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Information technology — Multimedia framework (MPEG-21) —

Part 5: Rights Expression Language

AMENDMENT 2: DAC (Dissemination And Capture) profile

Technologies de l'information — Cadre multimédia (MPEG-21) —

Partie 5: Langage d'expression des droits

AMENDEMENT 2: Profil DAC («Dissemination And Capture»)

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Foreword

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Amendment 2 to ISO/IEC 21000-5:2004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Information technology — Multimedia framework (MPEG-21) —

Part 5:
Rights Expression Language

AMENDMENT 2: DAC (Dissemination And Capture) profile

Insert a new subclause 10.3 as follows:

10.3 Multimedia Extension Two

10.3.1 General

This subclause specifies an extension, called the "multimedia extension two", of the REL specified in the previous clauses.

10.3.2 Normative Namespace

The XML namespace for the extension types and new elements and attributes introduced in the m2x extension shall be `urn:mpeg:mpeg21:2006:01-REL-M2X-NS`, and this namespace is normative. Here, the `01` represents a serial number that is expected to change as this extension evolves.

10.3.3 Namespace Prefixes

For convenience, this extension uses shorthand namespace prefixes when referring to XML elements and types. The actual prefix used is not important as long as the namespace URI is correct. The prefixes used in this extension are given in Table AMD2-1.

Table AMD2-1 — Prefixes of XML Schemas

Prefix	Name	Namespace
r	REL Core	urn:mpeg:mpeg21:2003:01-REL-R-NS
sx	REL Standard Extension	urn:mpeg:mpeg21:2003:01-REL-SX-NS
mx	REL Multimedia Extension	urn:mpeg:mpeg21:2003:01-REL-MX-NS
dsig	XML digital signature core	http://www.w3.org/2000/09/xmldsig#
xenc	XML encryption core	http://www.w3.org/2001/04/xmlenc#
m1x	REL Multimedia Extension one	urn:mpeg:mpeg21:2005:01-REL-M1X-NS
m2x	REL Multimedia Extension two	urn:mpeg:mpeg21:2006:01-REL-M2X-NS

10.3.4 Definition of Multimedia Extension Two

This subclause defines the extensions to the REL used in this profile. The syntax and the semantics of these extensions are presented here. The XML schema for the extension elements and types is listed in L.2.

10.3.4.1 Right Extension Elements

10.3.4.1.1 Export

10.3.4.1.1.1 Informative Description

This element represents the right to export the associated broadcast program to another rendering or storage device. With a `m2x:Export`, a broadcast program is allowed to be transferred to another device with clear resource. If the resource has been encrypted when `m2x:export` is exercised, the resource should be decrypted first before exercising the right. When it presents in an `r:grant` element, this element allows adding the constraints in the `m1x:outputRegulation` element to confine the cleared output signal.

Figure AMD2-1 — `m2x:Export` Right

The example below shows how to grant the '`m2x:export`' right to export a broadcast program. The broadcast program can be exported to other devices in any kind of format and quality since there is no `m1x:OutputRegulation` condition.

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DO1234567</m1x:idValue>
    </m1x:identityHolder>
    <m2x:export/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
</r:grant>
```

10.3.4.1.1.2 Normative Specification

Let r be a `m2x:Export`. Then r performs the act of releasing a resource in the current repository from explicit protection and(or) management by current DRM system to another controlled system such as CPS or an untrusted space. With a `m2x:Export`, a resource will be transferred to other system in the form of an output signal without protection.

If r is used as the Right Member of an authorization request, then both the resource Member of that authorization request shall be present and shall identify the destination and, letting Σ be the Authorization Context Member of that authorization request, Σ.`m2x:destinationPrincipal` shall identify the remote domain or device to which will be transferred the resource.

10.3.4.1.2 ExtendRights

10.3.4.1.2.1 Informative Description

This element represents the right to extend the rights which are originally transmitted.

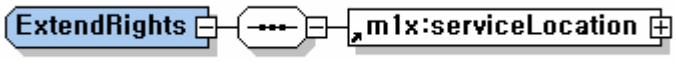

Figure AMD2-2 — `m2x:ExtendRights` Right

When present in an `r:grant` element, this element allows to get additional rights from the specified service location if current license does not have proper rights for user request.

The child element `m1x:ServiceLocation` includes identified source for additional rights.

The following example shows that recipient whose device identifier is DE1234567 can extend more rights than `'mx:play'` through '`http://www.foo.org/extendLiceseService`' dynamically.

```
<r:license>
    <r:grant>
        <m1x:identityHolder licensePartId="deviceID">
            <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
            <m1x:idValue>DE1234567</m1x:idValue>
        </m1x:identityHolder>
        <mx:play/>
        <r:digitalResource licensePartId="news">
            <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
        </r:digitalResource>
    </r:grant>
    <r:grant>
        <m1x:identityHolder licensePartIdRef="deviceID"/>
        <m2x:extendRights>
            <m1x:serviceLocation>
                <m1x:url>http://www.foo.org/extendLiceseService</m1x:url>
            </m1x:serviceLocation>
        </m2x:extendRights>
        <r:digitalResource licensePartIdRef="news"/>
    </r:grant>
</r:license>
```

10.3.4.1.2.2 Normative Specification

Let *r* be a `m2x:ExtendRights`. Then *r* performs the act of connecting the service location identified by `m1x:ServiceLocation` and receiving additional rights to a resource in the current repository when current license does not have proper rights for user request.

Let *d* be a `m1x:ServiceLocation`. The endpoint of the service is given by the value of *d*/`m1x:url`.

10.3.4.2 Condition Extension Elements

10.3.4.2.1 DestinationCondition

10.3.4.2.1.1 Informative Description

This condition is used to confine the destination entities on the exercise of transfer-oriented rights, such as `m1x:GovernedMove`, `m1x:GovernedCopy` or `m2x:Export`.

This condition element is used when the destination entity is required to have specific condition such as security level, physical proximity or specific territory etc.

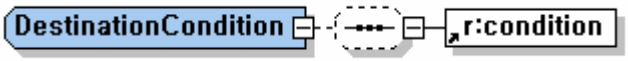

Figure AMD2-3 — `m2x:DestinationCondition` **Condition**

This condition is satisfied only if all conditions specified by the list of `m2x:DestinationCondition` is true.

Following example shows that a resource is allowed to export only if the destination entity has at least security level 5 in the security system 1 and its location is within Seoul, Korea.

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DO1234567</m1x:idValue>
    </m1x:identityHolder>
    <m2x:export/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcastnews:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:destinationCondition>
        <r:allConditions>
            <m2x:securitySystem>
              <m2x:identifier>urn:mpeg:mpeg21:security:system1</m2x:identifier>
              <m2x:level>5</m2x:level>
            </m2x:securitySystem>
            <sx:territory>
                <sx:location>
                    <sx:country>KR</sx:country>
                    <sx:region>SEOUL</sx:region>
                </sx:location>
            </sx:territory>
        </r:allConditions>
    </m2x:destinationCondition>
</r:grant>
```


10.3.4.2.1.2 Normative Specification

Let c be a `m2x:DestinationCondition`. Let (p, r, t, v, Σ, L, R) be an authorization request on the destination entity (or entities). Let (g, h, e) be an authorization story. Then c is satisfied with respect to (p, r, t, v, Σ, L, R) and (g, h, e) if and only if, for every integer i from 1 to Σ.`m2x:cNum`(), Σ.`c/r:condition`(`i`) is true.

10.3.4.2.2 DestinationPrincipal

10.3.4.2.2.1 Informative Description

This condition is used to specify principal on the destination entity of transfer-oriented rights, such as `m1x:GovernedMove`, `m1x:GovernedCopy` and `m2x:Export`.

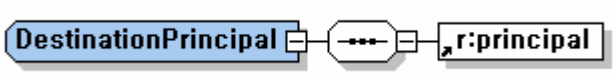

Figure AMD2-4 — `m2x:DestinationPrincipal` **Condition**

This condition is satisfied only if the entity specified by `m2x:DestinaionPrincipal` is authenticated as the destination entity.

In the following example, the right to export a resource can be exercised only if the destination device belongs to the same domain.

```
<r:grant>
    <m1x:identityHolder licensePartId="domainID">
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DO1234567</m1x:idValue>
    </m1x:identityHolder>
    <m2x:export/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:destinationPrincipal>
        <m1x:identityHolder licensePartIdRef="domainID">
    </m2x:destinationPrincipal>
</r:grant>
```

10.3.4.2.2.2 Normative Specification

Let c be a `m2x:DestinationPrincipal`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request on the destination entity. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if there exists a `c/r:principal` such that `r:principal` is Equal to Σ.`r:principal`().

10.3.4.2.3 Proximity

10.3.4.2.3.1 Informative Description

This condition is used to confine the destination entities in `m2x:DestinationCondition` element on the exercise of transfer-oriented rights, such as `m1x:GovernedMove`, `m1x:GovernedCopy` or `m2x:Export`.

This condition element is used when the destination entity is required to have physical proximity to source entity.

This condition is satisfied only if the destination entity has physical proximity with the source domain specified at `r:grant/r:recipient` element.

Figure AMD2-5 — `m2x:Proximity` Condition

Following example shows that a resource is allowed to export only if the destination entity has physical proximity with the domain specified by DO1234567.

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DO1234567</m1x:idValue>
    </m1x:identityHolder>
    <m2x:export/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:destinationCondition>
        <m2x:proximity/>
    </m2x:destinationCondition>
</r:grant>
```

NOTE There is no normative standard to determine the Proximity between source entity and destination entity. However according to MPAA memo[8], at a minimum, local proximity detection requires:(i) setting the Internet Protocol (IP) packet header parameter Time to Live (TTL) to 3 in all transmitted IP packets of output content from a source device; (ii) confirmation that any Internet Protocol (IP) packets of the content received by a destination device have an IP Time to Live (TTL) parameter value of no greater than 3; and (iii) confirmation by the source device for any transmission of content (including over point-to-point wired connections) that one secure, valid measurement of a Round Trip Time (RTT) of 7 milliseconds or less has been made between itself and the destination device prior to completing the destination device's authentication request. Time to Live (TTL) is defined in Internet Standard RFC 791 STD 5. So the standard of `m2x:Proximity` follows the MPAA's recommendation.

10.3.4.2.3.2 Normative Specification

Let c be a `m2x:Proximity`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if Σ. `c/m2x:pM(p)` is true.

10.3.4.2.4 Scrambling

10.3.4.2.4.1 Informative Description

This condition is used to confine the rights, '`m1x:GovernedCopy`' and '`m1x:GovernedMove`' to copy or move the associated resource to the device or system on which a scrambling algorithm should be applied to the resource before it is stored.

The optional attribute @`cipherType` of type QName indicates the name of a scrambling algorithm.

When the attribute is not specified, it means that it does not care about the kind of scrambling algorithm.

This condition is satisfied only if the target entity has a scrambling function with the algorithm specified at attribute @`cipherType`.

Figure AMD2-6 — `m2x:Scrambling` **Condition**

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <m1x:governedCopy />
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:scrambling cipherType="m2x:AES"/>
</r:grant>
```

In the above example, the `m1x:GovernedCopy` is granted the right to copy the resource specified in `r:DigitalResource` only if device1234567 has a scrambling function supporting AES algorithm.

10.3.4.2.4.2 Normative Specification

Let c be a `m2x:Scrambling`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if at least one of the following is true:

- if `c/@cipherType` is present then, Σ. `m2x:sB(c/@cipherType)` is true, or
- if `c/@cipherType` is present then Σ. `m2x:sB()` is true.

10.3.4.2.5 SecuritySystem

10.3.4.2.5.1 Informative Description

This condition element is used to specify a security system to handle the resource.

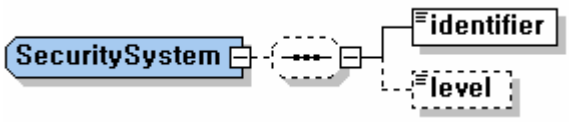

Figure AMD2-7 — `m2x:SecuritySystem` **Condition**

This condition is satisfied only if the DRM system to handle the resource is the same one which is specified by `m2x:identifier`, the child element of `m2x:SecuritySystem`, and if `m2x:level` is specified, it is equal to or less than the security level of target device on the specified DRM system. Target device can be current device or destination device according to specification position.

In the following example, the right to copy a resource can be exercised only if current device is controlled by the security system 1 and the security level on the system has at least class 3 or higher.

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DO1234567</m1x:idValue>
    </m1x:identityHolder>
    <m1x:governedCopy />
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:securitySystem>
        <m2x:identifier>urn:mpeg:mpeg21:security:system1</m2x:identifier>
        <m2x:level>3</m2x:level>
    </m2x:securitySystem>
</r:grant>
```

10.3.4.2.5.2 Normative Specification

Let c be a `m2x:SecuritySystem`. Let (p, r, t, v, Σ, L, R) be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to (p, r, t, v, Σ, L, R) and (g, h, e) if and only if `c/m2x:identifier` is Equal to Σ.`m2x:securitySystem`() and `c/m2x:level` is Equal to or less than Σ.`m2x:securitySystemLevel`().

10.3.4.2.6 noSkipConstraint

10.3.4.2.6.1 Informative Description

This condition element is used to specify time and object constraints for skipping in a resource.

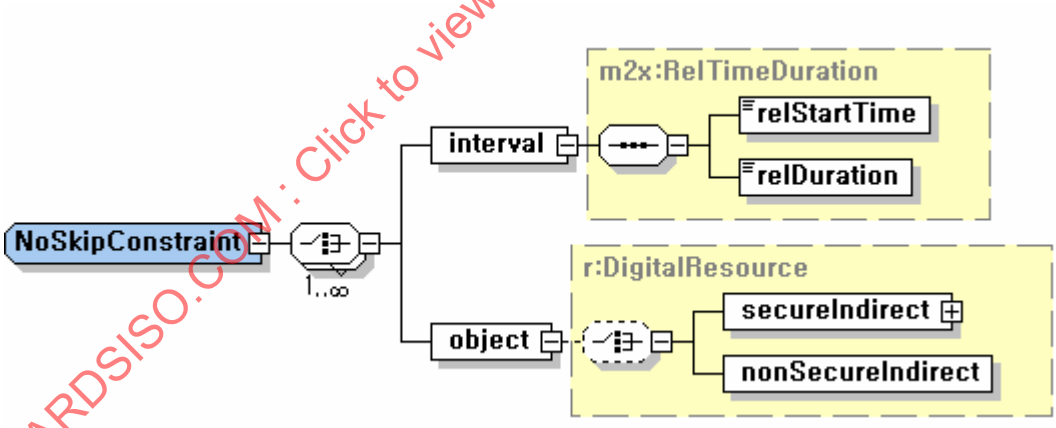

Figure AMD2-8 — `m2x:NoSkipConstraint` **Condition**

When present in an `r:grant` element, this element allows to skip parts of the resource only if constraint intervals or objects are processed (played or stored). For instance, let a resource have 5 min ads in front of the resource and the ads parts are referred in this element, then user can store the resource after the ads parts are stored.

The `m2x:NoSkipConstraint` element can have more than one `m2x:object` and `m2x:interval`. The `m2x:object` represents the object(s) not permitted skipping and `m2x:interval` represents interval(s), which means that the object(s) or interval(s) is(are) mandatory. This condition can be with store, copy and adapt as well as play. The child element, `m2x:relTimeDuration` is used to specify relative time interval in

a resource. It is composed of two elements: `m2x:relStartTime` and `m2x:relDuration`. The `m2x:relStartTime` indicates a start time point in a resource based on the beginning of the resource. The `m2x:relDuration` indicates time duration from the `m2x:relStartTime`.

The following example shows that for the recipient device, 30 to 45 period of the resource is mandatory to store. In the example, if the first AD part is not stored, storing behind part of the first AD part is not permitted.

```
<r:grant>
    <m1x:identityHolder licensePartId="deviceID">
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-01000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <m1x:govenedCopy/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:noskipConstraint>
        <m2x:interval>
            <m2x:relStartTime>PT30M</m2x:relStartTime>
            <m2x:relDuration>PT15M</m2x:relDuration>
        </m2x:interval>
    </m2x:noskipConstraint>
</r:grant>
```

10.3.4.2.6.2 Normative Specification

Let c be a `m2x:NoSkipConstraint`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if the following are true:

- Let *c1* be a `c/m2x:interval`. Both `c1/relStartTime`, `c1/relDuration` are present and the parts of the resource located between `c1/relStartTime` and `c1/relStartTime` + `c1/relDuration` have already exercised by right ρ before exercising the current position of the resource, or

- Let *c2* be a `c/m2x:object`. Both `c2/r:digitalResource` is present and the parts of the resource specified by `c2/r:digitalResource` are exercised by right ρ before exercising the current position of the resource.

NOTE Fast-forward play is restricted with the condition, but rewind or reverse is not restricted. However, after rewinding, any forward action such as play and fast-forward should be restricted again.

10.3.4.2.7 simultaneousAccess

10.3.4.2.7.1 Informative Description

This condition element is used to specify a condition for limiting simultaneous access to a resource by principals within a certain environment (e.g. a home network domain).

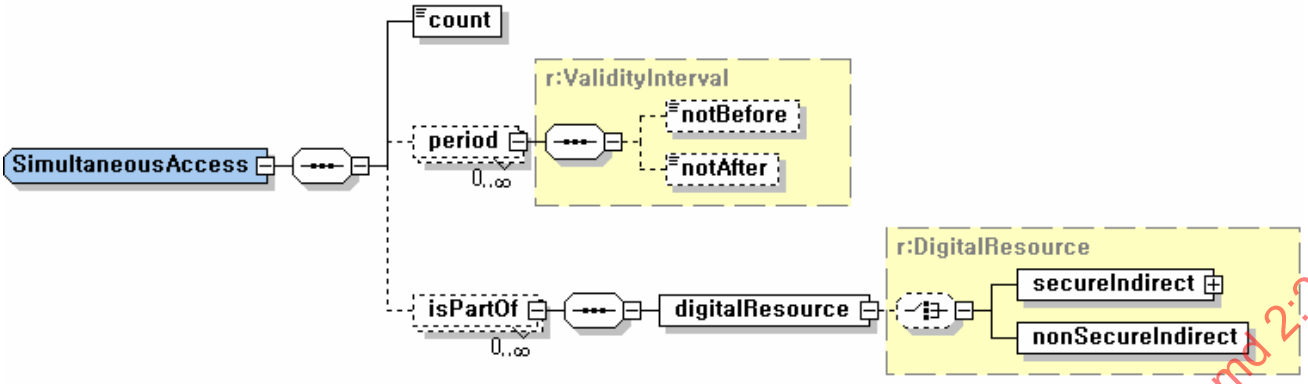

Figure AMD2-9 — `m2x:SimultaneousAccess` **Condition**

When present in a `r:grant`, this element limits simultaneous access to the associated resource `r:grant/r:Resource` by a number of principals within the environment according to specified conditions. The `m2x:SimultaneousAccess` is composed of `m2x:count`, and optionally `m2x:period` and `m2x:isPartOf`. The `m2x:count` represents the maximum number of principals within the environment that can have simultaneous access to the associated resource, the `m2x:period` represents a time period during which simultaneous access is allowed, and `m2x:isPartOf` represents a resource to which the associated resource belongs and the resource should not be accessed by any other principal in the environment. If there are more than one `m2x:isPartOf` specified, then at least one of the resources represented by `m2x:isPartOf` is not accessed by any other principal in the environment to access the resource specified in the `r:resource`.

NOTE A resource specified in the `m2x:isPartOf` may indicate a group or collection of the associated resources. When the associated resource is accessed, any one of groups or collections which the resource belongs to is considered to be accessed.

The condition represented by this element permits simultaneous access to the associated resource by principals within the given environment, if (i) the number of principals within the environment that have access to the resource simultaneously is less than the value specified by the `m2x:count` element, (ii) when the `m2x:period` is specified, the time interval to access the resource should be within the time period specified by `m2x:period`, and (iii) when an `m2x:isPartOf` is specified, no part of the resources specified by the `m2x:isPartOf` is accessed by any principal within the environment.

In the following example, the right to play a resource can be exercised only if the number of current principals within an environment that are accessing the resource simultaneously is not more than 5, and the period is from midnight on Jul 1, to midnight on Dec 31, 2006.

```
<r:grant>
    <m1x:identityHolder licensePartId="deviceID">
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-01000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <mx:play/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:simultaneousAccess>
        <m2x:count>5</m2x:count>
        <m2x:period>
            <notBefore>2006-07-01:T00:00:00</notBefore>
            <notAfter>2006-12-31T00:00:00</notAfter>
        </m2x:period>
    </m2x:simultaneousAccess>
</r:grant>
```

In the following example, the right to play a resource can be exercised by a maximum of 3 principals at the same time since the specified resource belongs to 3 different content groups.

```
<r:grant>
    <m1x:identityHolder licensePartId="deviceID">
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-01000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <mx:play/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:simultaneousAccess>
        <m2x:isPartOf>
            <r:digitalResource>
                <r:nonSecureIndirect URI="content_group_ID_1"/>
            </r:digitalResource>
        </m2x:isPartOf>
        <m2x:isPartOf>
            <r:digitalResource>
                <r:nonSecureIndirect URI="content_group_ID_2"/>
            </r:digitalResource>
        </m2x:isPartOf>
        <m2x:isPartOf>
            <r:digitalResource>
                <r:nonSecureIndirect URI="content_group_ID_3"/>
            </r:digitalResource>
        </m2x:isPartOf>
    </m2x:simultaneousAccess>
</r:grant>
```

10.3.4.2.7.2 Normative Specification

Let c be a `m2x:SimultaneousAccess`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if the following are true:

- `c/m2x:count` is greater than Σ.`m2x:simultaneousAccess(t)` AND
- Let *c1* be a `c/m2x:period`. Both `c1/r:notBefore`, `c1/r:notAfter` are present and the interval ϖ is within the interval specified by the values `c1/r:notBefore` and `c1/r:notAfter` AND
- If there are occurrences of `c/m2x:isPartOf`, then for at least one `c/m2x:isPartOf`, Σ.`m2x:accessed(c/m2x:isPartOf/r:digitalResource)` is false.

10.3.4.2.8 TimedExerciseLimit

10.3.4.2.8.1 Informative Description

This condition element is used to specify the period during which the right can be exercised, and the count which is allowed after the specified period has been expired.

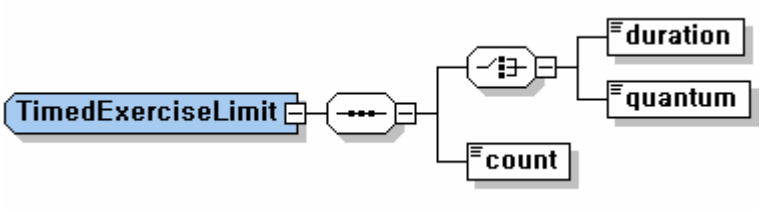

Figure AMD2-10 — `m2x:TimedExerciseLimit` Condition

This condition is satisfied only if the value of `m2x:duration` or `m2x:quantum` has not been expired, or if expired, the system counter is equal to or less than the value of `m2x:count`.

In the following example, the right to play a resource can be exercised without period limitation only for 3 days after acquiring the grant and another one time more after the 3 days.

```
<grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <mx:play/>
    <digitalResource licensePartId="news">
        <nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </digitalResource>
    <m2x:timedExerciseLimit>
        <m2x:duration>P3D</m2x:duration>
        <m2x:count>1</m2x:count>
    </m2x:timedExerciseLimit>
</grant>
```

10.3.4.2.8.2 Normative Specification

Let c be a `m2x:TimedExerciseLimit`. Let $(p, r, t, v, \Sigma, L, R)$ be an authorization request. Let (g, h, e) be an authorization story. Then c is satisfied with respect to $(p, r, t, v, \Sigma, L, R)$ and (g, h, e) if and only if at least one of the following is true:

- if `c/m2x:duration` is present then, Σ. `m2x:vD(c/m2x:duration)` is true or
- if `c/m2x:quantum` is present then, Σ. `m2x:vQ(c/m2x:quantum)` is true or
- if `c/m2x:count` is present then, Σ. `m2x:vC (c/m2x:count)` is true.

10.3.4.2.9 TimeShiftDuration

10.3.4.2.9.1 Informative Description

This condition element is used to specify maximum duration for temporal storing used for time-shifted operation or delayed watching service.

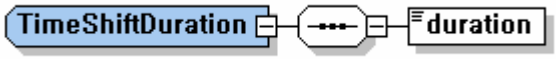

Figure AMD2-11 — `m2x:TimeShiftDuration` **Condition**

When present in `an r:grant` element, this element allows keeping data in buffer temporally within specified duration. If the duration is zero, the resource data is permitted for only immediate rendering or playing, not for buffering. The following example shows that the recipient device is permitted for maximum 5 minutes buffering for `mx:play`.

```
<r:grant>
    <m1x:identityHolder>
        <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-DAC-NS:DM-00001000</m1x:idSystem>
        <m1x:idValue>DE1234567</m1x:idValue>
    </m1x:identityHolder>
    <mx:play/>
    <r:digitalResource>
        <r:nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
    </r:digitalResource>
    <m2x:timeShiftDuration>
        <duration>PT5M</duration>
    </m2x:timeShiftDuration>
</r:grant>
```

10.3.4.2.9.2 Normative Specification

Let *c* be a `m2x:TimeShiftDuration`. Let (p, r, t, v, Σ, L, R) be an authorization request. Let (g, h, e) be an authorization story. Then *c* is satisfied with respect to (p, r, t, v, Σ, L, R) and (g, h, e) if and only if `c/m2x:duration` is Equal to or less than Σ`m2x:timeShiftDuration`().

10.3.4.3 Authorization Context Properties

Table AMD2-2 specifies the authorization context properties relating to the DAC extension and the statements they represent. If a property has the name given in the first column of Table AMD2-2 and the value given in the second column of Table AMD2-2, then the statement represented by that property is the statement given in the third column of Table AMD2-2.

Table AMD2-2 — m2x Extension Authorization Context Properties

Property name	Property value	Statement represented
m2x:pM(*p*)	true	*p* is r:grant/r:principal, m2x:pM(*p*) is a Boolean value indicating if the destination device has physical proximity to the source area identified by *p*.
m2x:sB(*q*)	true	*q* is m2x:Scrambling/@cipherType, m2x:sB(*q*) is a Boolean value indicating if the target device has scrambling function supporting algorithm *q*.
m2x:vD(*r*)	true	*r* is m2x:duration, m2x:vD(*r*) is a Boolean value indicating if the time difference between current datetime and acquisition time of the grant is within the period specified by *r*.
m2x:vQ(*s*)	true	*s* is m2x:quantum, m2x:vQ(*s*) is a Boolean value indicating if the accumulated time of every execution of the grant is equal to or less than the value specified by *s*.
m2x:vC(*t*)	true	*t* is m2x:count, m2x:vC(*t*) is a Boolean value indicating if the total number of every execution of the grant is equal to or less than the value specified by *t*.
m2x:accessed(*r*)	Boolean	*r* is r:digitalResource, m2x:accessed(*r*) is equal to true if the Resource *r* is currently being accessed, and otherwise equal to false.
m2x:simultaneousAccess (*r*)	Non-negative integers	*r* is r:resource, m2x:simultaneousAccess(*r*) is the number of simultaneous accesses to *r*.

10.3.4.4 Qualified Names

10.3.4.4.1 The REL M2X Profile QName

The qualified name RELProfile:DAC is the attribute value of r:license/@sx:profileCompliance to indicate that it is the REL DAC profile that the license is compliant to.

10.3.4.4.2 Type-of-Cipher QNames

10.3.4.4.2.1 AES

The qualified name m2x:AES identifies the AES cipher.

10.3.4.4.2.2 Camellia

The qualified name m2x:Camellia identifies the Camellia cipher.

10.3.4.4.2.3 DVB_CSA_1

The qualified name m2x:DVB_CSA_1 identifies the DVB CSA 1 cipher.

10.3.4.4.2.4 DVB_CSA_2

The qualified name `m2x:DVB_CSA_2` identifies the DVB CSA 2 cipher.

10.3.4.4.2.5 3DES

The qualified name `m2x:3DES` identifies the 3DES cipher.

10.3.4.4.2.6 M2

The qualified name `m2x:M2` identifies the M2 cipher.

Insert a new subclause 11.3 as follows:

11.3 DAC Profile

11.3.1 General

This clause specifies a profile, called the "DAC (Dissemination and Capture) profile", of the REL specified in the previous clauses.

11.3.2 DAC Profile Definition

The profile elements (together with the extension elements) and their included child elements are listed in Table AMD2-3.

Table AMD2-3 — DAC Profile Elements

Element/Child Element	Comments
`r:license`	The definition of an `r:license` is restricted to contain the following elements: `r:grant`, and `r:issuer`.
`r:grant`	Each `r:grant` represents a rights expression.
`r:issuer`	This element indicates which principal issues the license.
`@sx:profileCompliance` `@m1x:licenseType`	The `@sx:profileCompliance` attribute indicates a profile that the license is compliant to. The value of `urn:mpeg:mpeg21:2005:01-REL-DAC` shall be used in a license to indicate compliance to this profile. The attribute `@m1x:licenseType` provides a further categorization of the license, which is useful in identifying what elements and attributes the license may contain.
`r:grant`	An `r:grant` is restricted to include the following child elements only: `r:forAll`, `r:principal`, `r:right`, `r:resource` and `r:condition`.

`r:forAll`
`r:propertyPossessor`
`r:anXmlExpression`
	These elements are used to identify a category of entities (resources, principals, etc.) that match an expression or possess a property. This is useful for specifying memberships, subscriptions, or domains.

`r:keyHolder` `m1x:identityHolder`	This profile only supports these Principals.

r:issue r:possessProperty mx:execute mx:play mx:print m1x:governedCopy m1x:governedMove m2x:export m2x:extendRights	This profile only supports these Resources.
r:digitalResource sx:propertyUri m1x:protectedResource	This profile only supports these Resources.
r:allConditions r:validityInterval sx:exerciseLimit sx:territory sx:validityIntervalFloating sx:validityTimeMetered m1x:outputRegulation m2x:destinationCondition m2x:destinationPrincipal m2x:proximity m2x:scrambling m2x:securitySystem m2x:simultaneousAccess m2x:timedExerciseLimit	This profile only supports these Conditions.
r:propertyPossessor	This element is restricted to include the following child elements only: r:propertyUri and r:trustedRootIssuers.
r:propertyUri	A property using an URI. Used as defined.
r:trustedRootIssuers	Trusted root issuers. Used as defined.
r:keyHolder	This element is used as defined.
r:info	This element of type dsig:KeyInfoType specifies a key for the r:keyHolder. Used as defined.
m1x:identityHolder	This element is used as defined.
m2x:extendRights	This element is used as defined.
m1x:serviceLocation	This element is used as defined.
r:digitalResource	This element is restricted to include the following child elements only: r:nonSecureIndirect and r:secureIndirect.
r:nonSecureIndirect r:secureIndirect	r:nonSecureIndirect identifies a digital resource by reference. r:secureIndirect identifies a digital resource by reference and includes a hash to bind the content reference to the actual contents of the file. These two elements are used as defined.

m1x:ProtectedResource	This element is used as defined.
r:digitalResource xenc:EncryptedData xenc:EncryptedKey	r:digitalResource contains the URI that points to the protected Resource, and is used as defined. xenc:EncryptedData contains the encryption data for the Resource, and is used as defined. xenc:EncryptedKey contains the encrypted symmetric key that was used for encrypting the content identified in r:digitalResource, and is used as defined.
r:allConditions	This element is used as defined.
r:condition	The r:allConditions element is retained in the profile, so that other conditions can be grouped together by it and used conjunctively. Used as defined.
r:validityInterval	This element is used as defined.
r:notBefore r:notAfter	r:notBefore and r:notAfter are used to specify a fixed interval of time. Used as defined.
sx:validityIntervalFloating	This element is restricted to include the following child element only: sx:duration.
sx:duration	sx:duration is used to specify the duration of a floating interval of time. Used as defined.
sx:exerciseLimit	This element is restricted to include the following child element only: sx:count.
sx:count	sx:count is used to specify the maximum number of exercises allowed. Used as defined.
sx:territory	This element includes the following child element only: sx:location and sx:domain, but with sx:location being restricted to sx:country and sx:region.
sx:location	This element is restricted to include the following child elements only: sx:country and sx:region.
sx:country sx:region	sx:country and sx:region are used to specify ISO 3166 country and region codes for identifying a country and region. Used as defined.
sx:domain	sx:domain is used to specify a network domain identified by an URI. Used as defined.
sx:validityTimeMetered	This element is restricted to include the following child element only: sx:duration and sx:quantum.
sx:duration sx:quantum	A metered interval of time is specified with the length being the value of the sx:duration and incremental being the value of sx:quantum. Used as defined.
m2x:simultaneousAccess	This element is used as defined.
m2x:count m2x:period m1x:isPartOf	m2x:count specifies the maximum count for allowing simultaneous access. m2x:period specifies the period when this condition is applied.
m2x:noSkipConstraint	This element is used as defined.
m2x:interval m2x:object	m2x:interval specifies relative position(s) of the resource based on rendering time. m2x:object is the same as r:digitalResource.

m2x:interval	This element is used as defined.
m2x:relStartTime m2x:relDuration	m2x:relStartTime specifies the position of the resource where its running time is elapsed by the time. m2x:relDuration specifies the position of the resource where its running time is elapsed more by the time from the position having m2x:relStartTime.
m2x:destinationPrincipal	This element is used as defined.
m1x:identityHolder r:keyHolder	This element is used as defined.
m2x:destinationCondition	This element is used as defined.
r:condition	This element is used as defined.
m2x:securitySystem	This element is used as defined.
m2x:identifier m2x:level	m2x:identifier identifies the security system and m2x:level specifies required minimum security level
m2x:scrambling	This element is used as defined.
@m2x:cipherType	This optional attribute identifies a type of encryption algorithm.
m2x:timedExerciseLimit	This element is used as defined.
m2x:duration m2x:quantum m2x:count	m2x:duration is the same as sx:duration. m2x:quantum is the same as sx:quantum. m2x:count is the same as sx:count. Used as defined.
m2x:timeShiftDuration	This element is used as defined.
m2x:duration	m2x:duration is the same as sx:duration.
r:issuer	This element is restricted to include the following child element only: dsig:Signature and r:keyHolder.
dsig:Signature r:keyHolder	dsig:Signature, used as defined, gives the hash of the license, the public key of the issuer, and the signature of the issuer over the license. r:keyHolder gives the public key of the issuer, and is used as defined.
m1x:serviceLocation	This element specifies a (permission) server by its location m1x:url indicating where the server is located. It is used in the element r:serviceReference element within the m1x:seekPermission element to the location of a server from which the permission for exercising the associated right must be sought.

Insert a new Clause K.2 as follows:

K.2. DAC Profile

K.2.1 Play broadcast program with constraints

Kim's DTV is granted the right to play the stated resource with conditions like below:

- Play is only allowed within device identified by DE1234567.
- Allow Time-shift-operation.

- Required security system and level: MPEG-21 security system 1 and at least 3 level.
- Valid interval: from 2006/1/17 to 2006/1/21.
- Geographical limitation: only available within Seoul, Korea.
- Simultaneous access count: 5.
- ExtendRights: when the entity requests more right which is not specified in this license, extend license through http://www.foo.org/extendLiceseService.

```
<?xml version="1.0" encoding="UTF-8"?>
<license xmlns="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mx="urn:mpeg:mpeg21:2003:01-REL-MX-NS" xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS"
xmlns:m2x="urn:mpeg:mpeg21:2006:01-REL-M2X-NS" xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="urn:mpeg:mpeg21:2006:01-REL-M2X-NS rel-m2x-dac-v1.xsd">
    <grant>
        <m1x:identityHolder licensePartId="deviceID">
            <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
            <m1x:idValue>DE1234567</m1x:idValue>
        </m1x:identityHolder>
        <mx:play/>
        <digitalResource licensePartId="news">
            <nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
        </digitalResource>
        <allConditions>
            <m2x:securitySystem>
                <m2x:identifier>urn:mpeg:mpeg21:security:system1</m2x:identifier>
                <m2x:level>3</m2x:level>
            </m2x:securitySystem>
            <m2x:simultaneousAccess>
                <m2x:count>5</m2x:count>
            </m2x:simultaneousAccess>
            <validityInterval>
                <notBefore>2006-01-17T00:00:00</notBefore>
                <notAfter>2006-01-21T00:00:00</notAfter>
            </validityInterval>
            <sx:territory>
                <sx:location>
                    <sx:country>KR</sx:country>
                    <sx:region>SEOUL</sx:region>
                </sx:location>
            </sx:territory>
        </allConditions>
    </grant>
    <grant>
        <m1x:identityHolder licensePartIdRef="deviceID"/>
        <m2x:extendRights>
            <m1x:serviceLocation>
                <m1x:url>http://www.foo.org/extendLiceseService</m1x:url>
            </m1x:serviceLocation>
        </m2x:extendRights>
        <digitalResource licensePartIdRef="news"/>
    </grant>
    <issuer>
        <keyHolder>
            <info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </info>
        </keyHolder>
    </issuer>
</license>
```

K.2.2 Store broadcast program with scrambling

The rights issuer sends Kim a license that allows him to play and store the stated resource under following conditions:

- Store is only allowed at device identified by DE1234567.
- The content should be scrambled with AES encryption algorithm when storing.
- Play is allowed for 3 days and only 1 time more after the 3 days.

```
<?xml version="1.0" encoding="UTF-8"?>
<license xmlns="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mx="urn:mpeg:mpeg21:2003:01-REL-MX-NS" xmlns:m2x="urn:mpeg:mpeg21:2006:01-REL-M2X-NS"
xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="urn:mpeg:mpeg21:2006:01-REL-M2X-NS rel-m2x-dac-v1.xsd">
    <grant>
        <m1x:identityHolder licensePartId="deviceID">
            <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
            <m1x:idValue>DE1234567</m1x:idValue>
        </m1x:identityHolder>
        <mx:play/>
        <digitalResource licensePartId="news">
            <nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
        </digitalResource>
        <m2x:timedExerciseLimit>
            <m2x:duration>P3D</m2x:duration>
            <m2x:count>1</m2x:count>
        </m2x:timedExerciseLimit>
    </grant>
    <grant>
        <m1x:identityHolder licensePartIdRef="deviceID"/>
        <m1x:governedCopy/>
        <digitalResource licensePartIdRef="news"/>
        <m2x:scrambling cipherType="AES"/>
    </grant>
    <issuer>
        <keyHolder>
            <info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </info>
        </keyHolder>
    </issuer>
</license>
```

K.2.3 Export broadcast program with constraints

The rights issuer sends Kim a license that allows him to play and export specified resource while it is transferring under the following conditions:

- Play is only allowed at device identified by DE1234567.
- Export through HD-analog output in the form of Constrained Image.
- Export through all analog output in the form of Analog Protection according to Type 1 of APS.
- Export through the HD digital output in which DTCP protection method is used.
- All export is only allowed only if the destination is within the domain identified by DO0000100.
- All export is only allowed only if the destination is local to source. (proximity).
- All export is only allowed only if the security system of target entity is MPEG-21 security system 1 and has at least level 5.

```
<?xml version="1.0" encoding="UTF-8"?>
<license xmlns="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mx="urn:mpeg:mpeg21:2003:01-REL-MX-NS" xmlns:m2x="urn:mpeg:mpeg21:2006:01-REL-M2X-NS"
xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="urn:mpeg:mpeg21:2006:01-REL-M2X-NS rel-m2x-dac-v1.xsd">
    <grant>
        <m1x:identityHolder licensePartId="deviceID">
            <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
            <m1x:idValue>DE1234567</m1x:idValue>
        </m1x:identityHolder>
        <mx:play/>
        <digitalResource licensePartId="news">
            <nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
        </digitalResource>
    </grant>
    <grant>
        <m1x:identityHolder licensePartIdRef="deviceID"/>
        <m2x:export/>
        <digitalResource licensePartIdRef="news"/>
        <allConditions>
            <m1x:outputRegulation>
                <m1x:regulation typeOfSignal="analog" qualityOfSignal="HD">ICT:1</m1x:regulation>
                <m1x:regulation typeOfSignal="analog">APSTB:01</m1x:regulation>
                <m1x:regulation typeOfSignal="digital" qualityOfSignal="HD">DTCP</m1x:regulation>
            </m1x:outputRegulation>
            <m2x:destinationPrincipal>
                <m1x:identityHolder licensePartId="deviceID">
                    <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
                    <m1x:idValue>DO0000100</m1x:idValue>
                </m1x:identityHolder>
            </m2x:destinationPrincipal>
            <m2x:destinationCondition>
                <allConditions>
                    <m2x:proximity/>
                    <m2x:securitySystem>
                        <m2x:identifier>urn:mpeg:mpeg21:security:system1</m2x:identifier>
                        <m2x:level>5</m2x:level>
                    </m2x:securitySystem>
                    <sx:territory>
                        <sx:location>
                            <sx:country>KR</sx:country>
                            <sx:region>SEOUL</sx:region>
                        </sx:location>
                    </sx:territory>
                </allConditions>
            </m2x:destinationCondition>
        </allConditions>
    </grant>
    <issuer>
        <keyHolder>
            <info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </info>
        </keyHolder>
    </issuer>
</license>
```

K.2.4 Copy broadcast program with constraints

The rights issuer sends Kim a license that allows him to play and copy specified resource under the following conditions:

- Play is only allowed within device identified by DE1234567.
- Copy with CCI copy once.
- Copy is only allowed only during 1 day after the resource is delivered.
- Copy is only allowed only if the destination is within the domain identified by DO0000100.
- Copy is only allowed only if the destination is geographically specified area, Seoul, Korea.

```
<?xml version="1.0" encoding="UTF-8"?>
<license xmlns="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mx="urn:mpeg:mpeg21:2003:01-REL-MX-NS" xmlns:m2x="urn:mpeg:mpeg21:2006:01-REL-M2X-NS"
xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" xmlns:enc="http://www.w3.org/2001/04/xmlenc#"
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="urn:mpeg:mpeg21:2006:01-REL-M2X-NS rel-m2x-dac-v1.xsd">
    <grant>
        <m1x:identityHolder licensePartId="deviceID">
            <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
            <m1x:idValue>DE1234567</m1x:idValue>
        </m1x:identityHolder>
        <mx:play/>
        <digitalResource licensePartId="news">
            <nonSecureIndirect URI="urn:broadcast:news:2005_07_10-12H-00M"/>
        </digitalResource>
    </grant>
    <grant>
        <m1x:identityHolder licensePartIdRef="deviceID"/>
        <m1x:governedCopy governanceRule="acme:CopyOnce"/>
        <digitalResource licensePartIdRef="news"/>
        <allConditions>
            <m2x:destinationPrincipal>
                <m1x:identityHolder>
                    <m1x:idSystem>urn:mpeg:mpeg21:2006-01-REL-M2X-NS:DM-00001000</m1x:idSystem>
                    <m1x:idValue>DO0000100</m1x:idValue>
                </m1x:identityHolder>
            </m2x:destinationPrincipal>
            <m2x:destinationCondition>
                <sx:territory>
                    <sx:location>
                        <sx:country>KR</sx:country>
                        <sx:region>SEOUL</sx:region>
                    </sx:location>
                </sx:territory>
            </m2x:destinationCondition>
            <sx:validityIntervalFloating>
                <sx:duration>P1DT</sx:duration>
            </sx:validityIntervalFloating>
        </allConditions>
    </grant>
    <issuer>
        <keyHolder>
            <info>
                <dsig:KeyName>Rights Issuer Public Key Name</dsig:KeyName>
            </info>
        </keyHolder>
    </issuer>
</license>
```

Insert a new Clause L.2 as follows:

L.2 XML Schema for Elements and Types of the Multimedia Extension Two

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="urn:mpeg:mpeg21:2006:01-REL-M2X-NS"
xmlns:xenc="http://www.w3.org/2001/04/xmlenc#" xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS"
xmlns:mx="urn:mpeg:mpeg21:2003:01-REL-MX-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
xmlns:m2x="urn:mpeg:mpeg21:2006:01-REL-M2X-NS" xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS"
elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xsd:import namespace="http://www.w3.org/XML/1998/namespace"
schemaLocation="http://www.w3.org/2001/xml.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-r-dac-v1.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-SX-NS" schemaLocation="rel-sx-dac-v1.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-MX-NS" schemaLocation="rel-mx-dac-v1.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" schemaLocation="rel-m1x-dac-v1.xsd"/>
    <xsd:import namespace="http://www.w3.org/2001/04/xmlenc#" schemaLocation="http://www.w3.org/TR/2002/REC-
xmlenc-core-20021210/xenc-schema.xsd"/>
    <xsd:import namespace="http://www.w3.org/2000/09/xmldsig#" schemaLocation="http://www.w3.org/TR/2002/REC-
xmldsig-core-20020212/xmldsig-core-schema.xsd"/>
    <!-- Elements -->

    <xsd:element name="export" type="m2x:Export" substitutionGroup="r:right"/>
    <xsd:element name="extendRights" type="m2x:ExtendRights" substitutionGroup="r:right"/>
    <xsd:element name="simultaneousAccess" type="m2x:SimultaneousAccess" substitutionGroup="r:condition"/>
    <xsd:element name="noSkipConstraint" type="m2x:NoSkipConstraint" substitutionGroup="r:condition"/>
    <xsd:element name="destinationPrincipal" type="m2x:DestinationPrincipal" substitutionGroup="r:condition"/>
    <xsd:element name="destinationCondition" type="m2x:DestinationCondition" substitutionGroup="r:condition"/>
    <xsd:element name="securitySystem" type="m2x:SecuritySystem" substitutionGroup="r:condition"/>
    <xsd:element name="proximity" type="m2x:Proximity" substitutionGroup="r:condition"/>
    <xsd:element name="scrambling" type="m2x:Scrambling" substitutionGroup="r:condition"/>
    <xsd:element name="timedExerciseLimit" type="m2x:TimedExerciseLimit" substitutionGroup="r:condition"/>
    <xsd:element name="timeShiftDuration" type="m2x:TimeShiftDuration" substitutionGroup="r:condition"/>

    <!-- Complex Type -->
    <xsd:complexType name="DestinationPrincipal">
        <xsd:complexContent>
            <xsd:extension base="r:Condition">
                <xsd:sequence minOccurs="0">
                    <xsd:element ref="r:principal"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="DestinationCondition">
        <xsd:complexContent>
            <xsd:extension base="r:Condition">
                <xsd:sequence minOccurs="0">
                    <xsd:element ref="r:condition"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>

    <xsd:complexType name="Export">
        <xsd:complexContent>
            <xsd:extension base="r:Right"/>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ExtendRights">
        <xsd:complexContent>
            <xsd:extension base="r:Right">
                <xsd:sequence>
                    <xsd:element ref="m1x:serviceLocation"/>
```

```
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="SimultaneousAccess">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:sequence minOccurs="0">
                <xsd:element name="count" type="xsd:positiveInteger"/>
                <xsd:element name="period" type="r:ValidityInterval" minOccurs="0" maxOccurs="unbounded"/>
                <xsd:element name="isPartOf" minOccurs="0" maxOccurs="unbounded">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="digitalResource" type="r:DigitalResource"/>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="SecuritySystem">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:sequence minOccurs="0">
                <xsd:element name="identifier" type="xsd:anyURI"/>
                <xsd:element name="level" type="xsd:string" minOccurs="0"/>
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="Proximity">
    <xsd:complexContent>
        <xsd:extension base="r:Condition"/>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="Scrambling">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:attribute name="cipherType" type="xsd:QName" use="optional"/>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="TimedExerciseLimit">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:sequence minOccurs="0">
                <xsd:choice>
                    <xsd:element name="duration" type="xsd:duration" minOccurs="0"/>
                    <xsd:element name="quantum" type="xsd:duration" minOccurs="0"/>
                </xsd:choice>
                <xsd:element name="count" type="xsd:integer" minOccurs="0"/>
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="NoSkipConstraint">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:choice maxOccurs="unbounded" minOccurs="0">
                <xsd:element name="interval" type="m2x:RelTimeDuration"/>
                <xsd:element name="object" type="r:DigitalResource"/>
            </xsd:choice>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="RelTimeDuration" >
```

```
        <xsd:complexContent>
            <xsd:extension base="r:Condition">
                <xsd:sequence minOccurs="0">
                    <xsd:element name="relStartTime" type="xsd:duration"/>
                    <xsd:element name="relDuration" type="xsd:duration"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="TimeShiftDuration">
        <xsd:complexContent>
            <xsd:extension base="r:Condition">
                <xsd:sequence minOccurs="0">
                    <xsd:element name="duration" type="xsd:duration"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
</xsd:schema>
```

Insert a new Clause M.2 as follows:

M.2 DAC Profile

M.2.1 XML Schema for the Profile Elements and Types of the Multimedia Extension Two

See L.2.

M.2.2 XML Schema for Profile Elements and Types of the Multimedia Extension One

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" xmlns:m1x="urn:mpeg:mpeg21:2005:01-REL-M1X-NS" xmlns:mx="urn:mpeg:mpeg21:2005:01-REL-MX-NS" xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS" xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-NS" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xenc="http://www.w3.org/2001/04/xmlenc#" elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xsd:import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="http://www.w3.org/2001/xml.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS" schemaLocation="rel-r-mam-v1.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-SX-NS" schemaLocation="rel-sx-mam-v1.xsd"/>
    <xsd:import namespace="urn:mpeg:mpeg21:2003:01-REL-MX-NS" schemaLocation="rel-mx-mam-v1.xsd"/>
    <xsd:import namespace="http://www.w3.org/2001/04/xmlenc#" schemaLocation="http://www.w3.org/TR/2002/REC-xmlenc-core-20021210/xenc-schema.xsd"/>
    <!-- Elements -->
    <xsd:element name="delist" type="m1x:Delist" substitutionGroup="r:right"/>
    <xsd:element name="drmSystem" type="m1x:DrmSystem" substitutionGroup="r:condition"/>
    <xsd:element name="derivationConstraint" type="m1x:DerivationConstraint" substitutionGroup="r:condition"/>
    <xsd:element name="enlist" type="m1x:Enlist" substitutionGroup="r:right"/>
    <xsd:element name="governedCopy" type="m1x:GovernedCopy" substitutionGroup="r:right"/>
    <xsd:element name="governedMove" type="m1x:GovernedMove" substitutionGroup="r:right"/>
    <xsd:element name="identityHolder" type="m1x:IdentityHolder" substitutionGroup="r:principal"/>
    <xsd:element name="outputRegulation" type="m1x:OutputRegulation" substitutionGroup="r:condition"/>
    <xsd:element name="protectedResource" type="m1x:ProtectedResource" substitutionGroup="r:resource"/>
    <xsd:element name="seekPermission" type="m1x:SeekPermission" substitutionGroup="r:condition"/>
    <xsd:element name="serviceLocation" type="m1x:ServiceLocation" substitutionGroup="r:serviceDescription"/>
    <xsd:element name="startCondition" type="m1x:StartCondition" substitutionGroup="r:condition"/>
```

```
<!--Complex Types-->
<xsd:complexType name="Delist">
    <xsd:complexContent>
        <xsd:extension base="r:Right"/>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="DrmSystem">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:sequence minOccurs="0">
                <xsd:element name="identifier" type="xsd:anyURI"/>
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="Enlist">
    <xsd:complexContent>
        <xsd:extension base="r:Right"/>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="DerivationConstraint">
    <xsd:complexContent>
        <xsd:extension base="r:Condition">
            <xsd:sequence>
                <xsd:element name="isPartOf" minOccurs="0" maxOccurs="unbounded">
                    <xsd:complexType>
                        <xsd:sequence maxOccurs="unbounded">
                            <xsd:element ref="m1x:protectedResource"/>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
                <xsd:element name="resourceInclusionList" minOccurs="0" maxOccurs="unbounded">
                    <xsd:complexType>
                        <xsd:sequence maxOccurs="unbounded">
                            <xsd:element ref="m1x:protectedResource"/>
                        </xsd:sequence>
                        <xsd:attribute name="temporalRelation" type="xsd:QName" use="optional"/>
                    </xsd:complexType>
                </xsd:element>
                <xsd:element name="resourceExclusionList" minOccurs="0" maxOccurs="unbounded">
                    <xsd:complexType>
                        <xsd:sequence maxOccurs="unbounded">
                            <xsd:element ref="m1x:protectedResource"/>
                        </xsd:sequence>
                        <xsd:attribute name="temporalRelation" type="xsd:QName" use="optional"/>
                    </xsd:complexType>
                </xsd:element>
                <xsd:element name="resourceReplacementList" minOccurs="0">
                    <xsd:complexType>
                        <xsd:sequence maxOccurs="unbounded">
                            <xsd:element ref="m1x:protectedResource"/>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
<xsd:complexType name="GovernedCopy">
    <xsd:complexContent>
        <xsd:extension base="r:Right">
            <xsd:attribute name="governanceRule" type="xsd:QName"/>
        </xsd:extension>
    </xsd:complexContent>
</xsd:complexType>
```