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POSDATA MBS Design Document

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1 Introduction and Scope

This document describes how to implement MBS functions based on POSDATA MBS architecture reference model, protocols, and procedures.

2 Abbreviations and Acronyms

The following table lists several abbreviations and acronyms used throughout this document.

Table 2-1 Abbreviations and Acronyms

ABBREVIATION	EXPANSION
3GPP	Third Generation Partnership Project
3GPP2	Third Generation Partnership Project 2
ACR	Access Control Router
ASN	Access Service Network (WiMAX)
ASN-GW	Access Service Network Gateway (WiMAX)
BCAST	Mobile Broadcast Service (OMA)
BCMCS	Broadcast/Multicast Service (3GPP2)
BS	Base Station
CID	Connection Identifier
CSN	Connectivity Service Network (WiMAX)
DSA	Dynamic Service Addition
DSD	Dynamic Service Deletion
HO	Handoff
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
MAC	Medium Access Control
MBMS	Multimedia Broadcast/Multicast Service (3GPP)
MBS	Multicast Broadcast Service
MBSC	Multicast Broadcast Service Controller
MCBCS	Multicast and Broadcast Service (WiMAX)
MCID	Multicast Connection Identifier
MS	Mobile Station
NSP	Network Service Provider
OAM	Operations and Maintenance
OMA	Open Mobile Alliance

PIM-SM	Protocol Independent Multicast Sparse Mode
PIM-SSM	Protocol Independent Multicast Source Specific Multicast
PSS	Portable Subscriber Station
RAS	Radio Access Station
WiBro	Wireless Broadband network
WiMAX	Worldwide Interoperability for Microwave Access Forum

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2 **3 References**

- 3 [1] "IEEE Standard for Local and Metropolitan Area Networks", (*IEEE Std. 802.16-2004*).
- 4 [2] "IEEE Standard for Local and Metropolitan Area Networks", (*IEEE Std. 802.16e-2005*).
- 5 [3] "Specifications for 2.3GHz band Portable Internet Service," (*TTAS.KO-06.0082*), TTA, June 2005.
- 6 [4] "WiMAX End-to-End Network Systems Architecture (Stage 2: Architecture Tenets, Reference
7 Model and Reference Points)," WiMax Forum Network Working Group (NWG), under revision,
8 www.wimaxforum.org/technology/documents/, April 2006.
- 9 [5] "WiMAX End-to-End Network Systems Architecture (Stage 3: Detailed Protocols and
10 Procedures)," WiMax Forum Network Working Group (NWG), under revision,
11 www.wimaxforum.org/technology/documents/, August 2006.
- 12 [6] "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description
13 (Release 6)," (*3GPP TS 23.246 v6.9.0*), December 2005.
- 14 [7] "Interoperability Specification (IOS) for Broadcast Multicast Services (BCMCS)," (*A.S0019-0 v2.0*),
15 3GPP2, January 2006.
- 16 [8] "Broadcast/Multicast Services – Stage 1 Revision A," (*S.R0030-A v1.0*), 3GPP2, January 2004.
- 17 [9] "Broadcast-Multicast Service Security Framework," (*S.S0083-A v1.0*), 3GPP2, August 2004.
- 18 [10] "Mobile Broadcast Service Architecture," (*OMA-AD-BCAST-V1_0-20060329-D*), Open Mobile
19 Alliance, March 2006.
- 20 [11] "Proposed Stage 1 Requirements for MCBCS Requirements,"
21 (*060404_SPWG_MCBCS_Requirements for Rel1dot5_r1*) Service Provider Working Group, WiMAX
22 Forum, April 2006.
- 23 [12] B. Cain, S. Deering, I. Kouvelas, B. Fenner, and A. Thyagarajan, "Internet Group Management
24 Protocol, Version 3," *RFC 3376*, Oct. 2002.
- 25 [13] B. Fenner, M. Handley, H. Holbrook, and I. Kouvelas, "Protocol Independent Multicast - Sparse
26 Mode (PIM-SM): Protocol Specification (Revised)," *RFC 4601*, Aug 2006.
- 27 [14] S. Bhattacharyya, "An Overview of Source-Specific Multicast (SSM)," *RFC 3569*, July 2003.

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