may or may not be contiguous.

6 General Description

6.1 Introduction

Broadcast/Multicast service is intended to provide flexible and efficient mechanism to send common (the same) information to multiple users. The motivation for this service is to achieve the most efficient use of air interface and network resources when sending the same information to multiple users. The type of information transmitted could be any type of data, e.g. text, multimedia (e.g. voice) and streaming media. The Broadcast/multicast service is delivered via

[1] cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.

the most efficient transmission technique based on the density of BCMCS users, information (type of media) being transmitted, and available radio resources.

Transmission territory for each BCMCS program can be independently defined. Programs can be transmitted in time sequence on a given channel. Both simultaneous programs (over a single or multiple channels) and over the same channel, in time sequence can also coexist in a given cell.

Retransmission and acknowledgment in BCMCS are not required, since the type of transmission is "one way" and "one to many".

BCMCS programs may be transmitted to all or selected regions of the network. These regions constitute the transmission territory. The BCMCS programs may be received by all users or may be restricted to a subset of users via encryption. Selective encryption by territory of the same program may also be deployed.

BCMCS subscription is normally associated with the program (e.g. CNN, Disney Channel, Sports Channel), not the content (media type such as music, video, etc.). By selecting the program, the user selects the type of content he or she wishes to receive.

6.2 Service Functions

BCMCS includes the following functions:

Subscription Management function supports the capability to subscribe a user for broadcast/multicast service.

Service Discovery function refers to the procedures the mobile station employs to discover the BCMCS programs that can be provided by the system. This information may also be conveyed via mechanisms other then those provided by the BCMCS (e.g. via a web-site).

An announcement of a BCMCS program can be automatically sent to the BCMCS capable mobile station (for example by means of an icon appearing whenever a mobile station enters a broadcast range, or whenever broadcast program commences). Programmatic discovery, i.e. finding out in advance what programs will be aired when, may be accomplished by a variety of media outlets. If the nature of the event is private, the service discovery may be by invitation. A particularly useful method of programmatic discovery is announcement being posted on the wireless service provider's web site, e.g. date and time, duration, media type and format, broadcast territory, subscription information, etc.

Translating application layer discovery to transport (and other) layer discovery can be accomplished once the user selects a particular BCMCS program. The mobile station can then obtain ("discover") all necessary parameters required to receive the BCMCS program IP flow(s) (e.g. CDMA frequency and channel, media format, decryption keys, etc.). The exact methodology for this step is not a subject for Stage 1.

Information Acquisition function allows the user to acquire the information needed to receive a BCMCS program.

Service Accounting includes aspects of the service related to billing based on the services rendered.

Distribution Management provides the ability to determine the locations where the BCMCS program is transmitted.

Radio Management deals with efficient operation of the radio channels to support BCMCS.

Feature Interaction deals with the aspects of initiating and operating BCMCS service simultaneously with other services. BCMCS should co-exist with other services in cdma2000

networks with no adverse effects upon those other services, aside from provision of adequate resources to handle the expected traffic (e.g. radio resources).

7 Broadcast/Multicast Services Requirements

7.1 General Requirements

(M/B-01) **Transmission Territory:** Operators shall have the ability to define BCMCS transmission territory. Each Transmission Territory may span multiple cells/sectors of the same network. It may be possible to use RF boundaries such as sectors, cells, clusters, paging zones, and systems to confine the distribution of BCMCS program. An operator may provide a BCMCS program in a region of the network based on the subscription level of the recipient or based on the applicability of the program to that region.

(M/B-02) **Intended Recipients for BCMCS:** A BCMCS shall be usable (e.g. decipherable if encrypted) only by the BCMCS users subscribed to that program.

(M/B-03) **Transmission Control:** It shall be possible to limit transmission of a BCMCS program to those portions of the transmission territory where registered/active users for that program are located.

(M/B-04) **Encryption:** BCMCS shall support the capability for encryption of BCMCS programs.

(M/B-05) **Access to Internet (Non-Wireless) Broadcast:** The reception of a BCMCS program shall not prevent a user from subscribing to and receiving Internet based broadcast and multicast services.

(M/B-06) **Multimedia Types:** It shall be possible to support all types of multimedia (e.g. video, audio, etc.

(M/B-07) **QoS:** It shall be possible to provide QoS necessary to support real-time services such as audio and video.

(M/B-08) **Authorization:** It shall be possible to authorize BCMCS users for specific BCMCS programs.

(M/B-09) **Support of Multiple Programs:** The system shall support multiple BCMCS programs.

(M/B-010) **IP Versions:** The BCMCS system shall support IPv4 multicast flows in the initial version of the BCMCS system specification, and shall support IPv6 multicast flows in a later revision.

(M/B-011) **IP Header Compression:** It shall be possible to apply IP Header Compression of IP flows in the BCMCS programs.

(M/B-012) **Authentication:** The BCMCS system shall support user authentication.

(M/B-013) **Priority:** The BCMCS system shall be able to provide different priorities for the different multicast IP flows.

Explanatory Note: If contention of resources arises, a higher priority BCMCS flow has precedence over lower priority flows. Any outage would first start affecting lower priority flows. For the radio physical layer this can

be illustrated as follows. Assume that both BC-1 (high priority) and BC-2 are video flows, both are assigned the same nominal transmit power. During busy hour, if base station power amplifier (PA) resources approach exhaustion, BC-1 would continue transmission at full power, while BC-2 transmit power may be reduced. Mobile outage incidence for BC-2 would start increasing as a result.

(M/B-014) **Radio Interface Support:** The BCMCS shall be supported across all cdma2000 radio access technologies.

(M/B-015) **Incoming Call/Service Notification:** It shall be possible to receive incoming call/service notification while receiving BCMCS programs.

(M/B-016) **Emergency BCMCS Program:** BCMCS system shall be capable of designating a BCMCS program to be an Emergency program. Emergency BCMCS program designation shall be under the control of the Wireless Operator. When a mobile receives notification that an Emergency program is available, the mobile should alert the user. Emergency BCMCS may be available to users without the need for BCMCS subscription.

(M/B-017) **Roaming:** The BCMCS users shall be able to receive BCMCS programs from the home network and/or serving network while roaming in networks that support BCMCS and appropriate roaming agreements are in place.

(M/B-018) **Selection of Radio Channels:** It shall be possible to transmit BCMCS content over either shared or dedicated channels.

7.2 Accounting Requirements

(ACCT-01) **Program Based Charging:** It shall be possible to charge based on the BCMCS program.

(ACCT-02) **Charging Options:** It shall be possible to charge the BCMCS program originator, the BCMCS program subscriber, or both.

(ACCT-03) **Volume Based Charging:** It shall be possible to charge based on the volume of information transmitted.

(ACCT-04) **Time/Date Based Charging:** It shall be possible to base charging tariff on the Time of Day, and Date of broadcast or multicast transmission.

(ACCT-05) **Radio Resource Based Charging:** It shall be possible to charge based on radio resource utilization (e.g. video broadcast requiring 64 kbps and frame erasure target of 1 % may be more expensive than voice broadcast over 8 kbps and FER target of 2%).

(ACCT-06) **Multimedia Type:** Accounting records shall indicate the type of transmission medium (e.g. video, audio, etc.)

(ACCT-07) **Indication of Area of Transmission:** The accounting records shall include an indication of the transmission territory of the BCMCS program.

8 Procedures for BCMCS

8.1 Normal Procedures With Successful Outcome

8.1.1 Authorization

The service may be generally available or may be provided after pre-arrangement (e.g. subscription) with the service provider for all users with BCMCS equipped Mobile Stations.

8.1.2 De-Authorization

The service may be de-authorized by the service provider at the subscriber's request or for administrative reasons.

8.1.3 Registration

N/A

8.1.4 De-Registration

N/A

8.1.5 Activation

The service to a user shall be activated upon request for a BCMCS program for which the user is authorized.

8.1.6 De-Activation

The service to a user shall be de-activated upon de-authorization, termination of the BCMCS program that the user is receiving, or notification from the user that they are discontinuing reception of the BCMCS program.

8.1.7 Invocation

N/A

8.1.8 Normal Operation with Successful Outcome

Upon successful authorization, and activation the user shall be able to receive authorized BCMCS programs.

8.2 Exception Procedures or Unsuccessful Outcome

8.2.1 Registration

N/A

8.2.2 De-Registration

N/A

8.2.3 Activation

None identified.

8.2.4 De-Activation

None identified.

8.2.5 Invocation

N/A

8.2.6 Exceptions While Roaming

None identified.

8.2.7 Exceptions During Intersystem Handoff

None identified.

8.3 Alternate Procedures

None identified.