



BCAST Distribution System Adaptation – over DVB-NGH

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1. Scope

This document specifies how the BCAST 1.2 Enabler is implemented over the IP profile of Digital Video Broadcasting systems supporting the Generic Stream Encapsulation (DVB-GSE). This is the case more specifically to the Digital Video Broadcasting – Next Generation Handheld (DVB-NGH) distribution system and Digital Video Broadcasting – Second Generation Terrestrial (DVB-T2) which features T2-Base and T2-Lite profiles. This last profile is tailored for mobile reception. This document is restricted to the sheer terrestrial profile of DVB-NGH. The BCAST 1.2 Enabler supports the global interoperability among different BCAST Distribution Systems, and can also be adapted according to the characteristics of BCAST Distribution Systems. In this document, a single adaptation is presented, the generic adaptation.

2. References

2.1 Normative References

- [BCAST12-Distribution] “File and Stream Distribution for Mobile Broadcast Services”, Open Mobile Alliance™, OMA-TS-BCAST_Distribution-1_2,
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- [BCAST12-ServContProt] “Service and Content Protection for Mobile Broadcast Services”, Open Mobile Alliance™, OMA-TS-BCAST_SvcCntProtection-V1_2,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [BCAST12-Services] “Mobile Broadcast Services”, Open Mobile Alliance™, OMA-TS-BCAST_Services-V1_2,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [BCAST12-SG] “Service Guide for Mobile Broadcast Services”, Open Mobile Alliance™, OMA-TS-BCAST_ServiceGuide-V1_2,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [DRM20-Broadcast-Extensions] “OMA DRM v2.0 Extensions for Broadcast Support”, Open Mobile Alliance™, OMA-TS-DRM-XBS-V1_2,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [ETSI EN 300 468] ETSI EN 300 468, “Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB Systems”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
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[URL:http://portal.etsi.org/](http://portal.etsi.org/)
- [ETSI EN 302 755] ETSI EN 302 755, “Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
- [ETSI EN 303 105] ETSI EN 303 105, “Digital Video Broadcasting (DVB); Next Generation Broadcasting system to Handheld; Physical layer specification (DVB-NGH)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
- [ETSI TS 102 005] ETSI TS 102 005, “Specification for the use of video and audio coding in DVB services delivered directly over IP”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
- [ETSI TS 102 606-1] ETSI TS 102 606-1, “Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE)”; Part 1
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
 Note: This document is first publicly available as a DVB blue book before its publication at ETSI
 DVB Blue Book A116-1: Generic Stream Encapsulation (GSE); Part 1: Protocol
[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)
- [ETSI TS 102 606-2] ETSI TS 102 606-2, “Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE); Part 2 Logical Link Control (LLC)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
 Note: This document is first publicly available as a DVB blue book before its publication at ETSI
 DVB Blue Book A116-2: Generic Stream Encapsulation (GSE); Part 2: Logical Link Control (LLC)
[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)
- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.1, Open Mobile Alliance™, OMA-IOP-Process-V1_1,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [ISMACryp] “ISMA Encryption and Authentication v1.1.”, Internet Streaming Media Alliance,
[URL:http://www.isma.tv/](http://www.isma.tv/)

- [RFC1952] IETF RFC 1952 “GZIP file format specification version 4.3”, P. Deutsch, May 1996,
[URL:http://www.ietf.org/rfc/rfc1952.txt](http://www.ietf.org/rfc/rfc1952.txt)
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- [RFC3926] IETF RFC 3926 “FLUTE - File Delivery over Unidirectional Transport”, T. Paila et al, October 2004,
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- [RFC4234] “Augmented BNF for Syntax Specifications: ABNF”. D. Crocker, Ed., P. Overell. October 2005,
[URL:http://www.ietf.org/rfc/rfc4234.txt](http://www.ietf.org/rfc/rfc4234.txt)
- [SCRRULES] “SCR Rules and Procedures”, Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)

2.2 Informative References

- [OMADICT] “Dictionary for OMA Specifications”, Version x.y, Open Mobile Alliance™,
OMA-ORG-Dictionary-Vx_y,
[URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

This is an informative document, which is not intended to provide testable requirements to implementations.

3.2 Definitions

BCAST Distribution System	A system typically but not necessarily containing the ability to transmit the same IP flow to multiple Terminal devices simultaneously. A BCAST Distribution System (BDS) typically uses techniques that achieve efficient use of radio resources. A BDS consists of Network functionality up to the IP layer and optional Service Distribution/Adaptation functionality above the IP layer. Most BDSs support broadcast/multicast distribution in the network. Some BCAST Distribution Systems have the capability to deliver the IP flows in the network via unicast.
Broadcast Service	<p>A Broadcast Service is a “content package” suitable for simultaneous distribution to many recipients (potentially) without knowing the recipient. Either each receiver has similar receiving devices or the content package includes information, which allows the client to process the content according to his current conditions.</p> <p>Examples of Broadcast Services are:</p> <p>pure Broadcast Services:</p> <ul style="list-style-type: none"> - mobile TV - mobile file downloading (mobile newspaper, clips, games, SW upgrades, other applications) <p>combined broadcast/interactive Broadcast Services:</p> <ul style="list-style-type: none"> - mobile TV with file downloading and voting - betting Broadcast Services - auction Broadcast Services - trading Broadcast Services
Common PLP	PLP having one slice per logical frame, transmitted after the L1-POST signalling, which may contain data shared by multiple PLPs
IP profile of DVB-NGH	The IP profile of DVB-NGH utilizes Generic Stream Encapsulation (GSE) as encapsulation protocol for the IP protocol. The IP profile used by OMA-BCAST adaptation uses specific elements defined in [ETSI TS 102 606-2]
L1 signalling	signalling carried in the beginning of a logical frame providing more detailed L1 information about the NGH system and the PLPs
L2 signalling	signalling carried on the top of IP, which provides the exhaustive information of the signals available within the different networks.
P1 signalling	signalling carried by the P1 symbol(s) and used to identify the basic mode of the NGH frame.
P1 symbol	Fixed pilot symbol located in the beginning of the frame within each RF-channel. The P1 symbol is mainly used for fast initial band scan to detect the NGH signal, its timing, frequency offset and FFT-size.
Smartcard Profile	<p>Alias for a set of Smartcard-based technologies and mechanisms which provide key establishment and key management, as well as permission and token handling for the Service and Content Protection solution for BCAST Terminals. In particular, subscriber key establishment and both short and long term key management may be based on GBA mechanisms and a Smartcard with (U)SIM/ISIM as defined by 3GPP, or based on a pre-provisioned shared secret key and a Smartcard with R-UIM/CSIM/ISIM or a UIM as defined by 3GPP2.</p> <p>The Smartcard Profile is described in [BCAST12-ServContProt] Section 6.</p>

The upper layer signalling The upper layer signalling means the signalling elements specified within [ETSI TS 102 606-2], which are used in OMA-BCAST adaptation over DVB-NGH and incorporated into the SG elements.

3.3 Abbreviations

3GPP	3 rd Generation Partnership Project
BCAST	Mobile Broadcast Services
BCMCS	Broadcast Multicast Service
BDS	BCAST Distribution System
BSA	BCAST Service Application
BSD/A	BCAST Service Distribution and Adaptation
BSM	BCAST Subscription Management
CID	Context Identifier
DCF	DRM Content Format
DRM	Digital Rights Management
DVB	Digital Video Broadcast
DVB-NGH	Digital Video Broadcast – Next Generation Handheld
DVB-T2	Digital Video Broadcast – Second Generation Terrestrial
EN	European Norm
ETSI	European Telecommunications Standards Institute
FDT	File Delivery Table
FEC	Forward Error Correction
FFT	Fast Fourier Transform
FLUTE	File Delivery over Unidirectional Transport
GSE	Generic Stream Encapsulation
GZIP	GNU zip
IC	Interaction Channel
ID	Identifier
IP	Internet Protocol
IP/MAC	Internet Protocol/Media Access Control
IPsec	IP security
ISIM	IP Multimedia Services Identity Module
ISMACryp	Internet Streaming Media Alliance (ISMA) Encryption and Authentication
KMS	Key Management System
L1	Layer 1
L2	Layer 2
LCD	Link Control Data
LLC	Logical Link Control
MBMS	Multimedia Broadcast / Multicast Service
MIKEY	Multimedia Internet KEYing
MPE	Multi-Protocol Encapsulation
NCD	Network Control Data

OMA	Open Mobile Alliance
OSF	Open Security Framework
P1	P1 symbol
PLP	Physical Layer Pipe
PLPID	Physical Layer Pipe Identifier
ROHC	Robust Header Compression
ROHC-U	Robust Header Compression-Unidirectional
RTCP	Real Time Control Protocol
SDP	Session Description Protocol
SG	Service Guide
SG-C	Service Guide-Client
SG-D	Service Guide-Distribution
SGDD	Service Guide Delivery Descriptor
SGDU	Service Guide Delivery Unit
SRTP	Secure Real-time Transport Protocol
STKM	Short Term Key Message
T2-Lite	Digital Video Broadcast – Second Generation Terrestrial-Lite profile
TFS	Time-Frequency Slicing
TR	Technical Report
TS	Technical Specification
URI	Uniform Resource Identifier
XML	Extensible Markup Language

4. Introduction

This technical specification specifies how the OMA Mobile Broadcast Services (BCAST) Enabler can be implemented in the IP profile of DVB-NGH Network. The adaptation specified in this specification can also be used for the IP profile of DVB-T2 and T2-Lite.

4.1 Version 1.2

BCAST ERP 1.2 implements a single mode of adaptation for the IP profile of DVB-NGH or DVB-T2. This mode is the Generic adaptation over an underlying DVB-NGH or DVB-T2 transport network. This adaptation is built on DVB Generic Stream Encapsulation and is therefore usable on all DVB bearers which support GSE.

In this mode, this Technical Specification explains how the BCAST Enabler has access to the IP transport layer so that BCAST services can be provided from BCAST Network entities to BCAST terminals. Furthermore, this allows a common behaviour across multiple BCAST enabled BCAST Distribution Systems (BDSes).

Chapter 5 provides an informative overview of DVB-NGH and DVB-T2

Chapter 6 provides specifications for the generic adaptation over DVB- GSE IP transmission network.

Chapter 7 provides an informative walkthrough explaining how BCAST services are distributed over DVB-NGH.

5. Overview of DVB-NGH and DVB-T2(Informative)

5.1 DVB-NGH

DVB-NGH [ETSI EN 303 105] is an end-to-end broadcast system for delivery of any types of digital content and services using Transport Stream (TS) and IP-based mechanisms optimized for devices with limitations on computational resources and battery. An inherent part of the DVB-NGH system is the unidirectional broadcast path that may be combined with a bi-directional mobile/cellular interactivity path. DVB-NGH is thus a platform that can be used for enabling the convergence of services from broadcast/media and telecommunications domains (e.g., mobile/cellular).

The set of specification documents applicable to OMA-BCAST adaptation of DVB-NGH are defined in the following specifications:

- ETSI EN 303 105, “Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a next generation handheld digital terrestrial television broadcasting system (DVB-NGH)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)
- ETSI TS 102 606-1, “Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE); Part 1 Protocol”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)

Note: This document is first publicly available as a DVB blue book before its publication at ETSI

DVB Blue Book A116-1: Generic Stream Encapsulation (GSE); Part 1: Protocol

[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)

- ETSI TS 102 606-2, “Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE); Part 2 Logical Link Control (LLC)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)

Note: This document is first publicly available as a DVB blue book before its publication at ETSI

DVB Blue Book A116-2: Generic Stream Encapsulation (GSE); Part 2: Logical Link Control (LLC)

[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)

The following OMA-BCAST service layer over DVB-NGH:

- "File and Stream Distribution for Mobile Broadcast Services ", Open Mobile Alliance™, OMA-TS-BCAST_Distribution-1_2,
[URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Service and Content Protection for Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_SvcCntProtection-V1_2,
[URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_Services-V1_2,
[URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Service Guide for Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_ServiceGuide-V1_2,
[URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)

5.2 DVB-T2 and T2-Lite

DVB-T2 is a delivery system which is used as a basis for the physical layer of DVB-NGH. The DVB-T2 has a T2-Lite profile, which is tailored for mobile reception. Similar to DVB-NGH, DVB-T2 and T2-Lite make use of GSE for the transport of IP streams.

The set of specification documents given in the section 5.1 are equally applicable to OMA-BCAST adaptation of DVB-T2, except the DVB-NGH specification which is replaced by the following specification:

- ETSI EN 302 755, “Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)”,
[URL:http://portal.etsi.org/](http://portal.etsi.org/)

6. Generic adaptation over DVB-GSE IP transmission network

This Section describes how BCAST specifications (namely [BCAST12-Services], [BCAST12-SG], [BCAST12-ServContProt], [BCAST12-Distribution] and [DRM20-Broadcast-Extensions]) are used over a DVB network supporting the Generic Stream Encapsulation (DVB-GSE). This is the case for DVB-NGH or DVB-T2 IP transmission network. The provisions in this Section thus complement the ones in the generic specifications so that BCAST services can be distributed over a DVB- GSE IP transmission, usable over DVB-NGH network or DVB-T2 (for its T2-Base and its T2-Lite profiles).

All normative statements in this specification are only applicable to cases where OMA BCAST services are distributed over the IP profile of DVB system supporting DVB-GSE specified in [ETSI TS 102 606-1] and [ETSI TS 102 606-2]. ; e.g. DVB-NGH network specified in [ETSI EN 303 105]or DVB-T2 and its T2-Lite profilespecified in [ETSI EN 302 755].

The sentence "as defined by BCAST Enabler specifications" is a shorthand notation that indicates both BCAST server and terminal SHALL respect relevant BCAST specifications (listed above).

If BCAST network entities and BCAST terminal support DVB-NGH or DVB-T2, generic adaptation SHALL be used.

6.1 Access to the IP layer

The set of specification documents applicable to OMA-BCAST adaptation over DVB- GSE IP transmission are defined in the following specifications:

- ETSI TS 102 606-1, "Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE); Part1 Protocol", [URL:http://portal.etsi.org/](http://portal.etsi.org/)

Note: This document is first publicly available as a DVB blue book before its publication at ETSI

DVB Blue Book A116-1: Generic Stream Encapsulation (GSE); Part 1: Protocol

[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)

- ETSI TS 102 606-2, "Digital Video Broadcasting; Generic Stream Encapsulation Protocol (GSE); Part 2 Logical Link Control (LLC)", [URL:http://portal.etsi.org/](http://portal.etsi.org/)

Note: This document is first publicly available as a DVB blue book before its publication at ETSI

DVB Blue Book A116-2: Generic Stream Encapsulation (GSE); Part 2: Logical Link Control (LLC)

[URL: http://www.dvb.org/standards](http://www.dvb.org/standards)

The following OMA-BCAST service layer over DVB-NGH:

- "File and Stream Distribution for Mobile Broadcast Services ", Open Mobile Alliance™, OMA-TS-BCAST_Distribution-1_2, [URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Service and Content Protection for Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_SvcCntProtection-V1_2, [URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_Services-V1_2, [URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)
- "Service Guide for Mobile Broadcast Services", Open Mobile Alliance™, OMA-TS-BCAST_ServiceGuide-V1_2, [URL:http://www.openmobilealliance.org /](http://www.openmobilealliance.org/)

6.2 Generic adaptation related to OMA-TS-BCAST_Services

6.2.1 Interaction

OMA BCAST enables four cases of interaction specified in Section 5.3 of [BCAST12-Services] related to Mobile Broadcast Services. In all of these cases the interaction is supported by Interactive Channel. Since DVB-NGH and DVB-T2 are purely unidirectional bearers and do not include a logical Interactive Channel themselves, any bi-directional mobile system can be used as Interactive Channel with DVB-NGH and DVB-T2. Therefore these four cases of interaction are directly applicable when DVB-NGH or DVB-T2 is the BDS, i.e., a terminal with access to an interactive channel SHALL support all of these four cases of interaction.

This applies also to other DVB system supporting DVB-GSE IP transmission.

The specification in section 5.3 of [BCAST12-Services] SHALL apply.

6.2.2 Service Provisioning

The specification in section 5.1 of [BCAST12-Services] SHALL apply.

6.2.3 Terminal Provisioning

The specification in section 5.2 of [BCAST12-Services] SHALL apply.

Overriding the “status” definitions in [BCAST12-Services] Appendix F, terminal support for the <DVB-NGH> of the BCAST Management Object and its sub-nodes is defined as follows:

Node	Status
<X>/BDSEntryPoint/<X>/DVB-NGH	Required
<X>/BDSEntryPoint/<X>/DVB-NGH/Tuning	Optional
<X>/BDSEntryPoint/<X>/DVB-NGH/Tuning/Frequency	Required
<X>/BDSEntryPoint/<X>/DVB-NGH/Tuning/Bandwidth	Required

Table 1: BCAST Management Object and its sub-nodes for DVB-NGH

Overriding the “status” definitions in [BCAST12-Services] Appendix F, terminal support for the <DVB-T2> of the BCAST Management Object and its sub-nodes is defined as follows:

Node	Status
<X>/BDSEntryPoint/<X>/DVB-T2	Required
<X>/BDSEntryPoint/<X>/DVB-T2/Tuning	Optional
<X>/BDSEntryPoint/<X>/DVB-T2/Tuning/Frequency	Required
<X>/BDSEntryPoint/<X>/DVB-T2/Tuning/Bandwidth	Required

Table 2: BCAST Management Object and its sub-nodes for DVB-T2

6.2.4 Notification

The specification in Section 5.14 of [BCAST12-Services] SHALL apply.

When using DVB-NGH, DVB-T2 or other DVB system supporting DVB-GSE IP transmission, as the underlying BCAST Distribution System the Notification functionality is enabled as specified in [BCAST12-Services].

6.3 Generic adaptation related to OMA-TS-BCAST_ServiceGuide

6.3.1 Service Guide Delivery over Broadcast Channel

The provisions relevant to Service Guide delivery over Broadcast Channel in section 5.4.2 of [BCAST12-SG] SHALL apply.

6.3.2 Compression of Service Guide Delivery Units

The specification in section 5.4.1.4 of [BCAST12-SG] SHALL apply.

6.3.3 Session Description

The general provisions of specification in section 5.1.2.5 of [BCAST12-SG] SHALL apply with the modifications as detailed in the following sections.

6.3.3.1 SessionDescription for broadcast streamed media sessions

The SessionDescription SHALL provide the following parameters:

- The sender IP address
- List of media components in the session
- Initial buffering delay, using the 'min-buffer-time' attribute as specified in [ETSI 303 105]

The terminal MAY ignore the following parameters in the SessionDescription if they are present, as they are either not required or out of scope of DVB-NGH BDS:

- FEC configuration and related parameters
- The mode of MBMS bearer per media

6.3.3.2 SessionDescription for broadcast file delivery sessions

The specification in section 5.1.2.5.3 of [BCAST12-SG] SHALL apply.

The terminal MAY ignore the mode of MBMS bearer per media in the SessionDescription, as this parameter is out of the scope of DVB-NGH.

6.3.4 Service Guide Data Model

The specification in section 5.1 of [BCAST12-SG] SHALL apply.

6.3.4.1 CellTargetArea in DVB-NGH and DVB-T2

Underlying DVB-NGH functionality is re-used, as explained below.

OMA BCAST Service Guide allows describing the target area for Service and Content in terms of BDS-specific cell identification in the "CellTargetArea" element.

OMA BCAST Service Guide allows terminal to request specific SGs based upon its BDSLocationID in terms of BDS-specific cell identification.

In the case of DVB-NGH and DVB-T2, the value of the "CellArea" sub-element of the "CellTargetArea" element and BDSLocationID utilised by terminal to request specific SGs as specified in section 5.4.3.4 in [BCAST12-SG] are composed from the following parameters. Each parameter is signalled by an uppercase alpha character, immediately followed by a string of lowercase alphanumeric characters representing the value of a parameter, and immediately followed by the next parameter, if any, as defined in the table below. The parameters MUST be given in the order of appearance in the table below, starting with the network_id "N" parameter. All parameters defined below SHALL be supported by the Terminal. The Server SHALL support parameters with a cardinality of 1 or more and MAY support the remaining parameters.

6.3.4.1.1 CellArea/BDSLocationID based on Cell ID

When “BDSType” as specified in section 5.4.3.4 in [BCAST12-SG] or “type” attribute of CellTargetArea element is set to value 17 (DVB-NGH Cell ID), the value of BDSLocationID and each “CellArea” element is composed from the following parameters:

Parameter name	Signalling	Value	Length [bytes]	Cardinality	Description
network_id	“N”	Hexadecimal representation of a 16bit unsigned integer	4	1	“network_id”, transmitted in the L1 signalling according to [ETSI EN 303 105].
system_id	“Y”	Hexadecimal representation of a 16bit unsigned integer	4	1	“system_id”, transmitted in the L1 signalling according to [ETSI EN 303 105] .
cell_id	“C”	Hexadecimal representation of a 16bit unsigned integer	4	1	“cell_id”, L1 signalling according to [ETSI EN 303 105]
subcell_id	“S”	Hexadecimal representation of an 8bit unsigned integer	2 per entry	0..N	subcell id, transmitted as "cell_id_extension" in the Layer 2 signalling according to [ETSI TS 102 606-2]

Table 3: Parameters of “Cell area” element in the case of DVB-NGH

When “BDSType” as specified in section 5.4.3.4 in [BCAST12-SG] or “type” attribute of CellTargetArea element is set to value 18 (DVB-T2 Cell ID), the value of BDSLocationID and each “CellArea” element is composed from the following parameters:

Parameter name	Signalling	Value	Length [bytes]	Cardinality	Description
network_id	“N”	Hexadecimal representation of a 16bit unsigned integer	4	1	“network_id”, transmitted in the L1 signalling according to [ETSI EN 302 755]
system_id	“Y”	Hexadecimal representation of a 16bit unsigned integer	4	1	“system_id”, transmitted in the L1 signalling according to [ETSI EN 302 755] .
cell_id	“C”	Hexadecimal representation of a 16bit unsigned integer	4	1	“cell_id”, L1 signalling according to [ETSI EN 302 755]
subcell_id	“S”	Hexadecimal representation of an 8bit unsigned integer	2 per entry	0..N	subcell id, transmitted as "cell_id_extension" in the Layer 2 signalling according to [ETSI TS 102 606-2]

Table 4: Parameters of “Cell area” element in the case of DVB-T2

Examples (informative):

- The string "N12abY0000C005aS01S02" represents a target area defined by a network_id of 0x12ab, a system_id of 0x0000, a cell_id of 0x005a, and a list of two subcell_id (0x01 and 0x02).

6.3.4.2 BDSSpecificEntryPointInfo definition

Section 5.4.1.5.2 of [BCAST12-SG] specifies how SGDDs can include the definition of SGEEntryPoints over BCAST BDS broadcast channels. Each broadcast SGEEntryPoint (i.e. SG Announcement Channel) in a BCAST BDS is declared partially by generic parameters (such as 'srcIpAddress', 'port', etc.) and partially by BDS-specific parameters, provided in each BDS Adaptation TS via the extension by derivation of the abstract type of BDSSpecificEntryPointInfo element.

For the DVB-NGH BDS or DVB-T2 BDS, the abstract type of BDSSpecificEntryPointInfo element is derived as follows:

Name	Type	Category	Cardinality	Description	Data Type
BDSSpecificEntryPointInfo	E5	NM/TM	0..1	The placeholder for the supplementary information that is required in order to retrieve the broadcast SG and Upper layer signalling entry point in BCAST BDS, i.e. in DVB-NGH or DVB-T2 BDS for the present specification. For DVB-NGH and DVB-T2 BDS, BDSSpecificEntryPointInfo contains the following elements: LCD NCD	complexType deriving from abstract type of BDSSpecificEntryPointInfo element
LCD	E6	NM/TM	1	The LCD element is the place where the physical parameters are signalled allowing the Terminal to access to the signals available within current network and obtain a pointer (component_id) to the NCD information. LCD (Link Control Data) contains the following element: PHYParametersDescriptor	
PHYParametersDescriptor	E7	NM/TM	1..N	The PHYParametersDescriptor contains the following attributes: NetworkID SystemID Bandwidth GuardInterval TransmissionMode CommonClockReferenceID OtherFrequencyFlag TFSFlag NetworkSyncFlag The PHYParametersDescriptor contains the following elements: IOMode CellID	

NetworkID	A	NM/TM	1	This 16-bit field uniquely identifies an NGH or T2 network. The term is defined in [EN 302 755].	unsignedShort
SystemID	A	NM/TM	1	This 16-bit field uniquely identifies an NGH or T2 system within an NGH network or T2 network.	unsignedShort
Bandwidth	A	NM/TM	1	This 4-bit field indicates the bandwidth in use for NGH or for T2 according to [ETSI TS 102 606-2]. The byte is padded with "0" in the most significant bits	unsignedByte
GuardInterval	A	NM/TM	1	This 3-bit field indicates the guard interval for NGH or for T2 according to [ETSI TS 102 606-2]. The byte is padded with "0" in the most significant bits	unsignedByte
TransmissionMode	A	NM/TM	1	This 3-bit field indicates the FFT size of the signals transmitted within the associated cell for NGH or for T2 according to [ETSI TS 102 606-2]. The byte is padded with "0" in the most significant bits	unsignedByte
CommonClockReferenceID	A	NM/TM	1	This 4-bit field indicates if the signal in the current NGH or T2 multiplex or system is synchronized with other multiplexes or systems within the same network, and if synchronized it gives the ID of the clock reference it uses in common with other multiplexes or systems according to [ETSI TS 102 606-2]. This field will allow for fast zapping to a multiplex the receiver has previously visited. The byte is padded with "0" in the most significant bits	unsignedByte
OtherFrequencyFlag	A	NM/TM	1	This 1-bit flag indicates whether other frequencies (non-TFS case) or other groups of frequencies (TFS case) are in use. The value 0 (zero) indicates that the set of frequencies (non-TFS case) or the set of groups of frequencies (TFS case) included in the descriptor is complete, whereas the value 1 (one) indicates that the set is incomplete.	Boolean
TFSFlag	A	NM/TM	1	This 1-bit flag indicates whether a TFS arrangement is in place or not. A value 0 reflects no TFS arrangement in place, whereas a value 1 reflects TFS arrangement in place.	Boolean

NetworkSyncFlag	A	NM/TM	0..1	This 1-bit flag conveys information about whether the start of super-frames is synchronized in time across all transmitted signals of the NGH System. A value of 1 (one) indicates that they are synchronised within the NGH System. A value of 0 (zero) indicates that they are not synchronised within the NGH System. For DVB-T2 this attribute is not present.	Boolean
IOMode	E8	NM/TM	1..N	This element indicates the single/multiple input/output mode applied. For NGH system this IO mode may be different for each PLP. In this case multiple element of this type are present For T2 this IO mode is the same overall the T2 system, and then only one element is present in which the PLPID attribute is absent. The IOMode element contains the following attributes: PLPID IOModeValue	
PLPID	A	NM/TM	0..1	This 8-bit field identifies the PLP within an NGH system within an NGH network (i.e. network_id/system_id combination) for which the IO Mode defined in the IOModeValue attribute applies. For T2 system this attribute is not present.	unsignedByte
IOModeValue	A	NM/TM	1	For NGH system this 4-bit field indicates the single/multiple input/output mode applied to the PLP and - in the case of MISO PLPs - the frame type they are carried in. It shall be encoded according to [ETSI TS 102 606-2]. The byte is padded with "0" in the most significant bits For T2 system, this field is the SISO/MISO field as defined in [ETSI TS 102 606-2]. It is a 2-bit field indicating the SISO/MISO mode. The byte is padded with "0" in the most significant bits	unsignedByte
CellID	E8	NM/TM	1..N	This element identifies an NGH or T2 cell within an NGH or T2 network, with its corresponding frequency, sub cells signals, the components available in this cell with their Component_ID. CellID contains the following attribute: CellIDValue CellID contains the following elements: CentreFrequency SubcellInfo ComponentID	

CellIDValue	A	NM/TM	1	This 16-bit attribute is the identifier of the Cell. It is defined in [EN 303 105] for NGH or according to [EN 302 755] for T2	unsignedShort
CentreFrequency	E9	NM/TM	1..N	This 32-bit field indicates the frequency value in multiples of 10 Hz. The coding range is from minimum 10 Hz (0x00000001) up to a maximum of 42 949 672 950 Hz (0xFFFFFFFF). This element MAY be instantiated multiple times in the case where the GSE Stream carrying the SG Announcement Channel is transmitted over different frequencies (same GSE stream available on different cells).	unsignedInt
SubcellInfo	E9	NM/TM	0..N	This element gives information of the Subcell within the cell identified by the CellIDValue. This information is the cellIDExtension and its corresponding centre-frequency used by the transposer. This element is instantiated a number of times corresponding to the number of subcells defined for this identified cell. This SubcellInfo element contains the following attributes: CellIDExtension TransposerFrequency	
CellIDExtension	A	NM/TM	1	This 8-bit field is used to identify a sub-cell within a cell.	unsignedByte
TransposerFrequency	A	NM/TM	1	This 32-bit field indicates the centre frequency that is used by a transposer in the sub-cell indicated. It is encoded in the same way as the centre_frequency field.	unsignedInt
ComponentID	E9	NM/TM	1..N	This 8-bit field is a short-id for the URI, which identifies a component within the URI_descriptor. A component_id is unique within each system (identified with system_id). If the component_id has the same value in different cells (different cell_ids), then the associated service component is available in neighboring cells and handover is possible using L1 signalling information.	unsignedByte
NCD	E6	NM/TM	1	The NCD element is the place where the mapping between PLPs and services is provided. By using this information terminal is able to determine the association between the services and PLPs and obtain a pointer (component_id) to the LCD information per each service. NCD contains the following elements: ROHCDescriptor URIServiceDescriptor	

ROHCDescriptor	E7	NM/TM	1	<p>The ROHCDescriptor element is the place where the Robust Header Compression parameters are signalled. The ROHC is used for the IP header compression.</p> <p>The ROHCDescriptor contains the following attributes:</p> <p>ContextID ContextProfile</p> <p>The ROHCDescriptor contains the following element:</p> <p>StaticChain</p>													
ContextID	A	NM/TM	1	<p>This 8 or 16-bit field indicates the context id (CID) of the compressed IP stream. ROHC uses either a small or a large CID. The small CID is 8-bit and conveys values between 1 and 15. The large CID is one or two bytes from 1 to 16383. This field shall be encoded as follows:</p> <table border="1"> <thead> <tr> <th>contextID first bits</th> <th>Description</th> <th>Value range</th> </tr> </thead> <tbody> <tr> <td>1110</td> <td>Add-CID (CID is remaining 4 bits)</td> <td>1 to 15</td> </tr> <tr> <td>0</td> <td>small CID (CID is remaining 7 bits)</td> <td>1 to 127</td> </tr> <tr> <td>10</td> <td>large CID (CID is remaining 14 bits)</td> <td>1 to 16383</td> </tr> </tbody> </table>	contextID first bits	Description	Value range	1110	Add-CID (CID is remaining 4 bits)	1 to 15	0	small CID (CID is remaining 7 bits)	1 to 127	10	large CID (CID is remaining 14 bits)	1 to 16383	unsignedShort
contextID first bits	Description	Value range															
1110	Add-CID (CID is remaining 4 bits)	1 to 15															
0	small CID (CID is remaining 7 bits)	1 to 127															
10	large CID (CID is remaining 14 bits)	1 to 16383															
ContextProfile	A	NM/TM	1	<p>This 8-bit field indicates the range of protocols used to compress the IP stream.</p>	unsignedByte												

StaticChain	E8	NM/TM	1	<p>This element conveys the static information used to initialize the ROHC-U decompressor and consists of the concatenation of all bytes transmitted in the StaticChainByte elements. The size and structure of this field are dependent on the context profile defined in the attribute of the ROHCDescriptor element.</p> <p>This element contains the following attribute:</p> <p>StaticInfoLength</p> <p>This element contains the following sub-element:</p> <p>StaticChainByte</p>	
StaticInfoLength	A	NM/TM	1	This 8-bit field indicates the instantiation number of the StaticChainByte element.	unsignedByte
StaticChainByte	E9	NM/TM	1..N	This element is one byte of the static information.	unsignedByte
URIServiceDescriptor	E7	NM/TM	1..N	<p>The URIServiceDescriptor provides information for mapping service components onto URIs.</p> <p>The URIServiceDescriptor contains the following attributes:</p> <p>NetworkID</p> <p>SystemID</p> <p>The URIServiceDescriptor contains the following element:</p> <p>ComponentTableEntry</p>	
NetworkID	A	NM/TM	1	This 16-bit field uniquely identifies an NGH or T2 network. The term is defined in [EN 302 755].	unsignedShort
SystemID	A	NM/TM	1	This 16-bit field uniquely identifies an NGH or T2 system within an NGH network or T2 network.	unsignedShort
ComponentTableEntry	E8	NM/TM	1..N	<p>This element contains the mapping between ComponentID, PLPID and the URI, available in the specific System of the specific network defined by the couple NetworkID/SystemID specified in the attributes of URIServiceDescriptor. There are as many elements of this type as the number of components available in the specific System of the specific Network.</p> <p>This element contains the following attributes</p> <p>ComponentID</p> <p>PLPID</p> <p>URI</p>	

ComponentID	A	NM/TM	1	This 8-bit field is a short-id for the URI, which identifies a component within the URI_descriptor. A component_id is unique within each system (identified with system_id). If the component_id has the same value in different cells (different cell_ids), then the associated service component is available in neighboring cells and handover is possible using L1 signalling information.	unsignedByte
PLPID	A	NM/TM	1	This 8-bit field identifies uniquely a PLP within an NGH system within an NGH network (i.e. network_id/system_id combination). The plp_id is also used in L1 signalling. The term is defined in EN 302 755.	unsignedByte
URI	A	NM/TM	1	This field conveys URI and shall be encoded according to IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax". URI is used to identify a service component. The characteristics of each service component identified by URI are described in Session Description Protocol (SDP). In the case a service consists of only one component, the service component identified by URI corresponds one service.	anyURI

Table 5: BDSSpecificEntryPointInfo for BCAST DVB-NGH or DVB-T2

6.3.5 The Discovery of Service Guide and Upper Layer Signalling

Service Guide discovery in DVB-NGH networks SHALL be realized using DVB specifications, as explained below.

Except for the mechanism of discovering the Service Guide entry point specified in this Adaptation Specification, the specification in section 6 of [BCAST12-SG] SHALL apply.

The network provides Layer 1 signalling and Logical Link Control (LLC) information as specified in [ETSI EN 303 105], [EN 302 755] and in [ETSI TS 102 606-2]. The terminal MAY use Layer 1 and LLC information to find out if there is at least one OMA-BCAST SG available. The terminal checks whether there is IP stream with IP multicast address 224.0.23.165 for IPv4 or FF0X:0:0:0:0:0:132 for IPv6 with a Destination Port of 4090, available within the data streams carried in the common PLP defined in [ETSI EN 303 105] or in the PLP identified in the application_system_info of LLC data . If either or both of the IP addresses are available, then the entry point for one or more OMA-BCAST SGs can be found accordingly to the [BCAST12 – SG] through SGDD. The LLC information contains versioning information of the Upper Layer signalling, which may also be used when the signalling information is updated.

The Upper Layer signalling of DVB-NGH is carried on the top of IP layer, inside the SGDD. Hence, the Upper Layer signalling can be discovered by using BDSSpecificEntryPointInfo as defined in this specification in section 6.3.4.2.

Except for the mechanism of discovering the Upper Layer signalling specified in this Adaptation Specification, the specification in section 6 of [BCAST12-SG] SHALL apply.

6.4 Generic adaptation related to OMA-TS-BCAST_SvcCntProtection and OMA-TS-DRM-XBS

The provisions in the two specifications [BCAST12-ServContProt] and [DRM20-Broadcast-Extensions] SHALL apply.

For the Smartcard Profile, only the Session Description Method for Acquiring SEK/PEK as defined in section 6.10.1.2 of [BCAST12-ServContProt] SHALL be used to provide the entry point to the BSM.

6.5 Generic adaptation related to OMA-TS-BCAST-Distribution

6.5.1 File Distribution

The specification in section 5.2 of [BCAST12-Distribution] SHALL apply.

6.5.2 Associated Delivery Procedures

The specification in section 5.3 of [BCAST12-Distribution] SHALL apply.

6.5.3 Stream Distribution

The specification in section 6 of [BCAST12-Distribution] SHALL apply.

6.5.3.1 Buffer control

The buffer control mechanisms and buffer models are defined in [EN 303 105].

6.5.4 Media codecs

The Terminal SHALL be able to receive, decode and render the codecs and payload types that are MANDATORY according to Annex B of [ETSI TS 102 005].

The Terminal SHOULD be able to receive, decode and render the codecs and payload types that are RECOMMENDED according to Annex B of [ETSI TS 102 005].

The Terminal MAY be able to receive, decode and render the codecs and payload types that are OPTIONAL according to Annex B of [ETSI TS 102 005].

7. Walkthrough: Distribution of BCAST Services over DVB-NGH (Informative)

This section describes a walkthrough of all actions needed to receive a BCAST service distributed over DVB-NGH. It just describes the main actions and using selected functions and features. Not all possible options and variations are described here.

7.1 Power up, Network Attachment, Initial Procedures

When the receiver is powered up or enters a new network the receiver has to tune into the right frequency. This frequency can be either pre-provisioned or provisioned according to mechanisms described in service provisioning specification. If the frequency is not provisioned at all, the terminal performs a signal scan. DVB-NGH signals carry P1 signalling, which is designed to aid receiver to accomplish rapid signal scan. During the scan the receiver tests a frequency, tries to lock to the signal and when locked, inspects the P1 signalling information bits in the signal. If this is not available, the receiver discards the signal and proceeds to next one. Once a DVB-NGH is found, the terminal looks up the L1 signalling information, which it can use to discover and access the common PLP. From the common PLP, receiver is able to discover the LLC information and discover if an OMA BCAST SG is available on the top of IP by the presence of an application system descriptor with `application_system_id` set to OMA_BCAST. In this descriptor the OMA_BCAST_info gives the versioning information of L2 and identifies where the BCAST bootstrap session information is available (`Network_id`, `System_id` and `PHY_stream_id` (`plp_id`)). If the bootstrap session information is not available in the OMA_BCAST_info descriptor (`bootstrap_session_info_flag` set to 0), the default location is the common PLP. This bootstrap session information enables the access to the service guide and the L2 signalling carried on the top of IP, inside the SG elements. The signalling scan may be fully completed by accessing the L2 signalling information, which provides the exhaustive information of the signals available within different networks.

7.2 The Discovery of Service Guide and Upper Layer Signalling

The IP profile in DVB-NGH is a system where IP flows are carried in the form of IP streams inside GSE Streams. When an end-user selects a service the terminal has to tune into an IP stream which provides the service. The importance of this step is twofold:

- Find the information which provides the mapping between IP flows and Physical Layer Pipes (PLPs) and related modulation, coding and network information for each PLP, so the terminal knows where to find the right IP stream of a service.
- Find the entry point of the SG, because the SG provides the mapping between services, IP streams and other signalling information needed for accessing the service.

As described in 7.1, the PLP identified in the OMA_BCAST_info structure of the application system descriptor as defined in [ETSI TS 102 606-2] or by default the common PLP is the first entry point where the access to the SG should be started. The common PLP is a dedicated PLP within the DVB-NGH system which carries all signalling information carried on the top of Layer 1. Once accessing the common PLP or PLP identified in the OMA_BCAST_info structure, receiver should seek the access information from the IP flow identified either with the IP multicast address 224.0.23.165 for IPv4 or FF0X:0:0:0:0:0:132 for IPv6 and with a destination port of 4090 as defined in section 6 of [BCAST12-SG].

The Upper Layer signalling of DVB-NGH is carried inside the SGDD and it can be discovered by using `BDSSpecificEntryPointInfo`. Further information on the discovery of Upper Layer signalling can be found from [ETSI TS 102 606-2].

This SG entry point can be pre-provisioned or provisioned according to mechanisms described in the terminal provision function of the Services specification [BCAST12- Services].

7.3 Service Guide Reception and Update

The service guide provides the end-user with the information about all available services. The service guide consists of user readable data. The user can make a selection based on this data. When a user selects a service, it basically tells the terminal to tune into a certain IP flow, for which the terminal has to select the appropriate IP stream.

This step describes how the service guide is received and how updates are received. This step assures that the terminal has the correct information:

- about how to access the service (IP flow addresses, SDP information, service protection information etc)
- about the service itself form user presentation (title, language, length, start and end-time, price etc.)

The SG data is carried in SGDU's. Each SGDU is announced in a Descriptor Entry. A Descriptor Entry is carried inside the SGDD. The SGDD is the 'root' of the SG. There can be several SGDD's for the service guide, e.g. one which only carries the data of the next 2 hours, one which carries the SG of the day and one for the whole week. The terminal only collects those SGDU's, which belongs to his service provider. For this purpose the Descriptor Entries carries a BSMSSelector in the Grouping criteria.

When certain portions of the SG are not valid anymore, the terminal has the option to keep them for a while or throw them away.

Appendix A. Change History

(Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version 1.2 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-TS- BCAST_DVB_NGH_Adaptation-V1_2	07 Jun 2012	All	First baseline of version 1.2 of this spec
	13 Jun 2012	All	Edits based on telco review.
	22 Jun 2012	All	Further edits. DVB-T2 and T2-Lite included.
	08 Jul 2012	All	Further edits
	09 Jul 2012	All	Further edits
	11 Jul 2012	All	Further edits and SCR updates
	30 Aug 2012	Table 5, table 6 and annex C	Final edits and CRs incorporated
	08 Feb 2013	Table of Contents and Tables, 3.2, 3.3, 4.1, 6.3.4.1, 6.3.4.1.1, 6.3.4.2, 6.3.5, 7.3,	OMA-BCAST-2012-0074-CR_DVB_NGH_Adaptation incorporated
	19 Feb 2013	Table of Contents and Tables, 1, 2.1, 4.1, 5.1, 5.2, 6, 6.1, 6.2.1, 6.2.4, 6.3.4.2, 6.3.5, 7.2	OMA-BCAST-2013-0003- CR_BCAST1.2_DVB_NGH_Adaptation_DVB_Comments incorporated
	12 Aug 2013	6.3.3.1; 6.3.3.2	OMA-BCAST-2013-0014- CR_BCAST1.2_DVB_NGH_Adaptation_MBMS_parameters.doc
10 Dec 2013	2.1, 3.2, 5, 6, 7.1, 7.2	Implementation of CR OMA-BCAST-2013-0064- CR_CONR1.2_M001_to_M004.doc	
Candidate Version OMA-TS- BCAST_DVB_NGH_Adaptation-V1_2	14 Jan 2014	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2014-0002- INP_BCAST_NGH_V1_2_ERP_and_ETR_for_Candidate_approval

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [IOPPROC].

B.1 SCR for BCAST Terminal for DVB-NGH

Item	Function	Reference	Status	Requirement
BCAST-DVBNGH-C-001	Support DVB-NGH adaptation		O	BCAST-DVBNGH-C-002 OR BCAST-DVBNGH-C-003
BCAST-DVBNGH-C-002	Support Broadcast Channel reception over IP Bearer	Sections 6	O	BCAST-DVBNGH-C-004 AND BCAST-DVBNGH-C-007 AND BCAST-DVBNGH-C-021
BCAST-DVBNGH-C-003	Support Broadcast Channel and Interaction Channel for BCAST DVB-NGH Adaptation	Sections 6	O	BCAST-DVBNGH-C-004 AND BCAST-DVBNGH-C-005 AND BCAST-DVBNGH-C-006 AND BCAST-DVBNGH-C-007 AND BCAST-DVBNGH-C-021
BCAST-DVBNGH-C-004	Support DVB-NGH Media Codecs	Sections 6.5.4	O	
BCAST-DVBNGH-C-005	Support Service interaction between BSA and BSM and Terminal	Sections 6.2.1	O	
BCAST-DVBNGH-C-006	Support for the BCAST MO NGH sub nodes	Sections 6.2.3	O	
BCAST-DVBNGH-C-007	Support the adaptation of Service Guide Function for DVB-NGH Network	Sections 6.3	O	BCAST-DVBNGH-C-008 AND BCAST-DVBNGH-C-009 AND BCAST-DVBNGH-C-010
BCAST-DVBNGH-C-008	Support Service Guide Delivery over Broadcast Channel	Sections 6.3.1	O	
BCAST-DVBNGH-C-009	Support Session Description	Sections 6.3.3	O	
BCAST-DVBNGH-C-010	Support Service Guide Discovery by Terminal	Sections 6.3.5	O	
BCAST-DVBNGH-C-011	Support Adaptation of BCAST Service Protection Function for interactive and broadcast reception	Sections 6.4	O	(BCAST-DVBNGH-C-012 OR BCAST-DVBNGH-C-013) AND BCAST-DVBNGH-C-015 AND BCAST-DVBNGH-C-016 AND BCAST-DVBNGH-C-017
BCAST-DVBNGH-C-012	Support DRM Profile	Sections 6.4	O	BCAST-DVBNGH-C-014
BCAST-DVBNGH-C-013	Support Smartcard Profile	Sections 6.4	O	
BCAST-DVBNGH-C-014	Support LTKM and STKM restrictions for Service Protection	Sections 6.4	O	
BCAST-DVBNGH-C-015	Support SRTP	Sections 6.4	O	
BCAST-DVBNGH-C-016	Support IPSEC	Sections 6.4	O	

Item	Function	Reference	Status	Requirement
BCAST-DVBNGH-C-017	Support ISMACryp	Sections 6.4	O	
BCAST-DVBNGH-C-018	Support Buffer Control	Sections 6.5.3.1	O	

B.2 SCR for BCAST BSM for DVB NGH

Item	Function	Reference	Status	Requirement
BCAST-DVBNGH-BSM-001	Support BCAST Adaptation on DVB-NGH Network	Section 6	O	BCAST- DVBNGH-BSM-002 AND BCAST- DVBNGH-BSM -003
BCAST- DVBNGH-BSM-002	Support Broadcast and interactive communication between BSM and Terminal		O	
BCAST- DVBNGH-BSM-003	Support for the BCAST MO NGH sub nodes	Section 6.2.3	O	

B.3 SCR for BCAST BSD/A for DVB NGH

Item	Function	Reference	Status	Requirement
BCAST-DVBNGH-BSDA-001	Support BCAST Adaptation on DVB NGH Network		O	BCAST-DVBNGH-BSDA-002 AND BCAST-DVBNGH-BSDA-003
BCAST-DVBNGH-BSDA-002	Support IP bearer	Sections 6.1	O	
BCAST-DVBNGH-BSDA-003	Support DVB NGH Generic Adaptation	Section 6	O	(BCAST-DVB-BSDA-004 AND BCAST-DVBNGH-BSDA-005 AND BCAST-DVBNGH-BSDA-009) OR (BCAST-DVBNGH-BSDA-005 AND BCAST-DVBNGH-BSDA-009)
BCAST-DVBNGH-BSDA-004	Support Interactive communication between BSDA and Terminal		O	
BCAST-DVBNGH-BSDA-005	Support adaptation of Service Guide Function for DVB NGH Network	Section 6.3	O	BCAST-DVBNGH-BSDA-006 AND BCAST-DVBNGH-BSDA-007 AND BCAST-DVBNGH-BSDA-008
BCAST-DVBNGH-BSDA-006	Support Service Guide Delivery over Broadcast Channel extensions	Section 6.3.1	O	
BCAST-DVBNGH-BSDA-007	Support Session Description	Section 6.3.3	O	
BCAST-DVBNGH-BSDA-008	Support Service Guide Discovery by Terminal	Section 6.3.5	O	

Item	Function	Reference	Status	Requirement
BCAST-DVBNGH-BSDA-009	Support Buffer Control	Section 6.5.3.1	O	

B.4 SCR for BCAST BSA for DVB-NGH

Item	Function	Reference	Status	Requirement
BCAST- DVBNGH-BSA- 001	Support DVB NGH Generic Adaptation	Section 6	O	BCAST- DVBNGH-BSA- 002 AND BCAST- DVBNGH-BSA- 003
BCAST- DVBNGH-BSA- 002	Support DVB N CODEC	Section 6.5.4	O	
BCAST- DVBNGH-BSA- 003	Support the interactive communication between BSA and Terminal	Section 6.2.1	O	

B.5 SCR for BCAST Terminal for DVB-T2

Item	Function	Reference	Status	Requirement
BCAST-DVBT2-C-001	Support DVB-T2 adaptation		O	BCAST-DVBT2-C-002 OR BCAST-DVBT2-C-003
BCAST-DVBT2- C-002	Support Broadcast Channel reception over IP Bearer	Sections 6	O	BCAST-DVBT2-C-004 AND BCAST-DVBT2-C-007 AND BCAST-DVBT2-C-021
BCAST-DVBT2- C-003	Support Broadcast Channel and Interaction Channel for BCAST DVB-T2 Adaptation	Sections 6	O	BCAST-DVBT2-C-004 AND BCAST-DVBT2-C-005 AND BCAST-DVBT2-C-006 AND BCAST-DVBT2-C-007 AND BCAST-DVBT2-C-021
BCAST-DVBT2-C-004	Support DVB-T2 Media Codecs	Sections 6.5.4	O	
BCAST-DVBT2-C-005	Support Service interaction between BSA and BSM and Terminal	Sections 6.2.1	O	
BCAST-DVBT2-C-006	Support for the BCAST MO T2 sub nodes	Sections 6.2.3	O	
BCAST-DVBT2-C-007	Support the adaptation of Service Guide Function for DVB-T2 Network	Sections 6.3	O	BCAST-DVBT2-C-008 AND BCAST-DVBT2-C-009 AND BCAST-DVBT2-C-010
BCAST-DVBT2-C-008	Support Service Guide Delivery over Broadcast Channel	Sections 6.3.1	O	
BCAST-DVBT2-C-009	Support Session Description	Sections 6.3.3	O	
BCAST-DVBT2-C-010	Support Service Guide Discovery by Terminal	Sections 6.3.5	O	
BCAST-DVBT2-C-011	Support Adaptation of BCAST Service Protection Function for interactive and broadcast reception	Sections 6.4	O	(BCAST-DVBT2-C-012 OR BCAST-DVBT2-C-013) AND BCAST-DVBT2-C-015 AND BCAST-DVBT2-C-016 AND BCAST-DVBT2-C-017
BCAST-DVBT2-C-012	Support DRM Profile	Sections 6.4	O	BCAST-DVBT2-C-014

Item	Function	Reference	Status	Requirement
BCAST-DVBT2-C-013	Support Smartcard Profile	Sections 6.4	O	
BCAST-DVBT2-C-014	Support LTKM and STKM restrictions for Service Protection	Sections 6.4	O	
BCAST-DVBT2-C-015	Support SRTP	Sections 6.4	O	
BCAST-DVBT2-C-016	Support IPSEC	Sections 6.4	O	
BCAST-DVBT2-C-017	Support ISMACryp	Sections 6.4	O	
BCAST-DVBT2-C-018	Support Buffer Control	Sections 6.5.3.1	O	

B.6 SCR for BCAST BSM for DVB T2

Item	Function	Reference	Status	Requirement
BCAST-DVBT2-BSM-001	Support BCAST Adaptation on DVB-T2 Network	Section 6	O	BCAST- DVBT2-BSM-002 AND BCAST- DVBT2-BSM -003
BCAST- DVBT2-BSM-002	Support Broadcast and interactive communication between BSM and Terminal		O	
BCAST- DVBT2-BSM-003	Support for the BCAST MO T2 sub nodes	Section 6.2.3	O	

B.7 SCR for BCAST BSDA/A for DVB T2

Item	Function	Reference	Status	Requirement
BCAST-DVBT2-BSDA-001	Support BCAST Adaptation on DVB T2 Network		O	BCAST-DVBT2-BSDA-002 AND BCAST-DVBT2-BSDA-003
BCAST-DVBT2-BSDA-002	Support IP bearer	Sections 6.1	O	
BCAST-DVBT2-BSDA-003	Support DVB T2 Generic Adaptation	Section 6	O	(BCAST-DVB-BSDA-004 AND BCAST-DVBT2-BSDA-005 AND BCAST-DVBT2-BSDA-009) OR (BCAST-DVBT2-BSDA-005 AND BCAST-DVBT2-BSDA-009)
BCAST-DVBT2-BSDA-004	Support Interactive communication between BSDA and Terminal		O	
BCAST-DVBT2-BSDA-005	Support adaptation of Service Guide Function for DVB T2 Network	Section 6.3	O	BCAST-DVBT2-BSDA-006 AND BCAST-DVBT2-BSDA-007 AND BCAST-DVBT2-BSDA-008
BCAST-DVBT2-BSDA-006	Support Service Guide Delivery over Broadcast Channel extensions	Section 6.3.1	O	
BCAST-DVBT2-BSDA-007	Support Session Description	Section 6.3.3	O	

Item	Function	Reference	Status	Requirement
BCAST-DVBT2-BSDA-008	Support Service Guide Discovery by Terminal	Section 6.3.5	O	
BCAST-DVBT2-BSDA-009	Support Buffer Control	Section 6.5.3.1	O	

B.8 SCR for BCAST BSA for DVB-T2

Item	Function	Reference	Status	Requirement
BCAST- DVBT2-BSA-001	Support DVB T2 Generic Adaptation	Section 6	O	BCAST- DVBT2-BSA- 002 AND BCAST- DVBT2-BSA- 003
BCAST- DVBT2-BSA-002	Support DVB N CODEC	Section 6.5.4	O	
BCAST- DVBT2-BSA-003	Support the interactive communication between BSA and Terminal	Section 6.2.1	O	

Appendix C. An example of the Upper Layer signalling

Figure 1 depicts by the principle of the Upper Layer signalling and the use of ComponentID in the association of services, available within the current frequency/multiplex, with the neighbouring frequencies/multiplexes were those are available. Next, a description is provided for the four points pointed out in the Figure 1 by numbers from 1-4.

- 1.) GlobalServiceID=A is associated with the parameters needed for the service access and rendering. These parameters are provided within the Upper Layer sSignalling for the current multiplex/frequency, and are used together with the information obtained from the L1 signalling for the associated PLPID=14.

GlobalServiceID=A is also available within at least one neighbouring multiplex/frequency.

- 2.) GlobalServiceID=A is associated with the ComponentID=1 within the current multiplex/frequency. The ComponentID =1 is further associated with any neighbouring multiplex/frequency, which carries the service identified with the GlobalServiceID =A.
- 3.) PLPID=3 is the PLPID allocated for the service identified with the GlobalServiceID=A in the neighbouring multiplex/frequency (498 MHz,Bandwidth 8 MHz, NetworkID = 1, NGHSystemID = 6, CellID = 10). NOTE, that the PLP allocated for the service identified with the GlobalServiceID=A is not the same as PLP within the neighbouring multiplex/frequency and hence it has association with the PLPID=14.
- 4.) Upper Layer signalling for the neighbouring multiplex/frequency associates each ComponentID with the PLPIDs and provides minimal information needed for fast tuning to the neighbouring multiplex/frequency.

ComponentID=1 is associated with the PLP=3, which is the PLP available within the neighbouring multiplex/frequency.

By using 'tuning information' provided within the Upper Layer Signalling for the neighbouring multiplex/frequency, terminal is able to find the frequency carrying the PLPID=3. Based on the GlobalServiceID=1, given in 1.) and on the PLPID=3, receiver is able to further obtain and process all other signalling parameters needed to decode and render the service.

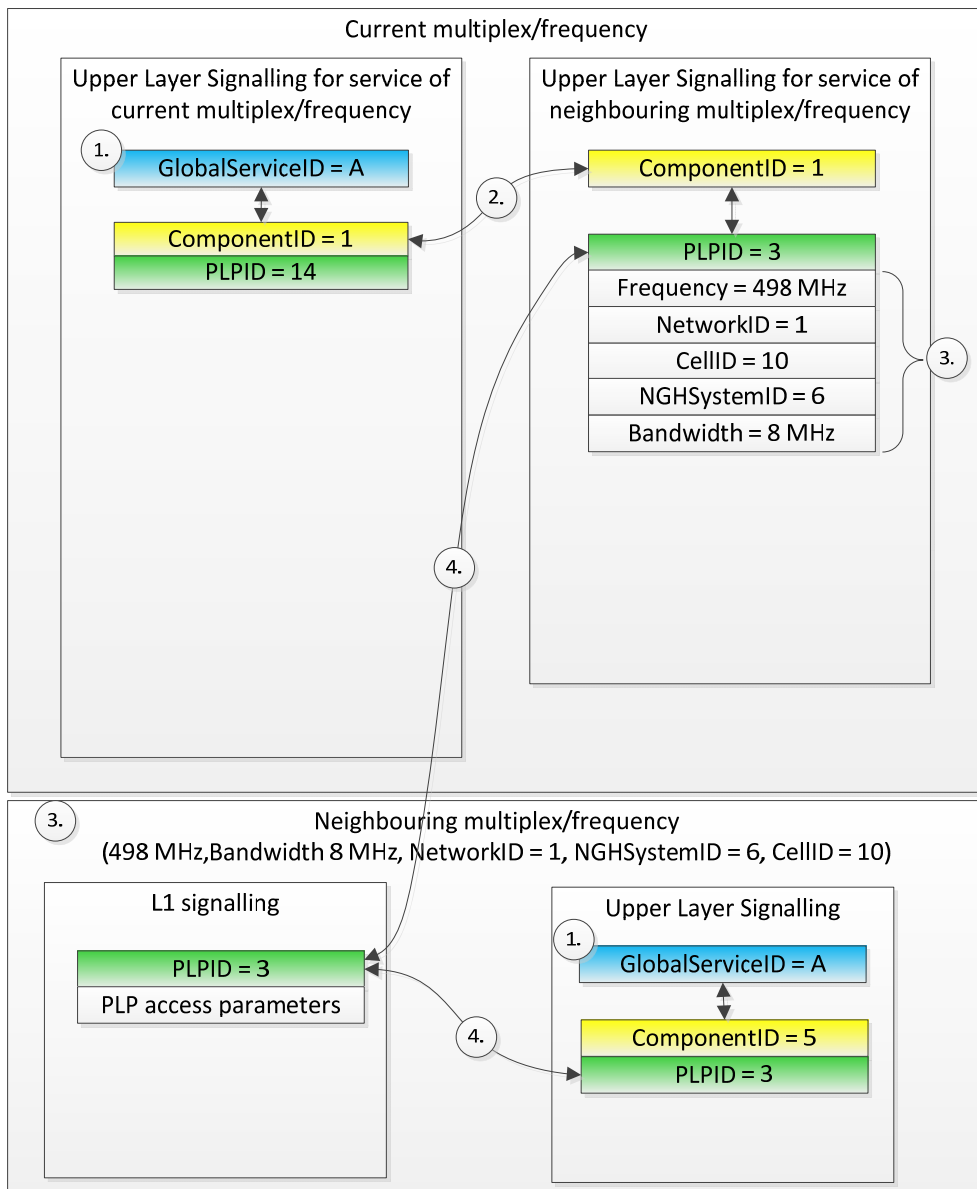


Figure 1: An example of the Upper Layer signalling