ETSI TR 122 947 V15.0.0 (2019-07)

**Universal Mobile Telecommunications System (UMTS);
Study on Personal Broadcast Service (PBS)
(3GPP TR 22.947 version 15.0.0 Release 15)**

3GPP
A GLOBAL INITIATIVE

Reference
RTR/TSGS-0122947vf00

Keywords
UMTS

ETSI

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Contents

Foreword

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Introduction

As a mobile service network evolves to a versatile packet data network, the service paradigm of mobile operators is gradually shifting from voice oriented communication to multimedia information sharing. A mobile device is no longer a simple tool for person to person communication, but now becomes an indispensable item for receiving essential information distributed for human society. Information for entertainment services such as TV or Radio show, as well as information for public safety, energy saving, environmental conservation, and for searching emergency aid, need to be delivered to the right person at the right time in any location. The multimedia broadcast service, MBMS [2], and packet switched streaming [8][9] is a widely deployed technique which fulfils the basic service requirements. However provisioning of content is currently allowed for a limited group of content providers, and ordinary users have no way to utilize the service.

The rationale of Personal Broadcast Service is to give an open opportunity for ordinary people to generate content, and broadcast it on air. A variety of broadcast services and a new device market may emerge once users are able to access the content distribution service. Abundant broadcast content will be available to be selected by 3GPP users. The extent of other potential service area is unbounded.

The objective of this document is to present some envisaged use cases of Personal Broadcast Service, for creative engineers and standard developers to pursue further investigation of PBS, and move to the next steps necessary for enhancement of relevant 3GPP standards.

1 Scope

This Technical Report presents potential use cases of Personal Broadcast Service. It aims to take account of service and system aspect of PBS. The minimum set of service requirements associated with each use case will be identified.

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] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.146: "Multimedia Broadcast/Multicast Service; Stage 1".

[3] 3GPP TS 22.246: "Multimedia Broadcast/Multicast Service (MBMS) user services".

[4] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[5] ETSI TS 181 016 v.2.0.0, "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Service Layer Requirements to Integrate NGN Services and IPTV," 2007-11

[6] OMA, "Mobile Broadcast Services Requirements," Approved Version 1.0 – 12 Feb 2009

[7] 3GPP TS 22.115: "Service Aspects; Charging and Billing (Release-9)"

[8] 3GPP TS 22.233: "Transparent end-to-end packet-switched streaming service; Stage 1".

[9] 3GPP TS 26.234: "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs".

[10] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[11] U.S. Department of Transportation Research and Innovative Technology Administration, "Intelligent Transportation Systems Benefits, Costs, Deployment, and Lessons Learned:2008 Update", September 2008, www.its.dot.gov

[12] ERTICO - ITS Europe, "Activities 2008", 08 May 2008, www.ertico.com

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

(void)

3.2 Symbols

For the purposes of the present document, the following symbols apply:

(void)

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

BSU	Broadcast Service User
CoD	Contents on Demand
MBNO	Mobile Broadcast/Multicast Network Operator
PBS	Personal Broadcast Service
PBSP	Personal Broadcast Service Provider
PBSF	Personal Broadcast Service Function
PBCP	Personal Broadcast Contents Provider
UGC	User Generated Contents
VoD	Video on Demand

4 General description

4.1 Service concept and definition

Personal Broadcast Service (PBS) is a content distribution service using 3GPP accesses. This enables any Internet user, private company or mobile user to generate content, and broadcast/multicast it to mobile users. Types of User Generated Content (UGC) in this context include not only multimedia files such as video, audio or image, but also variety of digital information distributed for various purposes such as e.g. public safety, energy saving, environment conservation.

The User Generated Content can be distributed in either a time unconstrained Content on-Demand (CoD) method, or in a time constrained, real-time method. In the former case, the contents are uploaded to a server and downloaded at the request of users at a convenient time. Most CoD applications and some MBMS user services may be delivered using unicast bearers as defined in [3][10]. However in some application, CoD users may share the content using multicast bearer service. A use case of shared VoD service is presented in this document.

In the case of live broadcast, content is delivered to multiple users simultaneously, as such a broadcast or multicast bearer is necessary for resource saving. A broadcast bearer service [3] is efficient when a large number of receivers are expected and the receivers are spread in many cellular areas. Major TV or Radio services are examples that may utilize such a broadcast bearer. UGC stream may also be transmitted using broadcast bearer if the population of receivers justifies cost for delivering the content. Private show of very popular celebrity or daily episodes of small production company may be a potential example. Another area of use case is localized broadcast in campus, theatre or theme park. Details of the use cases are presented in this document.

In contrast to broadcast bearer service, UGC will be delivered using multicast bearer service in many use cases. Content providers of Personal Broadcast Service may appear and disappear at any time. Content distribution may commence on an ad-hoc basis. Therefore, it will be inefficient to pre-allocate resources for such unpredictable content providers. New interfaces and requirements will be necessary to support such content providers. The communication may occasionally be bi-directional. Interactive data generated by mobile receivers needs to be passed to content providers. Some additional functions, e.g. time-stamping or adding cell ID, may need to be performed on upstream user data. This aspects associated with interactivity will be discussed in detail.

Currently, 3GPP supports an OMA [6] defined interface to be used between mobile operator and broadcast content provider [4]. Therefore, most broadcast applications that require a static allocation of resource may be supported using existing 3GPP and OMA standards. However new set of requirements and standards may be necessary to support distinctive features of PBS use cases as introduced in this document.

4.2 Roles of actors in use cases

The roles of major actors used in the description of each use case are explained in this section.

4.2.1 Personal Broadcast Content Provider (PBCP)

Personal Broadcast Content Provider (PBCP) is an individual or organization that produces electronic content for the purpose of distribution to mobile users. Any Internet user, company, school, government or even major TV or radio broadcasting company can be a Personal Broadcast Content Provider if one uses PBS.

In order to provide PBS service, PBCP needs to make information about the content available to a service provider, and reserve necessary resources via a wired or wireless connection that will be used for content delivery. The connection may be established via Internet or 3GPP radio access. When 3GPP radio access is used, the type of content provider is referred to Mobile PBCP. The Mobile PBCP is a 3GPP user, and the user typically generates contents while it is moving.

PBCP may receive user data via the Internet. For example, interactive data transmitted by service users, or user information provided by mobile operator can be delivered to PBCP.

4.2.2 Personal Broadcast Service Provider (PBSP)

Personal Broadcast Service Provider (PBSP) is an independent service provider whose major role is brokering content delivery between PBCPs and the mobile operator. While it is always possible for a mobile operator to directly receive contents from PBCPs without the involvement of PBSP, independent service providers may do better business by advertising, collecting good PBCPs and developing convenient User Interface software. Use cases in this document assume the role of PBSP between mobile operator and PBCP.

In some use cases, distinction between PBCP and PBSP is unclear. An example is when a PBSP creates contents using automated content production machine or unmanned device, e.g. game server, surveillance camera. In such case, the role of PBSP and PBCP are combined.

4.2.3 Broadcast Service User (BSU)

The Broadcast Service User (BSU) is typically a 3GPP UE that consumes PBS content distributed via 3GPP accesses. Some use cases assume a dedicated PBS service terminal integrated with a vehicle (e.g. car audio, GPS navigation) be used rather than a hand held device. The actual transmission method (i.e. unicast, MBMS) is transparent to the BSU.

4.2.4 Mobile Broadcast/Multicast Network Operator (MBNO)

The Mobile Broadcast Network Operator (MBNO) provides content distribution services to PBSP and PBCP. The service typically includes distribution of content information, session notification and content transmission. MBNO is responsible for protecting content from unauthorized access by users. MBNO may report information of usage statistics (e.g. receiver population, resource consumption, access failure of user) to PBSP and PBCP.

When an interactive service is requested, the MBNO provides reliable bi-direction communication path between BSUs and PBSP (or PBCP). Upon reception of BSU data, MBNO may perform access control, fairness control, DoS

prevention and other filtering actions. MBNO may further perform some value added functions on the BSU data, such as e.g. time-stamping, appending cell identity.

Figure 1 below shows an example of service association between the actors.

Note: This diagram is intended to provide clarification of the MBNO service interaction with other actors.

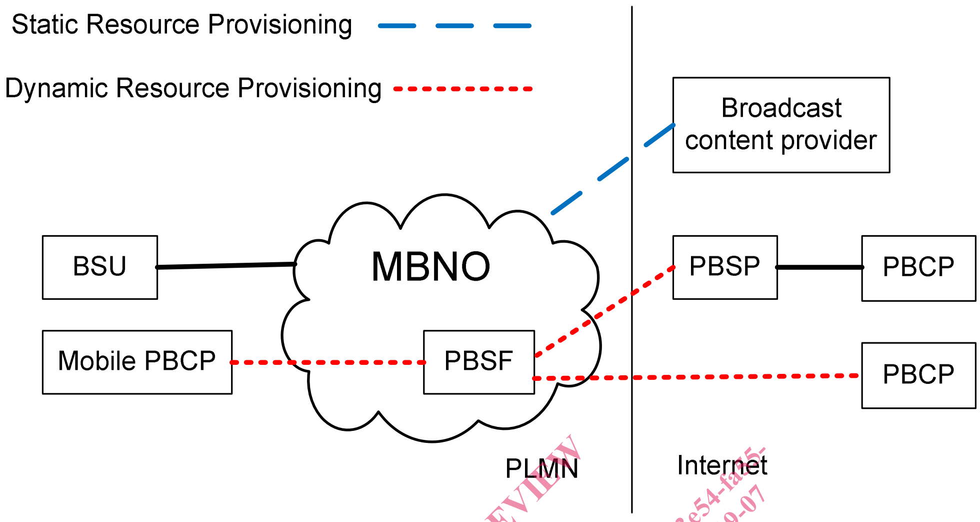

Figure 1: MBNO service association with actors

In Figure 1, the PBSF (Personal Broadcast Service Function) box depicts an interconnection point with PBSP, PBCP and Mobile PBCP. The PBSF may be a sub-function of the BM-SC [4] or an independent network element. Details of the architectural description are beyond the scope of this document.

Figure 1 illustrates that MBNO needs to provide external interfaces to PBSP and PBCP respectively, and an internal interface via network of the Mobile PBCP. The interfaces are used for dynamic resource provisioning , content delivery, information transfer, upstream data delivery, and there may be other uses. The interface between MBNO and broadcast content provider is used for static resource provisioning, and it is shown for completeness.