# OMVC Mobile TV Use Cases

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## Overview and Introduction

The following Use Cases represent the output of the OMVC's Business Advisory Group (OBAG) and OMVC's Technical Advisory Group (OTAG) to determine device requirements to support Mobile DTV service launch. A use case is any activity that a user may do when consuming a Mobile DTV service and while using a Mobile DTV receiver. The document focuses on use cases from the user's perspective and does not define functions specific to devices such as user interface flows. In order to add context and understanding to the use cases, some actions are specified that would be undertaken by the users or their service providers.

## Documentation Outline and Terms

The document is organized by user application. Functions necessary to support business models can be found in Annex A. Appendix A is a Cross Reference Matrix. The Matrix provides the reader with the functional requirements by use case.

The matrix in Appendix A assigns each use case a "term" and a "priority". Term is used to give an estimated expectation of when the OMVC expects the use case to be available in devices. "Device Launch" means that the use case will be available in the first available consumer devices. Medium Term may take 1-2 years to appear in devices. Long Term is beyond 2 years. Priority is used to indicate how likely broadcasters are to implement business and service models that would include the use cases. For example, High Priority means that broadcasters are actively pursuing business models involving the use case. In some cases, the terms and priorities may not be completely aligned, for example, based on technical realities.

# 1 Live Content Consumption

## 1.1 Television

Live broadcast television programming

### 1.1.1 Basic Watching

Users will be able to access free and pay television from a mobile device using an interface similar to Internet video players. Television will be accessible from the main menu of the mobile device.

Example: A commuter can listen and watch her local news broadcast with headphones while commuting to work on public transportation. A parent can watch the end of Oprah while sitting in a parked car waiting to pick up her kids from soccer practice.

[NOTE: All these may include the case where the program is video only, for example, a traffic camera.]

Click here for
TV programming

1.1.2 Larger Video Formats

This use case includes decoding both a base layer and enhancement layer. (An enhancement layer is optional in the M/H standard using Scalable Video Coding or SVC. This may add cost in the receiver and requires additional spectrum to enhance the quality.)


Full screen live local television broadcast

1.2 **Live Audio**

An audio only service

Audio programming can include local news broadcasts, sports highlights or music at about 48-100 kbps.

Example: After hopping off a commuter train where a user was watching a television show, the user can switch over to an audio-only local news broadcast while walking to the office.

1.2.1 Display of audio-related images, such an album cover. (See Section 5 for commerce tie-in)

1.3 **Datacasting**

A live data and/or graphics presentation

Datacasts can be viewed by selecting the appropriate item from a menu.

Datacasts require non-real-time data (NRT) and HTML in addition to RME to send objects. Datacasts may also be browser-driven.

Example: A user stuck in traffic during the morning commute can access live local traffic data, including traffic maps, to decide whether or not to choose another course. A user can also access data of up-to-the-minute local weather, sports scores or stock and financial market information.

Datacasts example

Weather datacast

Stock market datacast

## 1.4 **Closed Captioning**

Closed captioning is text that displays a transcription of the audio portion of a program on the mobile DTV screen as it occurs. Closed captioning (in multiple languages where available) can be toggled on or off while watching a TV program.

Example: A user is able to watch video in public without headphones.

Closed captioning “on”

### 1.5 Non-interactive Data Overlay

Graphics presentations included with a live video program

Non-interactive data might include a text or graphic that is overlaid onto a video program (or scaled with a video program) using the passive application framework. Users can access non-interactive data and information by selecting the appropriate widget from the main menu.

Example: A user can view sports scores, ads, a stock ticker or news ticker displayed in either full screen boxes or as lower third graphics and L-Bar formats overlaid onto video.

## 2 Non Real-Time Viewing

### 2.1 Clipcasting

Short form video and audio clips (similar to podcasts)

Similar to an RSS feed, the user will receive an alert (email, text message, etc.) when new content is available after requesting clips from a clipcasting item in the main menu. Clipcasting item may allow the user to browse clips and/or select categories for “subscriptions” in the user’s preference settings. The clips are driven by title and metadata, and may or may not be the same programming that is aired.

Both subscription and ad-supported clipcasting can be supported. Clip content can be automatically refreshed and expired. Viewer measurement and ad targeting are also possible.

Note: This use case may be based on audio only services.

Example: A user selects Sports and News highlights in his clipcasting preference settings. When new content is available, he will receive an alert on his mobile device telling him when there are sports and news highlight clips waiting for him to view. He will be able to queue up the clips and watch them all in succession.

| | |
|---|---|
|  <br>A download video service with one video being downloaded after the end-user requested the download. The ESG displays the list of videos available from this download service.<br><br>Sponsored ads could be used (pre-roll, post roll) |  <br>An automatic download of the top 10 music services |

## 2.2 **Push VOD**

Pre-cached long form content for video on demand

The user can select programming from a menu of pre-cached content that is stored on their mobile DTV device. Content can be pre-cached in two ways: 1) The user inputs personal data that allows the mobile device to select Push VOD recommendations hat are stored for future viewing; 2) The user "subscribes" to specific programming that is stored for future viewing. Either way, the user can elect to receive email or text message alerts when there is new content available to view.

The device must be on and accessible, and battery life may be impacted. Extra storage capacity within the device is necessary.

Note: This use case may be based on audio only services.

Example: A user creates a one-time subscription to "30 Rock" and "Lost". Each time the user accesses the mobile device, he is able to watch the most recent episodes of each show he is subscribed to.

Example: Selecting push VOD "subscriptions"

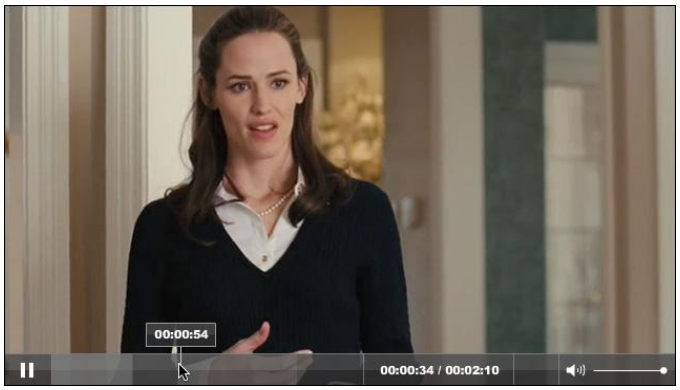
# 3 Time Shifted TV Viewing

## 3.1 Pause / Rewind Live TV

The television and video player will have both pause and rewind functionality in the tool bar at the bottom of the screen. When this occurs, the user continues to watch a "delayed" copy of the program without missing any content.

3.1.1 Pause – The user may pause the current program by activating the pause button in the player controls in order to take a short break and return to viewing without missing any content. Program pause should not exceed ~20 minutes.

3.1.2 Rewind – If the user wants to see a portion of the program that just played, she can rewind the program and resume watching. The user can rewind by dragging the video progress bar ("scrubbing") on the player back to the point in the show where she wants to resume watching.



Pause button and video progress bar for rewind functionality

Example: A user receives a phone call or text message while he is watching a television program. He pauses the program in order to answer the phone or read the text message. Once he is finished, he can return to the television program and begin watching at the same point in the program where he left off.

## 3.2 Mobile DVR

Scheduled pre-recording of television programming

The mobile DVR functionality will allow the user to program the mobile DTV device turn on, tune and record a program on a specific channel at a specific time. The user may also be able to schedule pre-recording from within the electronic service guide (ESG) by selecting a specific program and setting it to record. Broadcast support of this capability may require DRM.

## 4 Interactive TV

### 4.1 Poll / Vote / Rate

An interactive graphic (checkbox, button, text box) appears that allows a user to vote for or rate something related to the live content.

### 4.2 Interactive overlays

Click thru to more info – static or dynamic

4.2.1 **Interactive Overlays, Static -** A graphic overlay is displayed on the device which allows a user to input data (button, text box, etc.). Based on the user input, other content is accessed. For example, during a sports program, a text box is available that allows a user to enter a player's name. After entry, that player's statistics are overlaid as a lower third graphic. This case considers that the displays are static data.

4.2.2 **Interactive Overlays, Dynamic -** The case above where the information is dynamic in real time. For example, the sporting event application allows the user to input all player names that are on her fantasy team. A table is built that shows the fantasy results for each player. The table dynamically updates as games are played during the program.

### 4.3 Chat

Includes establishing windows for both private chat and chat rooms and adds social networking to traditional TV viewing.

4.3.1 A chat overlay allows the user to send private messages to their friends while watching a TV show.

4.3.2 An application allows a user to sign into a public or private "chat room" where they can discuss the TV show in real time.

### 4.4 Game shows / Gaming

An interactive graphic overlay allows a user to play along with a game show.


Polling: Choose your favorite American Idol contestant

## 5 Commerce/Advertising

### 5.1 Channel Change Interstitial

An image is displayed during an RF channel or ensemble change to mitigate any perception that the change is taking a 'long' time. The broadcaster sends the interstitial to be displayed when a service is left (tuned away from), and the data gathering process (see case 9.1 and 9.2) needs to account for the actual exposure time (in seconds). Minimum exposure time is 0.3 seconds. If the new RF service has not been detected within 5 seconds, feedback to the user is needed. Alternatively longer term interstitial display could be enabled with a hold-me key and/or partitioning of the image with interaction linked. (It is envisioned that the RME environment for the last channel remains active until the new service is acquired.)


### 5.2 Pop-up Ad

The application layer is used to display an advertisement during TV viewing. The graphic may or may not be interactive.

### 5.3 E-commerce

A purchasing opportunity is presented to the user. Interactivity allows the user to navigate to a web page or application where an electronic commerce transaction may take place.

### 5.4 Banner Ads on ESG

Banner images are associated to a specific channel or to a service. These images are displayed as part of the SG when the content is viewed or the channel listing browsed.

### 5.5 Coupon

An electronic coupon is delivered to the user via the broadcast channel. The mobile DTV device can be used to redeem the coupon at a point of sale, web site, etc.

### 5.6 Targeted advertising

A different ad plays for different users during an ad pod.

### 5.7 Geo-targeted

Same as targeted only distinction is made based on user location.

Return path:  Required (except in the case of 5.2)


E-commerce:  Purchase concert tickets or download songs


Interactive pop-up during TV ad

## 6 Emergency Alert

In addition to broadcasters inserting alerts directly into the stream of content, additional separate alerting capability is desirable.

### 6.1 Basic Alerting

The user receives an emergency alert on their mobile DTV device that is DMA-specific.  This could occur as a lower third.

### 6.2 Advanced Alerting

The user receives an alert that is geo-specific, not DMA-specific.  Mobile devices should map to a common coordinate system in order for the broadcaster to send alerts in a timely manner (ex. GPS, cell tower triangulation).

### 6.3 **Wake Up** –

The device automatically wakes up when it is in listen mode to alert the user.

## 7 Tuning and Electronic Service Guide (ESG)

There are two fundamental ways for the consumer to access services: (1) simple channel selection, (2) content selection from an electronic service guide. In the M/H standard, broadcasters must transmit information called “signaling” which tells the device what services are available, but does not include detailed program or schedule information. They may choose to transmit “announcement” which includes additional program details and scheduling information. Use cases in this section are broken down into Channel Listings, and Electronic Service Guide.

### 7.1 Channel Listings

#### 7.1.1 **Discovering Available Services**

A user wants to know what services are available in his reception area

7.1.1.1 User creates a channel listing / guide by manually surfing through channels

7.1.1.2 The user activates a “channel scan” for service discovery.

7.1.1.3 While watching a program, the user scrolls thru the channel listings while the current program continues to display in a smaller window.

#### 7.1.2 **Planned Viewing**

Tuning to a specific channel / program.

7.1.2.1 A user already knows what channel they want to watch and when. The user tunes to a specific channel using channel up/down buttons, or manually entered channel number.

7.1.2.2 A user tunes to a specific channel using an already built channel listing.

#### 7.1.3 **Impulse Viewing: What’s on now**

A user turns on a device and wants to know what shows are available for viewing

7.1.3.1 User checks programs by manually surfing through channels

7.1.3.2 The user activates a channel listing to see what shows are currently on. Once they find the channel they are looking for, they use the listing to tune to that channel.


## 7.2 Electronic Service Guide

### 7.2.1 Discovering Available Services

A user wants to know what services are available in his reception area

7.2.1.1 User creates a service guide by manually surfing through channels

7.2.1.2 The user activates a “channel scan” for service discovery.

7.2.1.3 The user uses a return channel to access an ESG from a source other than the M/H physical layer.

### 7.2.2 Planned Viewing

Tuning to a specific channel / program

7.2.2.1 A user already knows what channel they want to watch and when. The user tunes to a specific program or channel using channel up/down buttons, or manually entered channel number.

7.2.2.2 A user tunes to a specific program or channel using the channel listing / Electronic Service Guide.

### 7.2.3 Impulse Viewing: What’s on now

A user turns on a device and wants to know what shows are available for viewing

7.2.3.1 User checks programs by manually surfing through channels

7.2.3.2 The user activates the channel listing or ESG to see what shows are currently on. Once they find the content they are looking for, they use the listing/ESG to tune to that channel.

### 7.2.4 Planned viewing: What's on next

A user turns on a device 10 minutes before the hour and wants to know what shows are starting on the hour.

7.2.4.1 The user activates the ESG to see what shows are coming up.

7.2.4.2 Once they find the content they are looking for, they access more detailed information about the program by clicking on that program in the ESG.

### 7.2.5 Surfing viewing: What's on later

The user wants to "surf" channels, using a channel listing or service guide, to see program listings without interrupting the current program. The user scrolls thru the program guide while the current program continues to display in a smaller window.


Detailed program information

Sample service guide

## 8 Subscriber Interactions

Subscription TV can be "free" or "pay" with registration and may require additional components, e.g. a return channel. At a high level, there are two capabilities that must be supported for subscription TV: the first is security, the second is billing.

These options may require negotiated business agreements with cellular carriers. Regardless of the specific business case, these options may work best over a mobile web interface that provides secure transactions over HTTPS.

### 8.1 Security

#### 8.1.1 Simple Permission

The user gets a signal that one or more components require service protection in order to render service. This requires a handshake via return channel. A flag is set in the device once acknowledgement has been made. The content can then be accessed. Content is sent in the clear.

#### 8.1.2 IP Security / Keys

The user gets a signal that one or more components require service protection in order to render service. Upon registration, encryption keys are sent via the broadcast channel or a non-broadcast two-way communication channel.

### 8.2 Billing

### 8.2.1 Purchase subscription

8.2.1.1 A user wants to purchase or redeem a subscription plan for access to pay TV services protected by a conditional access service. The device has no back channel.

8.2.1.2 A user wants to purchase or redeem a subscription plan for access to pay TV services protected by a conditional access service. The device is a connected device.

8.2.1.3 The above cases when the service is an SVC enhancement layer.

### 8.2.2 Purchase one time access

8.2.2.1 A user wants to purchase “pay per view” content protected by a conditional access. The consumption device has no return path, but the user can be authorized on a separate device that is Internet-connected for consumption on the non-connected device. If no Internet connection is available, a user could call in and authorize the unconnected device verbally.

8.2.2.2 A user wants to purchase “pay per view” content protected by a conditional access. The device is a connected device.

8.2.2.3 The above cases when the service is an SVC enhancement layer. (This option is a low priority, if it is offered at all.)

### 8.2.3 Pre-paid access

A user wants the ability to pre-pay for access to pay TV services. This could be offered in terms of a fixed number of viewing minutes, etc.

## 8.3 Content Advisory Controls

The use of content advisories is an aspect of broadcasting that is expected to continue to be used by many broadcasters, especially when content is simulcast. These advisories are expected to consist of one and only one of the advisory categories present on the list of choices documented by the TV Parental Guidelines system using the standardized descriptor means in defined A/153 (only). Note: Allocation of data rate for transmission of any Rating Region Table structure is not necessary for broadcasters in the United States, so it is not useful. However, some broadcasters that cover Canada may send rating region 2 and a descriptor that cites that region for the advisory value.

# 9 Viewer Data Collection

Statistical survey based audience measurement such is used for obtaining program ratings for current television programming is assumed to always be possible and doing so has no system-level implications. Additional possibilities to collect viewer data are presented in the following use cases.

Appendix B includes a more thorough discussion of the techniques that might be used to collect viewer data.

**Viewer Interactions**

Real-time data brings Internet viewer data collection to mobile TV viewing – by providing a census, not a sample. Viewer data may be collected in a number of ways:

### 9.1 Passive Viewer Data Collection

A log is kept in the background and sent to a server over some backchannel. The user does not engage the measurement. The opt-in mechanism needs to meet legal requirements.

### 9.2 Active Viewer Data Collection

The broadcast solicits users to respond to questions during or after a show.

- May be as simple as:
  Did you like the show? Yes / No
- Tell us about yourself…

### 9.3 User Opt-Out

A user is presented with the option to opt-out of viewer data collection. Graphics or text may appear on the lower third of the viewing screen instructing users to tune away from the channel if they do not want data collected. If users continue watching the channel, passive viewer data collection will take place.


Active audience measurement: Users can gain access to additional content if they choose to disclose personal information

**Appendix A: Cross Reference Matrix**

| Section | Use Case | Term | Priority | Service Guide | Service Protection | RME | Content Protection | Back Channel | Interactivity | Other? |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Live Content Consumption | | | | | | | | | |
| 1.1 | Television | | | | | | | | | |
| 1.1.1 | Basic Watching | Device Launch | Highest | No | No | No | No | No | No | Includes synchronized audio**.** |
| 1.1.2 | Larger Video Formats | Medium Term | Medium | No | No | No | No | No | No | |
| 1.2 | Live Audio | Device Launch | Higher | No | No | No | No | No | No | |
| 1.2.1 | Live Audio with related still pictures | Medium Term | Medium | No | No | **Yes** | No | No | **No** | |
| 1.3 | Datacasting | Device Launch | High | No | No | **Yes** | No | No | **Yes** | **NRT and HTML** |
| 1.4 | Closed Captioning | Device Launch | Highest | No | No | No | No | No | No | **CEA-708** |
| 1.5 | Non-interactive Data Overlay | Device Launch | Medium | No | No | **Yes** | No | No | **Yes** | |
| 2 | Non Real-Time Viewing | | | | | | | | | |
| 2.1 | Clipcasting | Device Launch | High | **Yes** | No | No | No | No | No | **NRT** |
| 2.2 | Push VOD | Medium Term | Low | **Yes** | No | No | No | No | No | |
| 3 | Time Shifted TV Viewing | | | | | | | | | |
| 3.1 | Pause / Rewind Live TV | | | | | | | | No | |
| 3.1.1 | Pause Live TV | Medium Term | Medium | No | No | No | No | No | No | |
| 3.1.2 | Rewind Live TV | Medium Term | Medium | No | No | No | No | No | No | |
| 3.2 | Mobile DVR | Long Term | Low | **Yes** | No | No | **TBD** | **TBD** | No | |
| 4 | Interactive TV | | | | | | | | | |
| 4.1 | Poll / Vote / Rate | Device Launch | High | No | No | **Yes** | No | **Yes** | **Yes** | |
| 4.2 | Interactive overlays | | | | | | | | | |
| 4.2.1 | Interactive Overlay, | Device | Higher | No | No | Yes | No | Yes | **Yes** | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Static | Launch | | | | | | | | |
| 4.2.2 | Interactive Overlay, Dynamic | Device Launch | High | No | No | Yes | No | Yes | **Yes** | |
| 4.3 | Chat | | | | | | | | | |
| 4.3.1 | Chat IM | Medium Term | Low | No | No | Yes | No | Yes | **Yes** | Chat infrastructure |
| 4.3.2 | Chat Room | Medium Term | Low | No | No | Yes | No | Yes | **Yes** | Chat infrastructure |
| 4.4 | Game shows / gaming | Medium Term | Medium | No | No | Yes | No | Yes | **Yes** | |
| 5 | Commerce/Advertising | | | | | | | | | |
| 5.1 | Channel Change Interstitial | Launch | High | No | No | Yes | No | No | No | |
| 5.2 | Pop ups during TV viewing | Device Launch | High | No | No | Yes | No | No | No | |
| 5.3 | E-commerce | Device Launch | Medium | No | No | Yes | No | Yes | **Yes** | |
| 5.4 | Banner Ads on ESG | Device Launch | High | Yes | No | No | No | No | **Yes** | |
| 5.5 | Coupons | Medium Term | Medium | No | No | Yes | No | No | No | Online redemption requires back channel |
| 5.6 | Targeted Advertising | Long Term | Medium | No | No | No | No | No | No | Ad storage, preference or user profile UI, signaling ad playback opportunity through some means |
| 5.7 | Geo-targeted | Long Term | Medium | No | No | No | No | No | No | GPS or equivalent; plus everything required for Targeted Advertising |
| 6 | Emergency Alert | | | | | | | | | |
| 6.1 | Basic Alerting | Device Launch | High | No | No | No | No | No | No | Some receiver-specific message popup UI |
| 6.2 | Advanced Alerting | Long Term | Medium | No | No | No | No | No | No | GPS or equivalent; plus everything required for Basic Alerting |
| 6.3 | Wake Up | Long Term | Medium | No | No | No | No | No | No | Some receiver-specific message popup UI plus time feature |
| 7 | Tuning and Electronic Service Guide (ESG) | | | | | | | | | |
| 7.1 | Channel Listings | | | | | | | | | |
| 7.1.1 | Discovering Available Services | Device Launch | Highest | No | No | No | No | No | No | Note that SMT/SLT is enough for discovery, |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | although SG is preferred. Note that a second tuner is desirable for channel scan if a one-way device. |
| 7.1.2 | Planned Viewing | Device Launch | High | No | No | No | No | No | No | |
| 7.1.3 | Impulse Viewing | Device Launch | High | No | No | No | No | No | No | |
| 7.2 | Electronic Service Guide | | | | | | | | | |
| 7.2.1 | Discovering Available Services | Device Launch | High | No | No | No | No | No | No | Note that SMT/SLT is enough for discovery, although SG is preferred. Note that a second tuner is desirable for channel scan. Case 7.2.1.3 requires a back channel. |
| 7.2.2 | Planned Viewing | Device Launch | High | No | No | No | No | No | No | |
| 7.2.3 | Impulse Viewing | Device Launch | High | No | No | No | No | No | No | |
| 7.2.4 | Planned Viewing: What's on next | Device Launch | High | Yes | No | No | No | No | No | |
| 7.2.5 | Surfing Viewing: What's on later | Device Launch | High | No | No | No | No | No | No | |
| 8 | Subscriber Interactions | | | | | | | | | |
| 8.1 | Security | | | | | | | | | |
| 8.1.1 | Simple Permission | Device Launch | Highest | No | Yes | No | No | Yes | **Yes** | |
| 8.1.2 | IP Security / Keys | Medium Term | High | No | No | No | No | No | No | Return channel can be used |
| 8.2 | Billing | | | | | | | | | |
| 8.2.1 | Purchase Subscription | Device Launch | Higher | Yes | Yes | No | No | No | No | Some phone or off-line web registration required in 8.2.1.1 and 8.2.1.3. Back channel required for 8.2.1.2 and 8.2.1.3. |
| 8.2.2 | Purchase one time access | Medium Term | Medium | Yes | Yes | No | No | No | No | Some phone or off-line web registration required in 8.2.2.1 and 8.2.2.3. Back channel required for 8.2.2.2 and 8.2.2.3. |
| 8.2.3 | Pre-paid Access | Medium | Medium | Yes | Yes | No | No | No | No | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Term | | | | | | | | |
| 8.3 | Content Advisory Controls | Device Launch | High | No | No | No | No | No | No | |
| 9 | Viewer Data Collection | | | | | | | | | |
| 9.1 | Passive Viewer Data Collection | Device Launch | Higher | No | No | No | No | Yes | Yes | This is more than the ability to independently measure audience, which is essential (but not part of the MH system per se). |
| 9.2 | Active Viewer Data Collection | Device Launch | High | No | No | Yes | No | Yes | Yes | |
| 9.3 | Use Opt-Out | Device Launch | Higher | No | No | Yes | No | Yes | Yes | |

**Header Definitions:**

| | |
|---|---|
| **Term** | Timing for launch |
| **Priority** | Low/Medium/High; low implies not required, high implies highly necessary or critical; medium is somewhere in between. The High category is further distinguished using High/Higher/Highest with progressively greater weight. |
| **Service Guide** | Electronic Service Guide as called out in A/153 Announcement. |
| **Service Protection** | Protection (encryption) of the over-the-air stream, as defined in A/153 Service Protection (or equivalent). |
| **RME** | OMA-RME application layer as defined in A/153 Application |
| **Content Protection** | Protection (encryption) of files delivered over-the-air and stored on the receiving device. |
| **Back Channel** | An IP-compatible channel from the receiving device to the broadcaster or their delegate. |
| **Interactivity** | User data entry which is sent back over the Back Channel. |
| **Other?** | Any additional capabilities needed for the Use Case. |

## Appendix B: Viewer Data Collection

### Devices and Return Paths

Mobile DTV devices can be placed into one of four categories for the purpose of viewer data collection and monetization. (NOTE: Only categories 1-3 will be pertinent to this document.)

A. Always Connected
   Most likely device: Phone / Smartphone
   Return path: Cellular Network; Internet (Wi-Fi, WiMAX)
   Viewer data can be sent in real-time across the cellular network.

B. Occasionally Connected
   Most likely device: Laptop, Netbook
   Return path: Internet (Wi-Fi, WiMAX)
   Viewer data can be sent in batches whenever the device is within range of an Internet connection.

C. PC/Laptop Synch
   Most likely device: Stand-alone DVD player
   Return path: USB/Internet
   Viewer data is batched together and sent over a USB connection to a laptop that is Internet connected. Users will likely plug into the laptop to charge the battery in the device.

D. Never Connected
   Most likely device: Stand-alone DVD player
   Return channel: None
   Viewer data cannot be collected from one-way devices.

### Proposed Tech Roadmap

A. Terms of Service – A user will be given an option to agree to a broadcaster's Terms of Service (TOS). By agreeing to the TOS the user is allowing the broadcaster to collect viewer data.

   If the user does not agree to the TOS the broadcaster will not be allowed to collect viewer data. Additionally, the broadcaster my choose from a number of actions that result:
   - The user may still access the TV programming.
   - The user may not access the TV programming if it is protected content that is only accessible to users who accept the TOS.
   - The user may only access base TV programming if enhanced features (ex. higher video quality or interactive content) are only accessible to users who accept the TOS.

[The technical details of how to enforce these options in the receiver must be discussed.]

B. Unique ID – Each user must be assigned a unique ID in order to measure viewer data. The unique ID will also indicate how many devices are assigned to the user. Each individual user will determine how much personal data is attached to the user ID.

   Questions:
   - What should be the unique ID of each device?

- How will the unique ID integrate with other SSO web interfaces (ex. across NBCU properties)?
- How will the unique ID work with cable operator entitlement?

C. TV Profile – Users will be given the option to create a TV profile. This profile can be created and managed in a web application either from the mobile device or from a computer connected to the Internet. There will be a single web registration site for all broadcasters (potentially managed by OMVC). This site will provide a singular experience for all users and prevent users from multiple registration sites for each broadcaster.

Each broadcaster can determine what types of information to collect. Information can include: primary viewing geographic location (ex. zip code), gender, age range, household income range, etc. By creating and maintaining a profile the user must also opt-in to the TOS that provides the broadcaster with permission to store and collect the user's personal data.

Creating a profile is optional so users may need incentives to encourage them to create profiles for data collection. Incentives could include more relevant ads and/or additional features to enhance the viewing experience.

**Detailed Measurement Tech Roadmap**

The following viewing timestamps will be collected when a user tunes to a channel:

Version 1
D. Time in – When the user begins watching a channel
E. Time out – When the user stops watching a channel

Version 2
F. Mute – When a user mutes a channel to enter into video only mode (if closed captioning is on, the broadcaster should receive credit for the user viewing the program/ad)
G. Un-mute – When a user un-mutes a channel for full capability viewing
H. Pause – When a user pauses a program to stop watching
I. Un-pause – When a user begins watching a program after pausing it

Example: A user presses the pause button at 9:05am. If an ad runs at 9:10am during a morning program and the user un-pauses the program and resumes watching where he left off, the user will view the ad even though it is really 9:15am. [Note: Technical details must be sorted out – mute may require current time and frame count.]

Versioning allows broadcasters to get a basic approach in place (V1) before adding additional features (V2, etc.).

**Proposed Data Reporting and Aggregation Approach**

This process needs industry agreement, but it may be similar to the overnights and updates for DVR views.

Data will be pushed from the device to the repository. There are potentially 6-10 push mode methods.

Open Issues:

- Is there freedom of data?
  Broadcasters will be able to choose whether they want the data directly or if they want to send it to a 3rd party clearinghouse. Agreements with Networks & Affiliates are needed.

- How does the device know when and where to send data?
  Application Framework; Data will be sent to a specific URL as specified by the Application Framework code

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