



Qualcomm Technologies, Inc.

# **LTE Broadcast MSDC API Stub**

User Guide Version 4.3

80-PR784-1 Rev. A

September 16, 2019

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## Revision history

Revision	Date	Description
A	September 2019	Initial release

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# 1 Introduction

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This document describes how to use the MSDC\_API\_Stub for testing the MSDC\_API.

## 1.1 Background

The MSDC\_API\_Stub facilitates testing of the MSDC\_API by generating the notifications based on calls from the application for specific use cases.

## 1.2 Supported use cases

- Play streaming service
- Switching streaming service
- Starting file download service
- Receiving MPD Updated notification
- Receiving File Available notification
- Play group call service
- Update group call service
- Receiving Service Update notification
- Receiving Broadcast Coverage notification
- Receiving Stalled notification
- Configured service class
- Multiband
- Receiving File Download Failure notification
- Roaming State notification (Out of Network notification)
- E911 notification
- Error/Warning notification
- Signal Strength notification

## 1.3 Stub configuration

Use stub\_config.xml to configure options for the use cases described in Section 1.2.

Chapters 2 and 3 describe the different configuration options.

The following is a sample stub\_config.xml.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mpd_update_interval>80</mpd_update_interval>
  <service_started_interval>2</service_started_interval>

  <mobilityNotifications>
    <serviceStalled>
      <numberOfStalledNotifications>2</numberOfStalledNotifications>
      <serviceStalledInterval>20</serviceStalledInterval>
      <serviceStalledDuration>5</serviceStalledDuration>
    </serviceStalled>
    <outOfCoverage>

<numberOfOutOfCoverageNotifications>1</numberOfOutOfCoverageNotifications>
      <outOfCoverageInterval>15</outOfCoverageInterval>
      <outOfCoverageDuration>5</outOfCoverageDuration>
    </outOfCoverage>

  </mobilityNotifications>

  <streamingUpdate>
    <update_time_from_start>10</update_time_from_start>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
      <service_id>urn:3GPP:metadata-service_1_1</service_id>
      <serviceClassName>cnn</serviceClassName>
      <saSAIList>1, 2</saSAIList>
      <GroupName>venue</GroupName>
      <streamingSrvcType>BC_ONLY</streamingSrvcType>
    </service>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
      <service_id>urn:3GPP:metadata-service_1_3</service_id>
      <serviceClassName>cnn</serviceClassName>
      <saSAIList>1, 3</saSAIList>
      <GroupName>venue</GroupName>
      <streamingSrvcType>BC_ONLY</streamingSrvcType>
    </service>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
      <service_id>urn:3GPP:metadata-service_1_2</service_id>
```

```

        <saSAIList>1</saSAIList>
        <GroupName>national</GroupName>
        <serviceName>bbc</serviceName>
        <streamingSrcType>BC_ONLY</streamingSrcType>
    </service>
</currentGroupName>venue</currentGroupName>
<GroupInfo>
    <GroupName>venue</GroupName>
    <GroupSAIList>1,2</GroupSAIList>
</GroupInfo>
<GroupInfo>
    <GroupName>national</GroupName>
    <GroupSAIList>3</GroupSAIList>
</GroupInfo>
</streamingUpdate>

<fileDeliveryUpdate>
    <update_time_from_start>11</update_time_from_start>
    <service>
        <service_id>urn:3GPP:metadata-service_Data</service_id>
        <GroupName>national</GroupName>
        <serviceName>cnn</serviceName>
    </service>
    <service>
        <service_id>urn:3GPP:metadata-service_Data2</service_id>
        <GroupName>venue</GroupName>
        <serviceName>bbc</serviceName>
    </service>
    <currentGroupName>venue</currentGroupName>
</fileDeliveryUpdate>

<fileDownloadFailure>

<file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>urn:3GPP:metadata-service_Data</service_id>
    <start_index_number>4</start_index_number>
    <end_index_number>5</end_index_number>
    <fileDownloadFailure_interval>35</fileDownloadFailure_interval>
</fileDownloadFailure>

<fileAvailable>

<file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>urn:3GPP:metadata-service_Data</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>3</end_index_number>
    <md5>ec45affa</md5>

```

```

    <fd_progress_interval_kilobytes>1</fd_progress_interval_kilobytes>
    <fd_progress_suspended_interval>1</fd_progress_suspended_interval>
    <fileAvailable_interval>25</fileAvailable_interval>
</fileAvailable>

<fileAvailable>

<file_location>/sdcard/msdc_api/myDataFile$_test.mp4</file_location>
    <service_id>urn:3GPP:metadata-service_Data2</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>3</end_index_number>
    <fileAvailable_interval>30</fileAvailable_interval>
</fileAvailable>

<inaccessibleLocation>
    <msg>unable to access location</msg>
    <mountPoint>/storage/sdcard1</mountPoint>
    <inaccessibleLocation_interval>10</inaccessibleLocation_interval>
</inaccessibleLocation>

<insufficientStorage>

<file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>urn:3GPP:metadata-service_Data</service_id>
    <mountPoint>/storage/sdcard1</mountPoint>
    <reasonID>10</reasonID>
    <totalStorageNeeded>2344</totalStorageNeeded>
    <insufficientStorage_interval>15</insufficientStorage_interval>

</insufficientStorage>

</stubConfig>

```

## 1.4 Installation

To test your application using the stub:

1. Include the MSDC\_API\_Stub AAR in your application APK.
2. Copy stub\_config.xml to the external storage in **msdc\_api**.

mnt	2012-10-17	18:39	drwxrwxr-x	
asec	2012-10-17	18:39	drwxr-xr-x	
obb	2012-10-17	18:39	drwxr-xr-x	
sdcard	2012-10-17	18:40	d---rwxr-x	
LOST.DIR	2012-10-17	18:40	d---rwxr-x	
msdc_api	2012-10-22	19:40	d---rwxr-x	
stub_config.xml	2116	2012-10-22	18:08	----rwxr-x

# 2 Configuration

---

## 2.1 Streaming Service List Update notification

After the application initializes the streaming service, it must obtain a list of streaming services. The list may be empty the first time. The application must listen for a Streaming Service List Update notification. The application calls `getStreamingServiceList()` to get the list of streaming services. It can take up to a minute for the MSDC to populate the list of services.

The user can configure the services to be received for testing in `streamingUpdate`:

```
<service>
<mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
  <service_id>service_1_1</service_id>
</service>
```

- **service\_id** – Configures the service ID, a unique string that identifies the service
- **mpd\_uri** – Configures the mpd uri which will be passed to the `MediaPlayer` `setDataSource` function (can be the location of an mp4 file on the external storage)

The following is a sample using an actual mpd uri:

```
mMediaPlayer
  .setDataSource(streamingServiceModel.getMpdUrl(myServiceHandle));
<update_time_from_start>20</update_time_from_start>
```

- **update\_time\_from\_start** – Configures the elapsed time (in seconds) after initialization to send the update notification to the application

Multiple streaming services can be configured in `streamingUpdate`. Multiple `streamingUpdates` can be configured to be sent at different times to simulate Service Announcement updates.

### 2.1.1 ServiceClass filtering

The application uses `serviceClass` to obtain the list of services it is interested in. `ServiceClass` can be configured to simulate this use case. The following is an optional configuration:

```
<service>
<mpd_uri>/sdcard/msdc_api/SoccerGame.mp4</mpd_uri>
  <service_id>service_1_1</service_id>
  <serviceClassName>cnn</serviceClassName>
</service>
```

When the application uses a specific `serviceClass` during initialization, it only receives the list of services tagged with that `serviceClass`.



## 2.1.2 Multiband

The user equipment (UE) may be able to access services broadcast on multiple frequency carriers in a given geographical location, even though it may be camped on a single frequency.

The group of services on the camped frequency is called the *camped group*. The services on all frequencies that the UE can access can be grouped per frequency into multiple service groups. A camped group is the same or a subset of all service groups.

A service group is a set of services that the UE may accessed concurrently. The services in the camped group are immediately accessible without the need for the UE to switch or acquire another frequency carrier.

To simulate a receiving service list with grouping information and a camped group, use this configuration:

```
<streamingUpdate>
  <update_time_from_start>1</update_time_from_start>
  <service>
    <mpd_uri>/sdcard/msdc_api/SoccerGame.mp4</mpd_uri>
    <service_id>service_1_1</service_id>
    <GroupName>streamingGroup23</GroupName>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/myDataFile1_test.mp4</mpd_uri>
    <service_id>service_1_2</service_id>
    <GroupName>streamingGroup45</GroupName>
  </service>
  <currentGroupName> streamingGroup23</currentGroupName>
</streamingUpdate>
```

- **GroupName** – Configures the group name that the service belongs to
- **currentGroupName** – Configures the camped group name

## 2.1.3 Stalled notification

To simulate receiving a Stalled notification for the playing service, use this configuration:

```
<mobilityNotifications>
  <serviceStalled>
    <numberOfStalledNotifications>2</numberOfStalledNotifications>
    <serviceStalledInterval>20</serviceStalledInterval>
    <serviceStalledDuration>5</serviceStalledDuration>
  </serviceStalled>
</mobilityNotifications>
```

- **numberOfStalledNotifications** – Configures the number of stalled notifications that the application is interested in receiving
- **serviceStalledInterval** – Configures the interval (in seconds) at which the application receives a Stalled notification
- **serviceStalledDuration** – Configures the stalled duration until the application receives a Service Started notification

## 2.1.4 Streaming service type

Streaming service types determine the availability of the streaming service.

To simulate different behaviors of the streaming services, a streaming service type can be configured as:

- **streamingSrcvType** – Configures type of streaming service, which can be “BC\_ONLY” or “BC\_UC\_CONTINUITY”

## 2.2 File Delivery Service List Update notification

After the application initializes the file delivery service, it must obtain a list of file delivery services. The list may be empty the first time.

The application must listen for a File Delivery Service List Update notification, then calls `getFileDeliveryServiceList()` to get the list of file delivery services. It can take up to a minute for the MSDC to populate the list of services.

The following shows how a user can configure the services to be received for testing in `fileDeliveryUpdate`:

```
fileDeliveryUpdate>
<update_time_from_start>11</update_time_from_start>
  <service>
    <service_id>service_Data</service_id>
  </service>
</fileDeliveryUpdate>
```

- **service\_id** – Configures the service ID, a unique string that identifies the service
- **update\_time\_from\_start** – Configures the elapsed time (in seconds) after initialization to send the Update notification to the application

Multiple file delivery services can be configured in `fileDeliveryUpdate`. Multiple `fileDeliveryUpdates` can be configured to be sent at different times to simulate the Service Announcement update.

## 2.3 File Available notification

The File Available notification indicates a new file has been downloaded and is ready to use:

```
<fileAvailable>
  <file_location>myDataFile$_test.xml</file_location>
  <service_id>service_Data</service_id>
  <start_index_number>0</start_index_number>
  <end_index_number>10</end_index_number>
  <fileAvailable_interval>20</fileAvailable_interval>
</fileAvailable>
```

- **file\_location** – Downloaded file location/name. The `file_location` can also be a template to present a sequence of files. If so, the \$ is replaced with a configured index.
- **start\_index\_number** (optional)

- **end\_index\_number (optional)** – Numbers used to expand the file\_location template  
 Example: If the file\_location is: myDataFile\$\_test.xml, the start index is 0, and the end index is 5, and the application receives the File Available notification for the following files:
  - myDataFile0\_test.xml
  - myDataFile1\_test.xml
  - myDataFile2\_test.xml
  - myDataFile3\_test.xml
  - myDataFile4\_test.xml
- **service\_id** – Configures the service ID, a unique string that identifies the service
  - File Available notifications are sent when the following service is running:  
 <file\_available\_interval>20</file\_available\_interval>
- **fileAvailable\_interval** – Configures the interval (in seconds) at which the application receives the configured File Available notifications

## 2.4 MPD Updated notification

The application receives the MPD Updated notification on a running service. After receiving the notification, the application should get the new mpd\_uri and initialize the mediaPlayer.

```
<mpd_update_interval>20</mpd_update_interval>
```

- **mpd\_update\_interval** – The application receives the mpdUpdated notification that it configures in seconds. This option applies to all services.

**NOTE:** To simulate live streaming, the mpdUpdated notification should be received by the application before the end of the current playing video. For example, if the length of the video is 120 s, the mpd\_update\_interval can be configured to 118 s.

## 2.5 Broadcast coverage

To simulate receiving a Broadcast Coverage notification, the following options can be configured:

```
<mobilityNotifications>
```

```
  <outOfCoverage>
```

```
    <numberOfOutOfCoverageNotifications>2</numberOfOutOfCoverageNotifications>
```

```
      <outOfCoverageInterval>15</outOfCoverageInterval>
```

```
      <outOfCoverageDuration>5</outOfCoverageDuration>
```

```
    </outOfCoverage>
```

```
</mobilityNotifications>
```

- **numberOfOutOfCoverageNotifications** – Configures the number of broadcast out of coverage notifications that the application is interested to receive
- **outOfCoverageInterval** – Configures the interval (in seconds) at which the application receives a broadcast out of coverage notification

- **outOfCoverageDuration** – Configures the broadcast out of coverage duration until the application receives an in-coverage notification

## 2.6 File Download Failure notification

This notification indicates that the requested file capture has failed.

To simulate the File Download Failure notification, the user can configure the following element:

```
<fileDownloadFailure>
  <file_location>myDataFile$_test.txt</file_location>
  <service_id>urn:3GPP:metadata-service_Data</service_id>
  <start_index_number>4</start_index_number>
  <end_index_number>5</end_index_number>
  <fileDownloadFailure_interval>35</fileDownloadFailure_interval>
</fileDownloadFailure>
```

- **file\_location** – Location/name of the file that failed to be downloaded
  - file\_location can also be a template to present a sequence of files
    - If so, the \$ gets replaced with a configured index
- start\_index\_number (optional)
- **end\_index\_number (optional)** – Numbers used to expand the file\_location template

Example: file\_location is: myDataFile\$\_test.xml, start index is 0 and end index is 5, and the application receives the file available notification for the following files:

- myDataFile0\_test.xml
- myDataFile1\_test.xml
- myDataFile2\_test.xml
- myDataFile3\_test.xml
- myDataFile4\_test.xml
- **service\_id** – Configures the service ID, a unique string that identifies the service
  - File download failure notifications get sent when this service is running
- **fileDownloadFailure\_interval** – Configures the interval (in seconds) at which the application receives the configured file download failure notifications

## 2.7 Roaming State notification (Out of Network notification)

This notification indicates the roaming state.

To simulate receiving an Out of Network notification, the following options can be configured:

```
<mobilityNotifications>
  <outOfNetworkNotification>

  <numberOfOutOfNetworkNotifications>1</numberOfOutOfNetworkNotifications>
```

```
<OutOfNetworkNotificationInterval>25</OutOfNetworkNotificationInterval>
<OutOfNetworkNotificationDuration>10</OutOfNetworkNotificationDuration>
  </outOfNetworkNotification>
</mobilityNotifications>
```

- **numberOfOutOfNetworkNotifications** – Configures the number of roaming out of network notifications that the application is interested to receive
- **OutOfNetworkNotificationInterval** – Configures the interval (in seconds) at which the application receives a roaming out-of-network notification
- **OutOfNetworkNotificationDuration** – Configures the out of network duration until the application receives a roaming in-network notification

## 2.8 E911 notification

To simulate receiving E911 notifications, the following options can be configured:

```
<e911Notification>
  <e911NotificationTimeFromStart>40</e911NotificationTimeFromStart>
  <e911NotificationDuration>10</e911NotificationDuration>
</e911Notification>
```

- **e911NotificationTimeFromStart** – Configures elapsed time (in seconds) after initialization to send the E911 IN notification to the application
- **e911NotificationDuration** – Configures the E911 notification duration (in seconds) until the application receives the E911 OUT notification

## 2.9 Error/Warning notification

To simulate receiving Error or Warning notifications, the following options can be configured:

```
<errorWarning>
<ID>10000</errorID>
<errorWarningNotificationTimeFromStart>20</errorWarningNotificationTimeFromStart>
</errorWarning>
```

- **ID** – Error or warning ID number, which represents the corresponding error/warning code
- **errorWarningNotificationTimeFromStart** – Configures elapsed time (in seconds) after initialization to send the Error or Warning notification to the application

**Table 2-1 Error/warning codes**

Error or warning code	Range (minimum to maximum)
MSDC Error	10000 to 15000
MSDC Warning	15001 to 19999
Network Service Error	20000 to 25000
Network Service Warning	25001 to 29999
Streaming Service Error	30000 to 35000

Error or warning code	Range (minimum to maximum)
Streaming Service Warning	35001 to 39999
File Delivery ServiceError	40000 to 45000
File Delivery Service Warning	45001 to 50000
Group call service Error	51000 to 55000
Group call service Warning	55001 to 59999

## 2.10 Signal Strength notification

To simulate receiving a Signal Strength notification, the following options can be configured:

```
<mobilityNotifications>
  <signalStrengthNotification>

  <SignalStrengthNotificationInterval>15</SignalStrengthNotificationInterval>
  </signalStrengthNotification>
</mobilityNotifications>
```

- **SignalStrengthNotificationInterval** – Configures the signal strength interval (in seconds) after which the application updates the Signal Strength.

## 2.11 Service Area ID list update notification for Group Call

The group call application gets the list of services from the group call client, but these services will be filtered based on the Service Area ID list. All services that have the Service Area ID as the current cell Service Area ID, will be shown to the user as available group call services for playing.

### Example 1

In this configuration, there is a single service with Tmgi **16838928** with Service Area ID list [1,2,3] and frequency list [103,105,107]. Therefore, service will be available or can be played only in the cell service area ids [1,2,3] in the frequencies [103,105,107].

```
<service>
  <tmgi id="16838928">
    <saiList>
      <saiId id="1"></saiId>
      <saiId id="2"></saiId>
      <saiId id="3"></saiId>
    </saiList>
    <freqList>
      <freqNum id="103"></freqNum>
      <freqNum id="105"></freqNum>
      <freqNum id="107"></freqNum>
    </freqList>
  </tmgi>
  -
  -
</service>
```

All services available in the tag `<service> ... </service>` are ideally the services obtained by the app from the group call client. The group call client gets these services from the group call server which is in the network.

Among the services obtained by the app, only the services which have the Service Area IDs of current cell Service Area IDs will be shown to the user for playing.

## Example 2

This configuration sets the current cell Service Area IDs with [1,2] and current group name as emergency. The services which all have Service Area IDs [1,2] will be shown to the user as available group call services for playing.

```
<gcGroupInfoDetails>
  <currentGroupName>emergency</currentGroupName>
  <GroupInfo>
    <GroupName>emergency</GroupName>
    <GroupSAIList>1,2</GroupSAIList>
  </GroupInfo>
  <GroupInfo>
    <GroupName>normal</GroupName>
    <GroupSAIList>3</GroupSAIList>
  </GroupInfo>
</gcGroupInfoDetails>
```

# 3 Sample Configurations

---

This section provides sample configurations for different use cases. These configurations can be saved as `stub_config.xml` to simulate related scenarios.

## 3.1 Two streaming services

This configuration file does the following:

- Sends a Streaming Service List Update notification with two streaming services 5 s after starting the application.
- If the application chooses to start either of the two streaming services, it receives a `ServiceStarted` notification after 1 s.
- The playing streaming service receives an `mpdUpdated` notification every 119 s, which is 1 s less than the video length.

**NOTE:** Multiple services can be added to a `StreamingUpdate` element.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<mpd_update_interval>119</mpd_update_interval>
<service_started_interval>1</service_started_interval>
<streamingUpdate>
  <update_time_from_start>5</update_time_from_start>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
    <service_id>service_1_1</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrvctype>BC_ONLY</streamingSrvctype>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
    <service_id>service_1_2</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrvctype>BC_ONLY</streamingSrvctype>
  </service>
</streamingUpdate>
</stubConfig>
```



## 3.2 Two file delivery services

This configuration file does the following:

- Sends a File Delivery Service List Update notification with two file delivery services 2 s after starting the application.
- Service service\_Data receives five fileAvailable notifications every 20 s.
- Service service\_Data2 receives three fileAvailable notifications every 30 s.

**NOTE:** Multiple services can be added to the fileDeliveryUpdate element along with related fileAvailable configurations.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <fileDeliveryUpdate>
    <update_time_from_start>2</update_time_from_start>
    <service>
      <service_id>service_Data</service_id>
      <serviceClassName>cnn</serviceClassName>
    </service>
    <service>
      <service_id>service_Data2</service_id>
      <serviceClassName>cnn</serviceClassName>
    </service>
  </fileDeliveryUpdate>
  <fileAvailable>
    <file_location>/sdcard/msdc_api/data$_test.txt</file_location>
    <service_id>service_Data</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>4</end_index_number>

<fileAvailable_interval>20</fileAvailable_interval>
  </fileAvailable>
  <fileAvailable>
    <file_location>/sdcard/msdc_api/myVideo_test$.mp4</file_location>
    <service_id>service_Data2</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>2</end_index_number>

<fileAvailable_interval>30</fileAvailable_interval>
  </fileAvailable>
</stubConfig>
```

### 3.3 Remove or add services during ServiceListUpdate

This configuration file does the following:

- Sends a Streaming Service List Update notification with two streaming services 5 s after starting the application.
- Sends a Streaming Service List Update that removes one service, service\_1\_2, and adds two new services, service\_2\_1 and service\_2\_2.
- If the application chooses to start either of the two streaming services, it receives a ServiceStarted notification after 1 s.
- The playing streaming service receives an mpdUpdated notification every 119 s, which is 1 s less than the length of the video.

**NOTE:** The same can be done with File Delivery Update.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<mpd_update_interval>119</mpd_update_interval>
<service_started_interval>1</service_started_interval>
<streamingUpdate>
  <update_time_from_start>5</update_time_from_start>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
    <service_id>service_1_1</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
    <service_id>service_1_2</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
  </service>
</streamingUpdate>
<streamingUpdate>
  <update_time_from_start>40</update_time_from_start>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
    <service_id>service_1_1</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
    <service_id>service_2_1</service_id>
    <serviceClassName>cnn</serviceClassName>
```

```

        <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
    <service>
        <mpd_uri>/sdcard/msdc_api/camera4.mp4</mpd_uri>
        <service_id>service_2_2</service_id>
        <serviceClassName>cnn</serviceClassName>
        <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
</streamingUpdate>
</stubConfig>

```

### 3.4 Streaming services filtering using ServiceClassName

This configuration file does the following:

- Sends a Streaming Service List Update notification with two streaming services 2 s after starting the application. One streaming service is for the CNN service class, and the other is for BBC.
- Sends a File Delivery Service List Update notification with two file delivery services 5 s after starting the application. One file delivery service is for the CNN service class, and the other is for BBC.
- Depending on the application's interest in either or both of the service classes, it receives associated services.

NOTE: If the application:

- Does not set a service class during the initialization and the services are tagged with service class in the configuration file, the application does not get any services.
- Sets the service class as null and the service is not tagged with any service class in the stub configuration file, the application gets all the services.
- Does not set any service class during the initialization and the services are *not* tagged with service class in the configuration file, the application gets all services.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <mpd_update_interval>119</mpd_update_interval>
    <service_started_interval>1</service_started_interval>
    <streamingUpdate>
        <update_time_from_start>2</update_time_from_start>
        <service>
            <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
            <service_id>service_1_1</service_id>
            <serviceClassName>cnn</serviceClassName>
            <streamingSrcvType>BC_ONLY</streamingSrcvType>
        </service>
        <service>

```

```

        <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
        <service_id>service_1_2</service_id>
        <serviceClassName>bbc</serviceClassName>
        <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
</streamingUpdate>

<fileDeliveryUpdate>
    <update_time_from_start>5</update_time_from_start>
    <service>
        <service_id>service_Data</service_id>
    <serviceClassName>cnn</serviceClassName>
    </service>
    <service>
        <service_id>service_Data2</service_id>
        <serviceClassName>bbc</serviceClassName>
    </service>
</fileDeliveryUpdate>

<fileAvailable>

    <file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>service_Data</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>

<fileAvailable_interval>20</fileAvailable_interval>
</fileAvailable>

<fileAvailable>

    <file_location>/sdcard/msdc_api/myDataFile$_test.mp4</file_location>
    <service_id>service_Data2</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>

<fileAvailable_interval>30</fileAvailable_interval>
</fileAvailable>
</stubConfig>

```

### 3.5 Service Stalled notification

This configuration file:

- Sends a Streaming Service List Update notification with two streaming services 2 s after starting the application.
- Sends a File Delivery Service List Update notification with two file delivery services 5 s after starting the application.

- Sends two Stalled notifications on the playing streaming service. Each service unavailability takes 5 s. The Service Started notification is sent at the end of each stalled duration. The interval between each stalled notification is 20 s. The timer starts after the Service Started notification.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mpd_update_interval>119</mpd_update_interval>
  <service_started_interval>1</service_started_interval>
  <mobilityNotifications>
    <serviceStalled>

<numberOfStalledNotifications>2</numberOfStalledNotifications>
    <serviceStalledInterval>20</serviceStalledInterval>
    <serviceStalledDuration>5</serviceStalledDuration>
  </serviceStalled>
</mobilityNotifications>
  <streamingUpdate>
    <update_time_from_start>1</update_time_from_start>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
      <service_id>service_1_1</service_id>
      <serviceClassName>cnn</serviceClassName>
      <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
      <service_id>service_1_2</service_id>
      <serviceClassName>cnn</serviceClassName>
      <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
  </streamingUpdate>

  <fileDeliveryUpdate>
    <update_time_from_start>2</update_time_from_start>
    <service>
      <service_id>service_Data</service_id>
      <serviceClassName>cnn</serviceClassName>
    </service>
    <service>
      <service_id>service_Data2</service_id>
      <serviceClassName>cnn</serviceClassName>
    </service>
  </fileDeliveryUpdate>
  <fileAvailable>

  <file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
```

```

        <service_id>service_Data</service_id>
        <start_index_number>0</start_index_number>
        <end_index_number>1</end_index_number>

</fileAvailable_interval>20</fileAvailable_interval>
</fileAvailable>
<fileAvailable>

        <file_location>/sdcard/msdc_api/myDataFile$_test.mp4</file_location>
        <service_id>service_Data2</service_id>
        <start_index_number>0</start_index_number>
        <end_index_number>1</end_index_number>

</fileAvailable_interval>30</fileAvailable_interval>
</fileAvailable>

</stubConfig>

```

### 3.6 Broadcast Out of Coverage notification

This configuration file:

- Sends a Streaming Service List Update notification with two streaming services 2 s after starting the application.
- Sends a File Delivery Service List Update notification with two file delivery services 5 s after starting the application.
- Sends two Stalled notifications on the playing streaming service. Each service unavailability takes 5 s. The Service Started notification is sent at the end of each stalled duration. The interval between each Stalled notification is 13 s. The timer starts after the Service Started notification.
- Sends two Out of Coverage notifications. Each broadcast service unavailability takes 5 s. The In Coverage notification is sent at the end of each Out of Coverage duration. The interval between each Out of Coverage notification is 15 s. The timer starts after the In Coverage notification.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <mpd_update_interval>119</mpd_update_interval>
    <service_started_interval>1</service_started_interval>
    <mobilityNotifications>
<serviceStalled>

<numberOfStalledNotifications>2</numberOfStalledNotifications>
    <serviceStalledInterval>13</serviceStalledInterval>
    <serviceStalledDuration>5</serviceStalledDuration>
    </serviceStalled>
</outOfCoverage>

```

```

<numberOfOutOfCoverageNotifications>2</numberOfOutOfCoverageNotifications>
    <outOfCoverageInterval>15</outOfCoverageInterval>
    <outOfCoverageDuration>5</outOfCoverageDuration>
</outOfCoverage>
</mobilityNotifications>
<streamingUpdate>
    <update_time_from_start>1</update_time_from_start>
    <service>
        <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
        <service_id>service_1_1</service_id>
        <serviceClassName>cnn</serviceClassName>
        <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
    <service>
        <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
        <service_id>service_1_2</service_id>
        <serviceClassName>cnn</serviceClassName>
        <streamingSrcvType>BC_ONLY</streamingSrcvType>
    </service>
</streamingUpdate>

<fileDeliveryUpdate>
    <update_time_from_start>2</update_time_from_start>
    <service>
        <service_id>service_Data</service_id>
        <serviceClassName>cnn</serviceClassName>
    </service>
    <service>
        <service_id>service_Data2</service_id>
        <serviceClassName>cnn</serviceClassName>
    </service>
</fileDeliveryUpdate>
<fileAvailable>

<file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>service_Data</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>
    <fileAvailable_interval>20</fileAvailable_interval>
</fileAvailable>
<fileAvailable>

<file_location>/sdcard/msdc_api/myDataFile$_test.mp4</file_location>
    <service_id>service_Data2</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>
    <fileAvailable_interval>30</fileAvailable_interval>

```

```

    </fileAvailable>

</stubConfig>

```

### 3.7 Multiband services

This configuration file does the following:

- Sends a Streaming Service List Update notification with two streaming services 2 s after starting the application. One service belongs to the Venue group and the other to the Regional group. The camped group is Venue.
- Sends a File Delivery Service List Update notification with two file delivery services 5 s after starting the application. One service belongs to the Venue group and the other to the Regional group. The camped group is Venue.
- If there is a change in the current group due to a channel switch, the Streaming Service List Update notification is triggered.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mpd_update_interval>119</mpd_update_interval>
  <service_started_interval>1</service_started_interval>
  <streamingUpdate>
    <update_time_from_start>2</update_time_from_start>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera1.mp4</mpd_uri>
      <service_id>service_1_1</service_id>
      <serviceClassName>cnn</serviceClassName>
      <streamingSrvctype>BC_ONLY</streamingSrvctype>
      <GroupName>Venue</GroupName>
    </service>
    <service>
      <mpd_uri>/sdcard/msdc_api/camera2.mp4</mpd_uri>
      <service_id>service_1_2</service_id>
      <serviceClassName>cnn</serviceClassName>
      <streamingSrvctype>BC_ONLY</streamingSrvctype>
      <GroupName>Regional</GroupName>
    </service>
    <currentGroupName>Venue</currentGroupName>
  </streamingUpdate>

  <fileDeliveryUpdate>
    <update_time_from_start>5</update_time_from_start>
    <service>
      <service_id>service_Data</service_id>
      <serviceClassName>cnn</serviceClassName>
      <GroupName>Venue</GroupName>
    </service>

```



```

    <service>
      <service_id>service_Data2</service_id>
      <serviceClassName>cnn</serviceClassName>
      <GroupName>Regional</GroupName>
    </service>
    <currentGroupName>Venue</currentGroupName>
  </fileDeliveryUpdate>
  <fileAvailable>

    <file_location>/sdcard/msdc_api/myDataFile$_test.txt</file_location>
    <service_id>service_Data</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>

  <fileAvailable_interval>20</fileAvailable_interval>
  </fileAvailable>
  <fileAvailable>

    <file_location>/sdcard/msdc_api/myDataFile$_test.mp4</file_location>
    <service_id>service_Data2</service_id>
    <start_index_number>0</start_index_number>
    <end_index_number>1</end_index_number>

  <fileAvailable_interval>30</fileAvailable_interval>
  </fileAvailable>

</stubConfig>

```

### 3.8 File delivery services with failed file download

This configuration file does the following:

- Sends a File Delivery Service List Update notification with two file delivery services 2 s after starting the application.
- Service service\_Data receives five fileAvailable notifications every 20 s.
- Service service\_Data2 receives three file download failure notifications every 30 s.

**NOTE:** Multiple services can be added to the fileDeliveryUpdate element along with related fileAvailable and file download failure configurations.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <fileDeliveryUpdate>
    <update_time_from_start>2</update_time_from_start>
    <service>
      <service_id>service_Data</service_id>
      <serviceClassName>cnn</serviceClassName>

```

```

</service>
  <service>
    <service_id>service_Data2</service_id>
    <serviceClassName>cnn</serviceClassName>
  </service>
</fileDeliveryUpdate>
<fileAvailable>
  <file_location>/sdcard/msdc_api/data$_test.txt</file_location>
  <service_id>service_Data</service_id>
  <start_index_number>0</start_index_number>
  <end_index_number>4</end_index_number>
  <fileAvailable_interval>20</fileAvailable_interval>
</fileAvailable>
<fileDownloadFailure>
  <file_location>/sdcard/msdc_api/myVideo_test$.mp4</file_location>
  <service_id>service_Data2</service_id>
  <start_index_number>4</start_index_number>
  <end_index_number>5</end_index_number>
  <fileDownloadFailure_interval>35</fileDownloadFailure_interval>
</fileDownloadFailure><serviceQualityIndicator>
</stubConfig>

```

### 3.9 Roaming State notification (Out of Network notification)

This configuration file sends:

- Sends a Streaming Service List Update notification with two streaming services 2 s after starting the application.
- Sends one Roaming Out of Network notification 20 s after the start of the application. The roaming takes 10 s. The Roaming In Network notification is sent at the end of the roaming duration. The interval between each Roaming Out of Network notification is 20 s. The timer starts after each Roaming In Network notification.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<mpd_update_interval>80</mpd_update_interval>
<service_started_interval>2</service_started_interval>
<mobilityNotifications>
<outOfNetworkNotification>

<numberOfOutOfNetworkNotifications>1</numberOfOutOfNetworkNotifications>

<OutOfNetworkNotificationInterval>20</OutOfNetworkNotificationInterval>

<OutOfNetworkNotificationDuration>10</OutOfNetworkNotificationDuration>
  </outOfNetworkNotification>
</mobilityNotifications>

```

```

<streamingUpdate>
  <update_time_from_start>2</update_time_from_start>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
    <service_id>urn:3GPP:metadata-service_1_1</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
    <GroupName>venue</GroupName>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
    <service_id>urn:3GPP:metadata-service_1_3</service_id>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
    <GroupName>venue</GroupName>
  </service>
  <service>
    <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
    <service_id>urn:3GPP:metadata-service_1_2</service_id>
    <GroupName>national</GroupName>
    <serviceClassName>cnn</serviceClassName>
    <streamingSrcvType>BC_ONLY</streamingSrcvType>
  </service>
</currentGroupName>venue</currentGroupName>
</streamingUpdate>
</stubConfig>

```

### 3.10 E911 notification

This configuration file:

- Sends a Streaming Service List Update notification with four streaming services 2 s after starting the application
- Sends an E911 IN notification 40 s after start of the application. The E911 OUT notification is sent after elapsing the 10 s duration

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <mpd_update_interval>100</mpd_update_interval>
  <service_started_interval>2</service_started_interval>
  <e911Notification>
    <e911NotificationTimeFromStart>40</e911NotificationTimeFromStart>
    <e911NotificationDuration>10</e911NotificationDuration>
  </e911Notification>
  <streamingUpdate>
    <update_time_from_start>2</update_time_from_start>

```

```

<service>
  <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
  <service_id>urn:3GPP:metadata-service_1_1</service_id>
  <serviceClassName>cnn</serviceClassName>
  <streamingSrcvType>BC_ONLY</streamingSrcvType>
  <GroupName>venue</GroupName>
</service>
<service>
  <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
  <service_id>urn:3GPP:metadata-service_1_2</service_id>
  <serviceClassName>cnn</serviceClassName>
  <streamingSrcvType>BC_ONLY</streamingSrcvType>
  <GroupName>venue</GroupName>
</service>
<service>
  <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
  <service_id>urn:3GPP:metadata-service_1_3</service_id>
  <serviceClassName>cnn</serviceClassName>
  <streamingSrcvType>BC_ONLY</streamingSrcvType>
  <GroupName>national</GroupName>
</service>
<service>
  <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
  <service_id>urn:3GPP:metadata-service_1_4</service_id>
  <serviceClassName>cnn</serviceClassName>
  <streamingSrcvType>BC_ONLY</streamingSrcvType>
  <GroupName>national</GroupName>
</service>
<currentGroupName>venue</currentGroupName>
</streamingUpdate>
</stubConfig>

```

## 3.11 Error/Warning notification

### Error notification

This configuration file sends an Error notification 10 s after starting the application.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <mpd_update_interval>80</mpd_update_interval>
  <service_started_interval>2</service_started_interval>
  <errorWarning>
    <ID>10004</ID>
    <errorWarningNotificationTimeFromStart>20</errorWarningNotificationTimeFromStart>
  </errorWarning>
</stubConfig>

```

```

    </errorWarning>
</stubConfig>

```

## Warning notification

This configuration file simulates a Warning notification:

- Sends a Streaming Service List Update notification with three streaming services 20 s after starting the application.
- Sends a Warning notification 10 s after starting the application.

```

<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

    <mpd_update_interval>80</mpd_update_interval>
    <service_started_interval>2</service_started_interval>
    <errorWarning>
        <ID>15001</ID>
    <errorWarningNotificationTimeFromStart>10</errorWarningNotificationTimeFromStart>
    </errorWarning>

    <streamingUpdate>
        <update_time_from_start>20</update_time_from_start>
        <service>
            <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
            <service_id>urn:3GPP:metadata-service_1_1</service_id>
            <serviceClassName>cnn</serviceClassName>
            <streamingSrvctype>BC_ONLY</streamingSrvctype>
            <GroupName>venue</GroupName>
        </service>
        <service>
            <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
            <service_id>urn:3GPP:metadata-service_1_3</service_id>
            <serviceClassName>cnn</serviceClassName>
            <streamingSrvctype>BC_ONLY</streamingSrvctype>
            <GroupName>venue</GroupName>
        </service>
        <service>
            <mpd_uri>/sdcard/msdc_api/camera3.mp4</mpd_uri>
            <service_id>urn:3GPP:metadata-service_1_2</service_id>
            <GroupName>national</GroupName>
            <serviceClassName>cnn</serviceClassName>
            <streamingSrvctype>BC_ONLY</streamingSrvctype>
        </service>
        <currentGroupName>venue</currentGroupName>
    </streamingUpdate>
</stubConfig>

```

## 3.12 Signal Strength notification

This configuration file:

- Sends File Delivery Service List Update notification with two file delivery services 10 s after starting the application.
- Sends Signal Strength notification after 15 s.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<mobilityNotifications>
  <signalStrengthNotification>

<SignalStrengthNotificationInterval>15</SignalStrengthNotificationInterval>
  </signalStrengthNotification>
</mobilityNotifications>

  <fileDeliveryUpdate>
    <update_time_from_start>10</update_time_from_start>
    <service>
      <service_id>urn:3GPP:metadata-service_Data</service_id>
      <GroupName>national</GroupName>
      <serviceClassName>cnn</serviceClassName>
    </service>
    <service>
      <service_id>urn:3GPP:metadata-service_Data2</service_id>
      <GroupName>venue</GroupName>
      <serviceClassName>bbc</serviceClassName>
    </service>
    <currentGroupName>venue</currentGroupName>
  </fileDeliveryUpdate>
</stubConfig>
```

## 3.13 Four Group Call services

1. The Application reads the services from the Four Group Call configuration file.  
Based on the Service Area ID list update from the SDK, the services obtained from the above step will be filtered.
2. After playing a particular group call service, the App will get the service started notification after 1 s.

```
<?xml version="1.0" encoding="UTF-8"?>
<stubConfig xsi:noNamespaceSchemaLocation="MSDC_APP_STUB.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```

<service>
  <tmgi id="16838928">
    <saiList>
      <saiId id="1"></saiId>
      <saiId id="2"></saiId>
      <saiId id="3"></saiId>
    </saiList>
    <freqList>
      <freqNum id="103"></freqNum>
      <freqNum id="105"></freqNum>
      <freqNum id="107"></freqNum>
    </freqList>
  </tmgi>
  <tmgi id="33616144">
    <saiList>
      <saiId id="0"></saiId>
      <saiId id="1"></saiId>
      <saiId id="2"></saiId>
    </saiList>
    <freqList>
      <freqNum id="81"></freqNum>
      <freqNum id="83"></freqNum>
      <freqNum id="85"></freqNum>
    </freqList>
  </tmgi>
  <tmgi id="50393360">
    <saiList>
      <saiId id="0"></saiId>
      <saiId id="3"></saiId>
    </saiList>
    <freqList>
      <freqNum id="82"></freqNum>
      <freqNum id="300"></freqNum>
    </freqList>
  </tmgi>
  <tmgi id="67170576">
    <saiList>
      <saiId id="0"></saiId>
      <saiId id="1"></saiId>
    </saiList>
    <freqList>
      <freqNum id="102"></freqNum>
      <freqNum id="104"></freqNum>
      <freqNum id="106"></freqNum>
    </freqList>
  </tmgi>
</service>

```

The above service configuration file has Four Group Call services with Tmgi 16838928, 33616144, 50393360 and 67170576.

# 4 Support

---

For support information, visit the following LTE Broadcast SDK web page on the Qualcomm® Developer Network (QDN) site:

<https://developer.qualcomm.com/ltebroadcast>