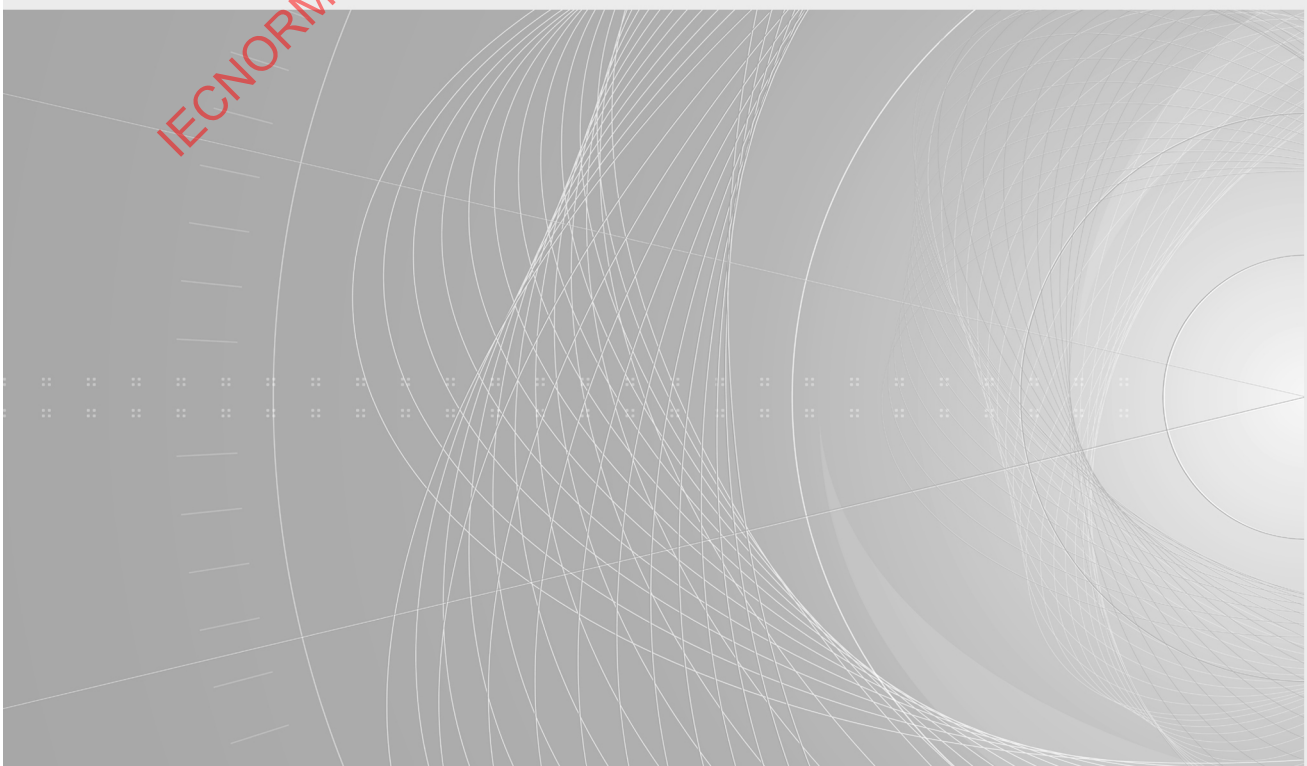
IEC/TR 62636

Edition 1.0 2009-12

TECHNICAL REPORT

colour inside

Multimedia home server systems – Implementation of digital rights permission code



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Multimedia home server systems – Implementation of digital rights permission code

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MULTIMEDIA HOME SERVER SYSTEMS – IMPLEMENTATION OF DIGITAL RIGHTS PERMISSION CODE

FOREWORD

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IEC 62636, which is a technical report, has been prepared by technical area 8: Multimedia home server systems, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
100/1561/DTR	100/1611/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

IEC 62227, which defines the digital rights permission code, is structured so that information required by engineers familiar with how permission information is coded can easily access it. However, for engineers who are not familiar with the code, there are few descriptions of specific service scenarios and the permission code that corresponds to them. For these engineers it is therefore difficult to understand how to implement a digital rights permission code using just the information given in IEC 62227.

This Technical Report provides guidelines for digital rights permission code technology to supplement the information presented in IEC 62227 and to foster the use of digital rights permission code.

MULTIMEDIA HOME SERVER SYSTEMS – IMPLEMENTATION OF DIGITAL RIGHTS PERMISSION CODE

1 Scope

This Technical Report provides guidelines to implement the digital rights permission code. It gives examples of fixed length permission codes derived from restricted code length profiling by using 23 specific usage scenarios to profile the variable-length digital rights permission code defined in IEC 62227 as fixed length digital rights permission code.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62227, *Multimedia home server systems – Digital rights permission code*

3 Terms, definitions, and abbreviations

3.1 Terms and definitions

3.1.1
permission
act by a certain issuing entity to authorize the use of content to a certain receiving entity under a certain set of permission classifications and usage conditions

NOTE The issuing entity and/or the receiving entity may not only be human, but also a device, storage medium, organization, domain or another entity.

3.1.2
home server
client device that serves as a gateway to a home domain

3.1.3
compliant device
device that possesses functions to control content access as specified in a compliant license

3.1.4
domain
set of actors to which a common set of rules apply in the context of content management

3.1.5
subscription
fee-based permission that charges per time period

3.1.6
coupon
fee-based permission that uses coupons, a form of alternative currency that can be exchanged for a given piece of content

NOTE Coupons are distributed to users by the content sponsor in order to increase user contact with that sponsor.

3.1.7
move
usage type that permits the moving of content to a compliant medium under a reuse permission

NOTE Permission conditions are further specified in the condition parameters.

3.1.8
copy
usage type that permits the copying of content to a compliant medium under a reuse permission

NOTE Permission conditions are further specified in the condition parameters.

3.1.9
export
usage type that permits the exporting of content to a non-compliant medium under a reuse permission

NOTE Permission conditions are further specified in the condition parameters.

3.1.10
permission code
code system that represents codes through a common system so that permissions from two parties with differing DRM implementations can interact with each other

3.1.11
parent permission code
permission code issued for a group of content

3.1.12
child permission code
permission code issued for an individual piece of content belonging to a larger group

3.2 Abbreviations

CD	Compact Disc
CPRM	Content Protection for Recordable Media
DCF	DRM Content Format
DRM	Digital Rights Management (System)
DRPC	Digital Rights Permission Code
DVD	Digital Versatile Disk
HD	High Definition
HDD	Hard Disk Drive
ID	Identifier
SAFIA	Security Architecture For Intelligent Attachment
WMT	Windows Media Technology

4 Purpose and justification for this TR

4.1 General

The digital rights permission code defined in IEC 62227 is variable-length, and there is no upper limit to the code length. This is because it was designed to be a very versatile specification capable of encoding permission conditions for a great variety of anticipated usage scenarios.

However, when digital rights permission code is used to provide actual services, it will be used in environments where there are practical limitations on computation and distribution resources, so it is necessary to take steps such as shortening the overall code length for the permission code to lower the cost of distribution resources and making the code length for individual permissions fixed-length so that computation can be more efficient.

Therefore, it is necessary to create guidelines for the individual permission code lengths within the overall digital rights permission code in order to restrict the length of the variable-length digital rights permission code defined in IEC 62227 when providing actual services.

To that end, this TR presents typical content usage scenarios anticipated for actual services and validates the permission code lengths for the usage conditions used in these scenarios to define restricted-length individual digital rights permission code profiles and presents guidelines for the use of digital rights permission code.

4.2 Pupose

The following applies to this Technical Report.

- The digital rights permission code lengths are fixed-length.
- The number of occurrences for each digital rights permission code unit are counted.

In addition to the scenarios that are supported under the existing digital rights management described in IEC 62227, the anticipated usage scenarios were selected based on usage scenarios required for a home server environment.

The specific usage scenarios specified in this Technical Report are the following:

- content purchase (see Figure 1);
- rental with time or playback limits (see Figure 2);
- subscription (see Figure 3);
- direct retrieval of content from a device: Scenario 1 (see Figure 4);
- direct retrieval of content from a device: Scenario 2 (see Figure 5);
- unlimited play (see Figure 6);
- preview (see Figure 7);
- multiple permissions for a multipart DCF (see Figure 8);
- inheritance (see Figure 9);
- export of OMA DRM content (see Figure 10);
- combinations of constraint elements (see Figure 11);
- FairPlay (see Figure 12);
- CPRM (see Figure 13);
- SAFIA (see Figure 14);
- ringtones (see Figure 15);
- download of content free with advertising (see Figure 16);
- streaming of content free with advertising (see Figure 17);
- giveaways (see Figure 18);
- coupons (discount points) (see Figure 19);
- privacy information disclosure (see Figure 20);
- copying 9 times with unlimited moving (see Figure 21);
- subscription games (see Figure 22);

- software rental (see Figure 23).

Detailed information about the digital rights permission code generated for each usage scenario is also provided in Annex B.

5 Usage scenarios

5.1 General

This clause presents the usage scenarios profiled in this report. The details of the permission units that were used in each scenario are described in Annex B.

5.2 Content purchase

Mr. S purchases a song from a content provider, downloads it, and plays it back on Device Y, which belongs to domain D, and he exports it to a CD, see Clauses B.2 to B.5, No.1

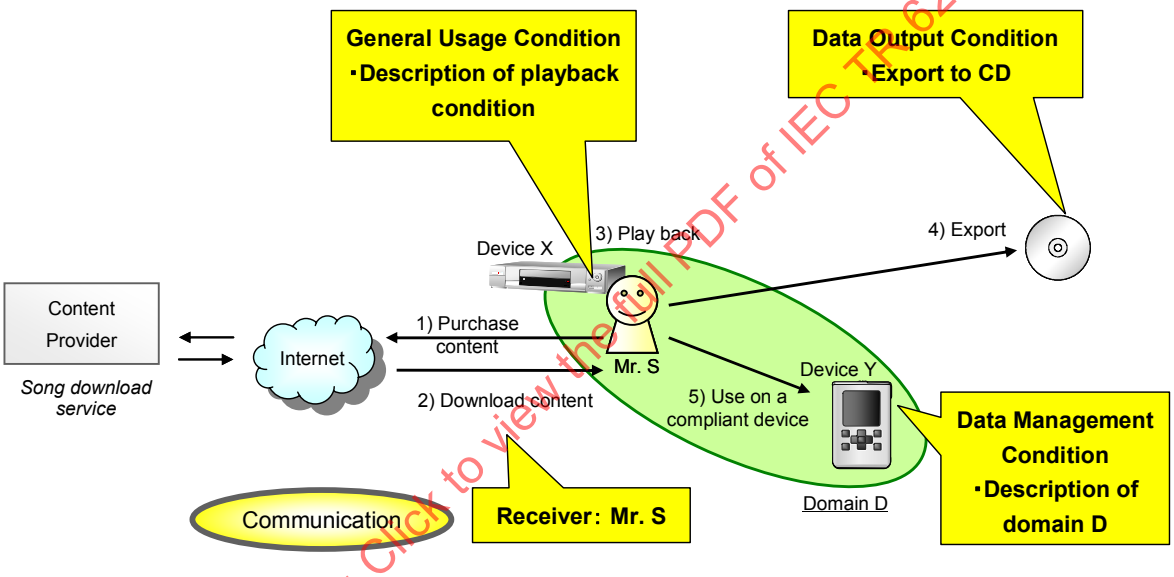


Figure 1 – Content purchase

5.3 Rental with time or playback limit

Mr. S rents video content from a content provider. He downloads it and plays it back. It has a playback condition stipulating that the playback time is limited to 48 h, see Clauses B.2 to B.4, No.2.

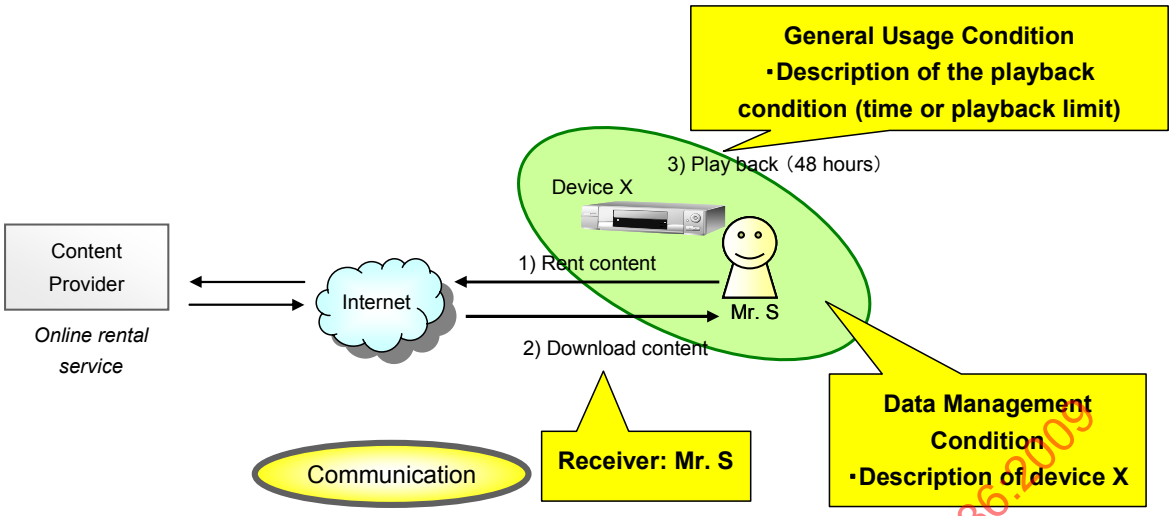
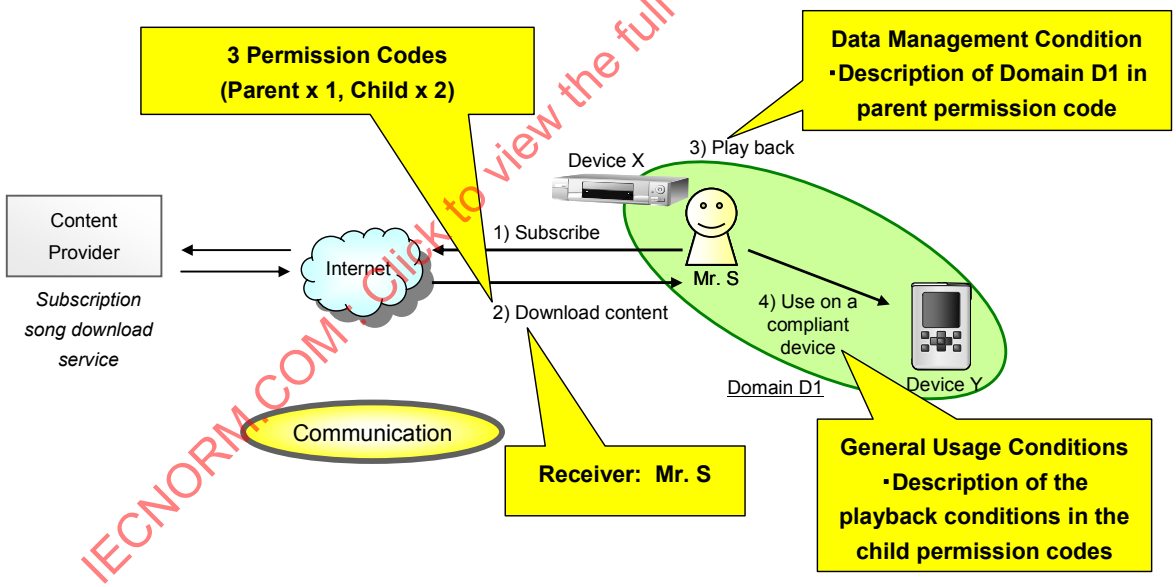


Figure 2 – Rental with time or playback limit

5.4 Subscription

Mr. S enters into a subscription contract with a content provider. Mr. S downloads Song C1 from the content provider and plays it back on Device Y, which belongs to domain D1. Mr. S downloads Song C2 from the content provider and plays it back on Device Y, which belongs to domain D1, see Clauses B.2 to B.4, No. 3 to 5.



Subscription
a) Parent permission code:
   Describes the subscription conditions
   Charge class field is “Subscribe”. There are no general usage conditions.
b) Child permission code:
   Describes each content usage condition in a subscription
   Charge class field is “Subscribe”. There is at least one general usage condition.

Figure 3 – Subscription

5.5 Direct retrieval of content from a device: Scenario 1

Mr. S purchases a song from a content provider to play back on Device X. He downloads it and plays it back, see Clauses B.2 to B.4, No.6.

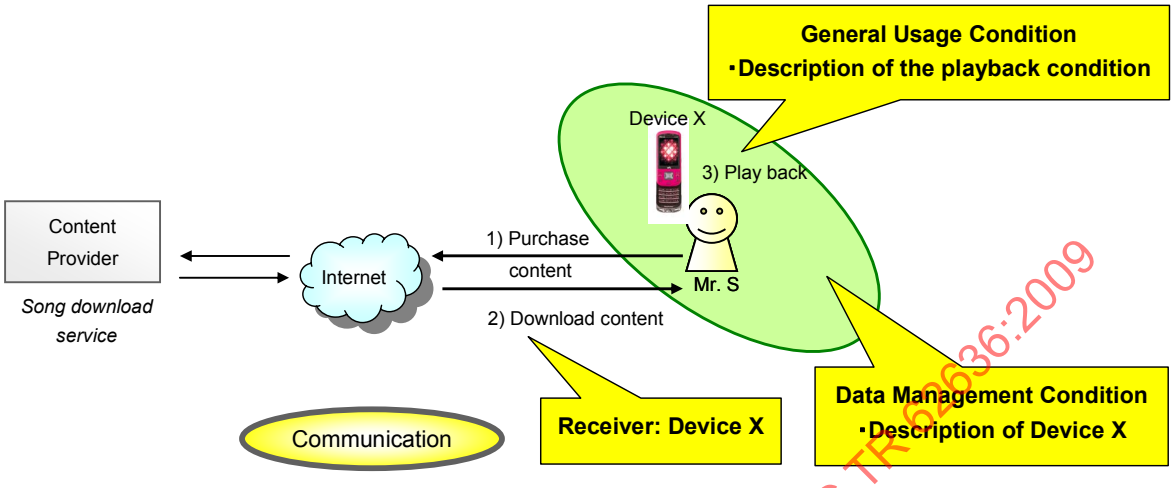


Figure 4 – Direct retrieval of content from a device: Scenario 1

5.6 Direct retrieval of content from a device: Scenario 2

Mr. S purchases VOD content from a content provider to play back on Device X. He plays it back by streaming it, see Clauses B.2 to B.3, No.7.

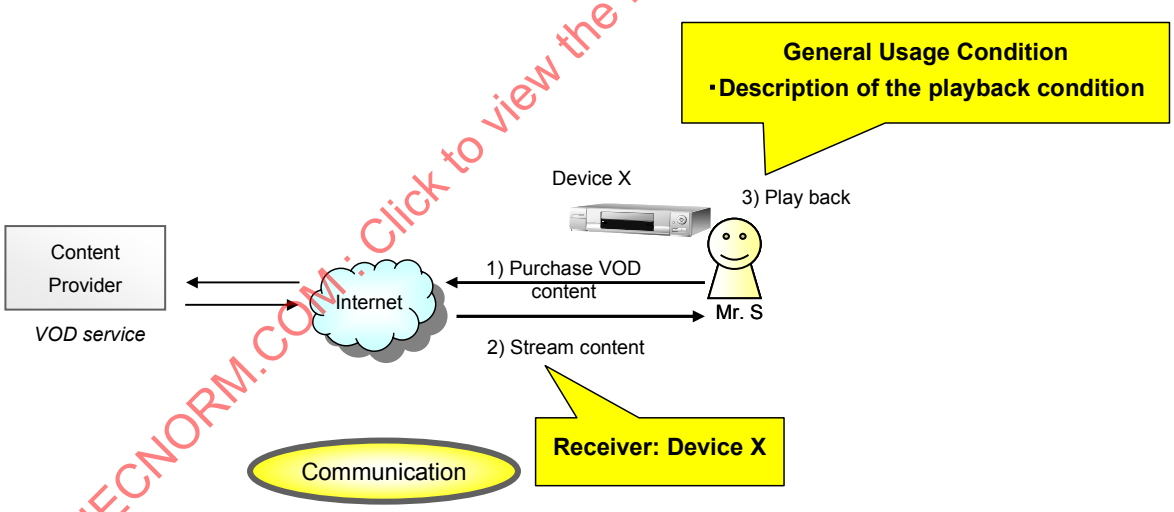


Figure 5 – Direct retrieval of content from a device: Scenario 2

5.7 Unlimited play

Mr. S purchases video content from a content provider and downloads it. There are no limits on how many times he can play it back, see Clauses B.2 to B.4, No.8.

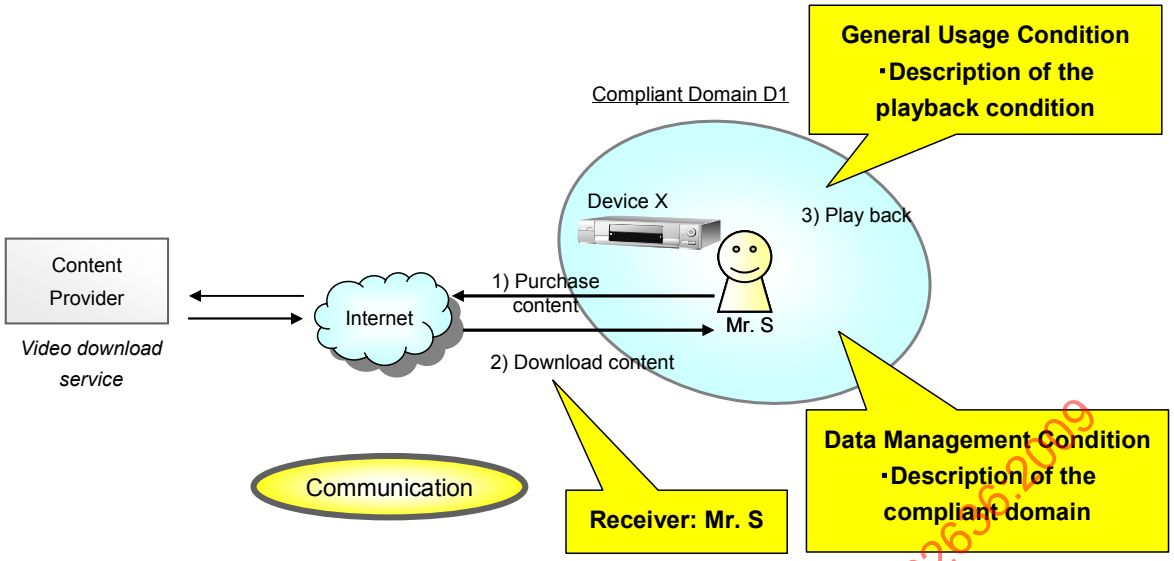


Figure 6 – Unlimited play

5.8 Preview

Mr. S applies for a trial video subscription from a content provider. He plays back the trial content by streaming it, see Clauses B.2 to B.3, No.9.

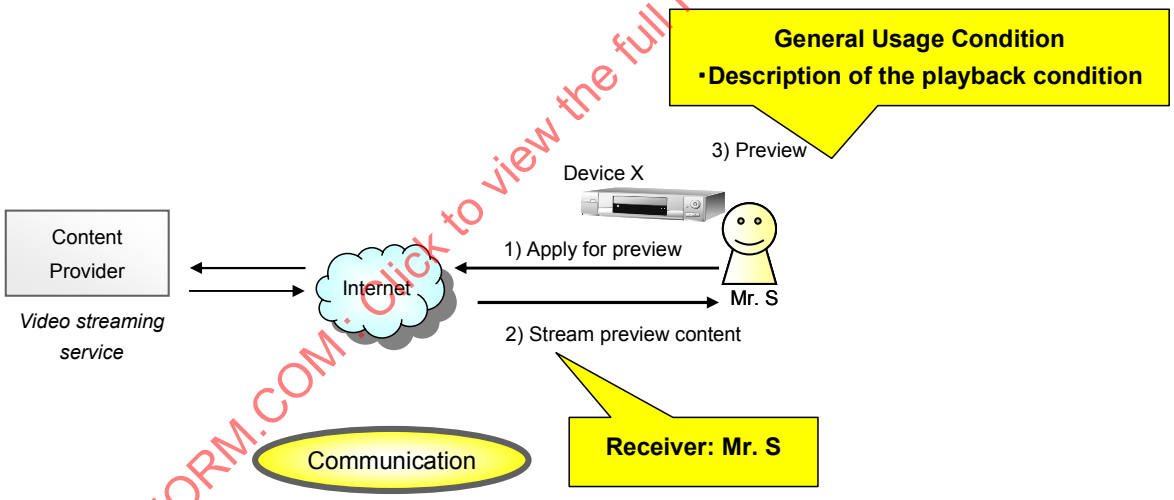


Figure 7 – Preview

5.9 Multiple permissions for a multipart DCF

Mr. S purchases a song with lyrics to be used on Device X and downloads it as a multipart DCF from a content provider. He can play the song back, display the lyrics on Device X and print the lyrics out from Device X, see Clauses B.2 to B.4, No.10 to 11.

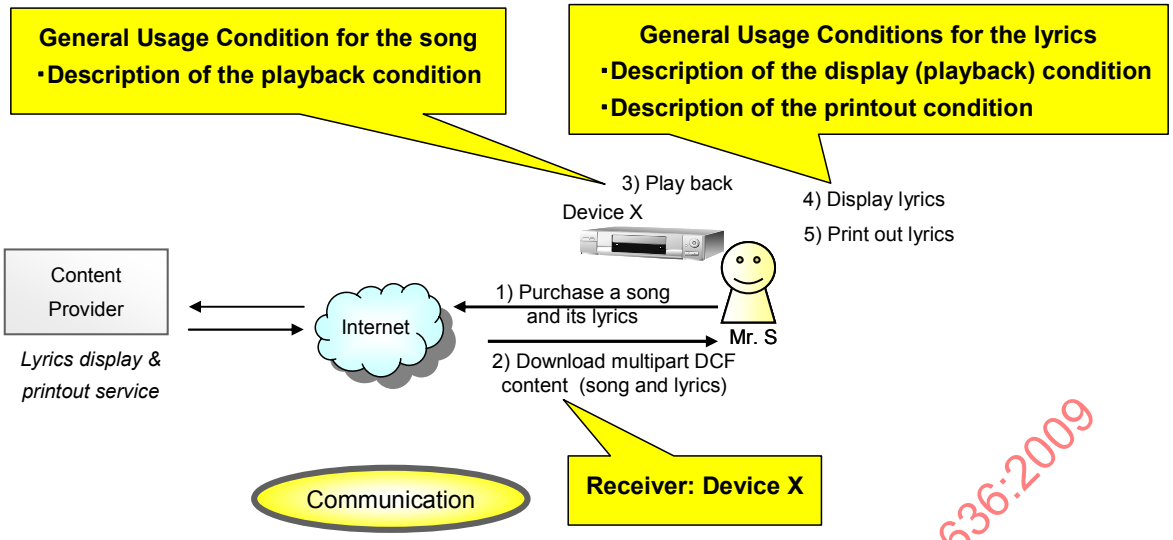


Figure 8 – Multiple permissions for a multipart DCF

5.10 Inheritance

Mr. S purchases the lyrics of a song to be used on Device X from a content provider. He can display and print out the lyrics 10 times each from 1 Jul 2008 to 31 Aug 2008 and 3 times each from 1 Sep 2008 to 30 Sep 2008, see Clauses B.2 to B.4, No.12.

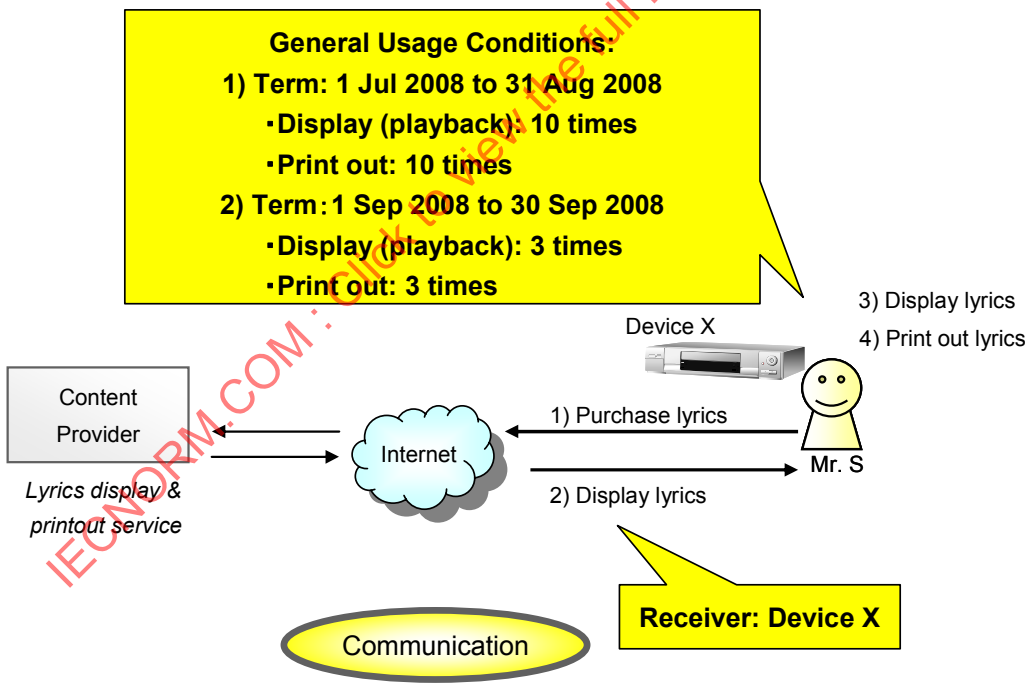


Figure 9 – Inheritance

5.11 Export of OMA DRM content

Mr. S purchases video content to be used on Device X from a content provider. He downloads it, plays it back, and exports it to a DVD, see Clauses B.2, B.3 and B.5, No.13.

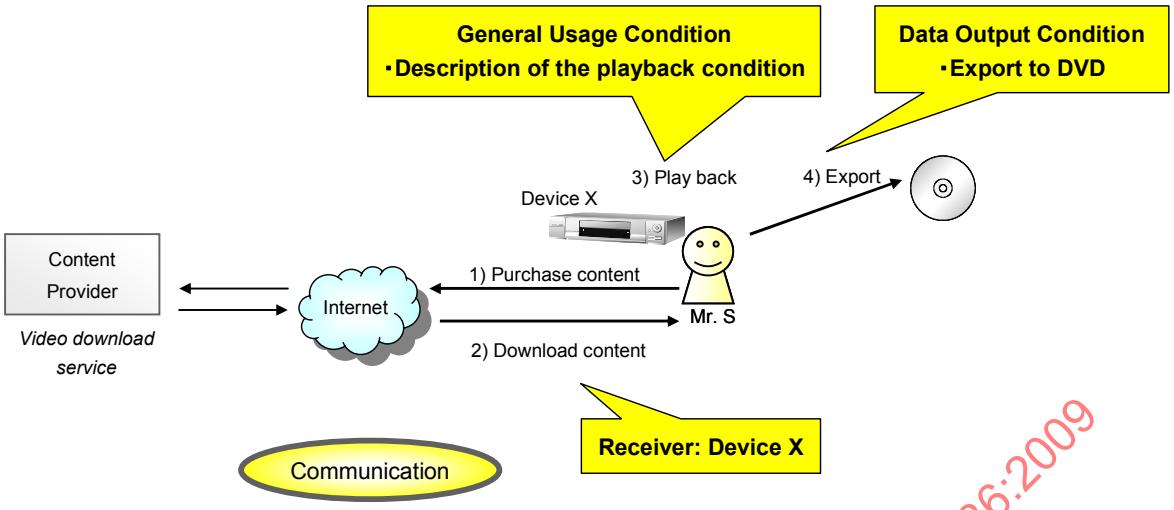


Figure 10 – Export of OMA DRM content

5.12 Combinations of constraint elements

Mr. S applies for a trial subscription to video content from a content provider. He plays back the trial content by streaming it. He can play it back 10 times for 30 s from 1 Jul 2008 to 31 Aug 2008 and 2 times for 180 s from 1 Sep 2008 to 30 Sep 2008, see Clauses B.2 and B.3, No.14.

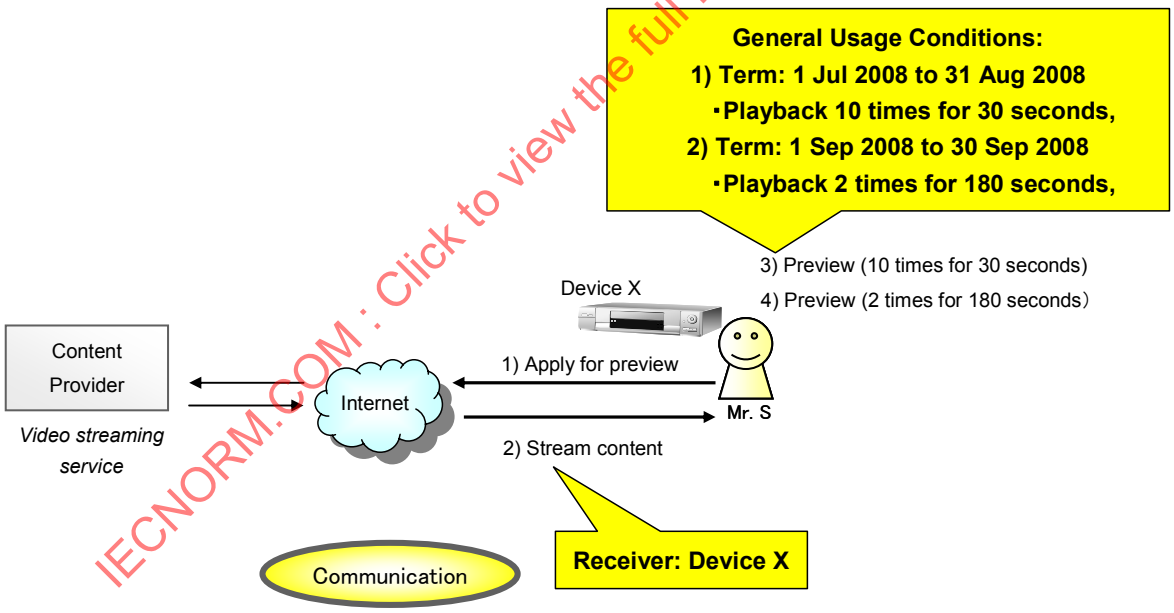


Figure 11 – Combinations of constraint elements

5.13 FairPlay

Mr. S purchases a song from a content provider and downloads it. He plays it back on Device Y, which belongs to domain D1, and also exports it to a CD, see Clauses B.2 to B.5, No.15.

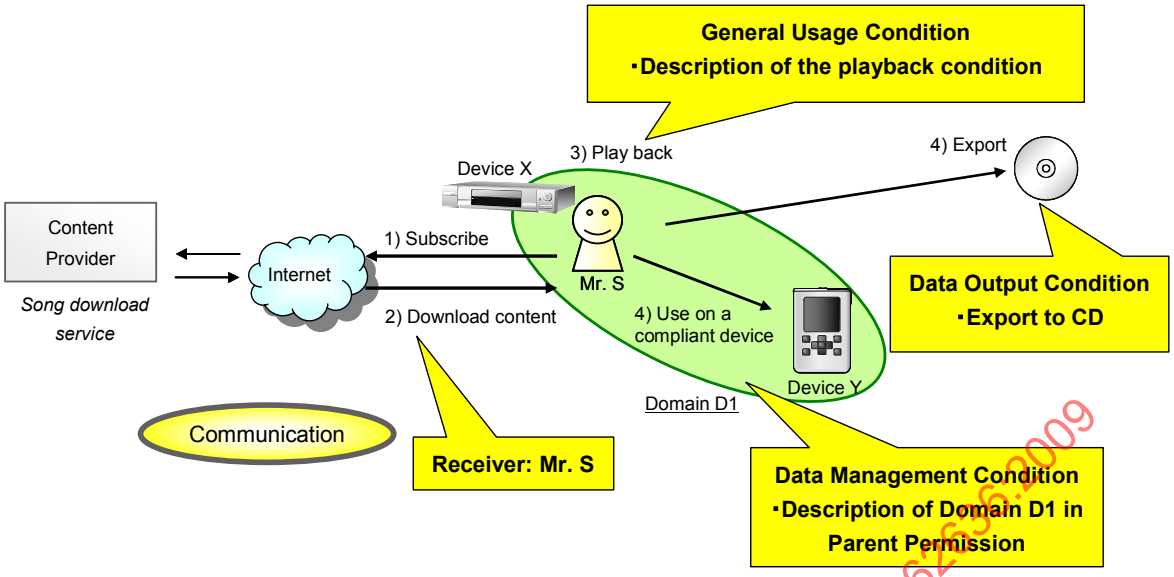


Figure 12 – FairPlay

5.14 CPRM

Mr. S purchases a song from a content provider, downloads it, and plays it back. He plays it back on Device Y and also exports it to a DVD, see Clauses B.2 to B.3 and B.5, No.16.

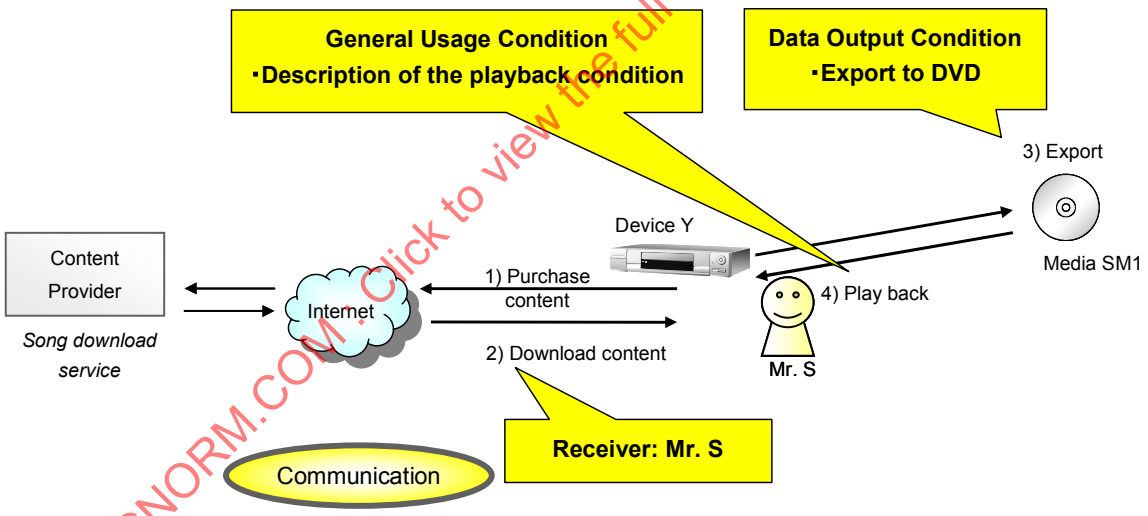


Figure 13 – CPRM

5.15 SAFIA

Mr. S purchases a song from a content provider, downloads it, and plays it back. He plays it back on Device Y, which belongs to domain D1, and he also exports it to a removable hard disk drive, see Clauses B.2 to B.5, No.17.

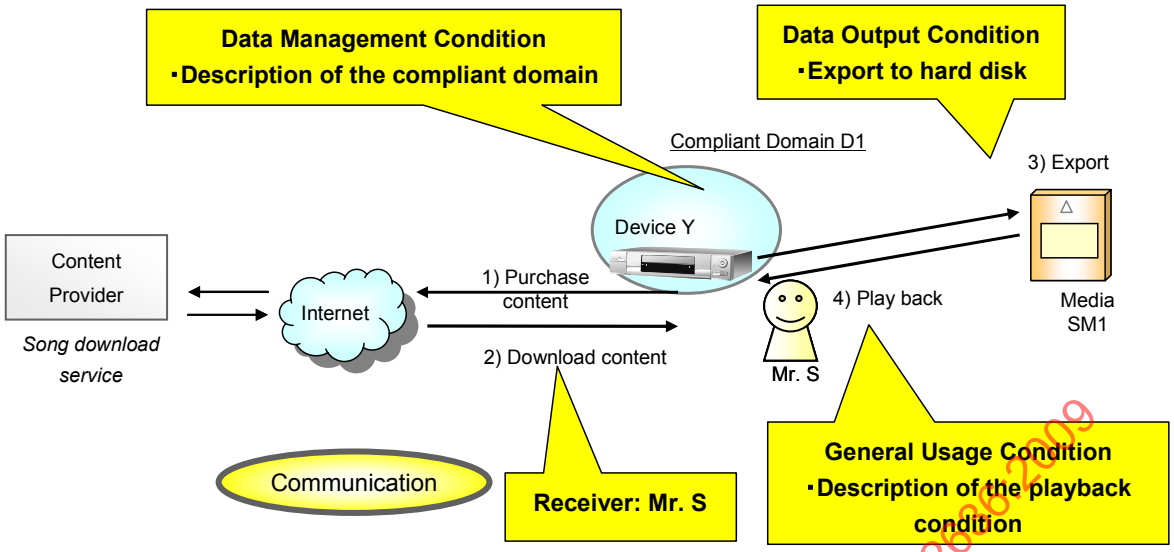


Figure 14 – SAFIA

5.16 Ringtones

Mr. S purchases a song from a content provider, downloads it, and plays it back. He plays it back on Device Y, which belongs to domain D1, and he also exports it to a removable memory device, see Clauses B.2 to B.5, No.18.

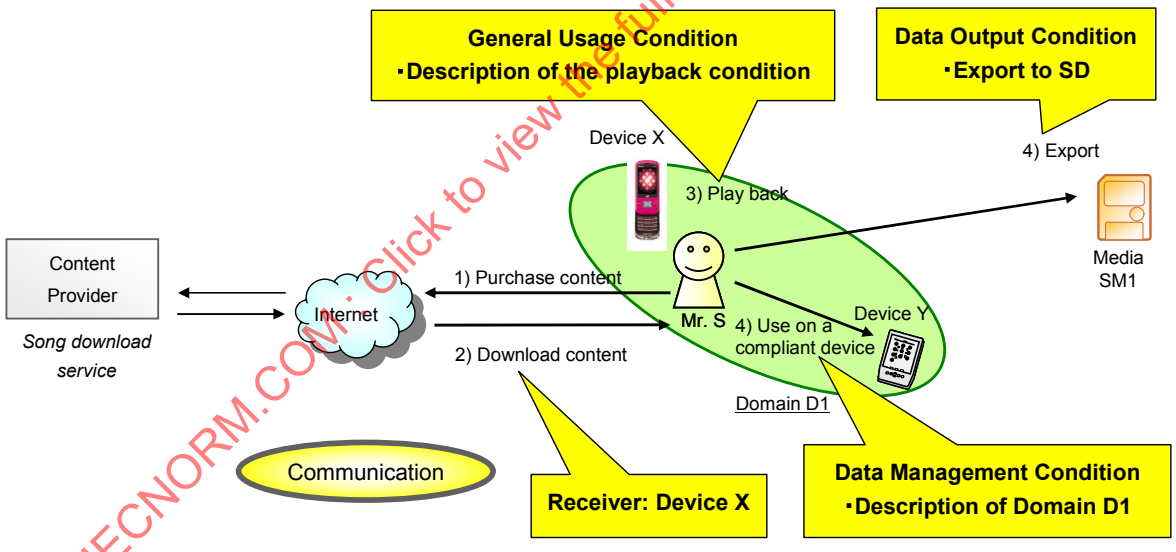


Figure 15 – Ringtones

5.17 Download of content free with advertising

Mr. S requests content that is free with advertising, downloads it, and plays it back. He also plays it back on Device Y, which belongs to domain D1, see Clauses B.2 to B.4, No.19.

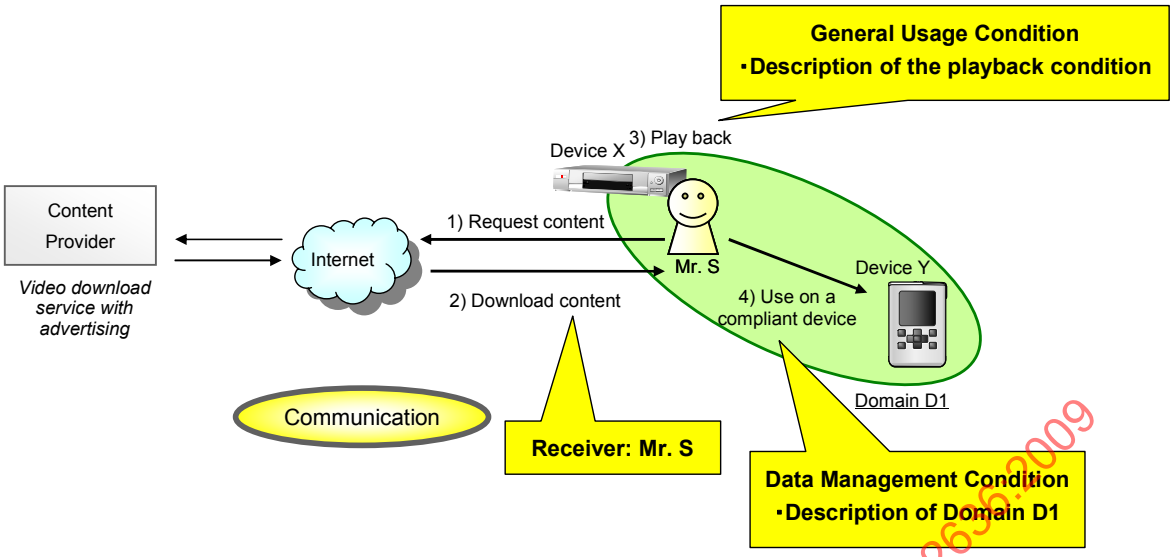


Figure 16 – Download of content free with advertising

5.18 Streaming of content free with advertising

Mr. S requests video content that is free with advertising and plays it back by streaming it, see Clauses B.2 to B.3, No.20.

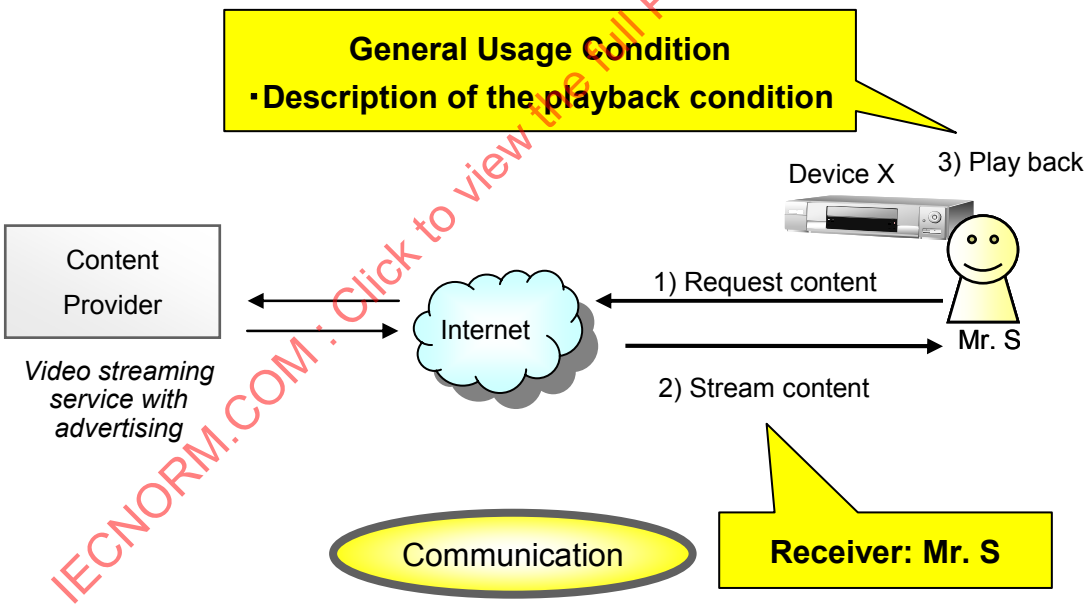


Figure 17 – Streaming of content free with advertising

5.19 Giveaways

Mr. S purchases a soft drink with a free giveaway at a shop and submits the proof of purchase at the manufacturer's website. He downloads a free video and plays it back on Device X. He also plays it back on Device Y, which belongs to domain D1, see Clauses B.2 to B.4, No.21.

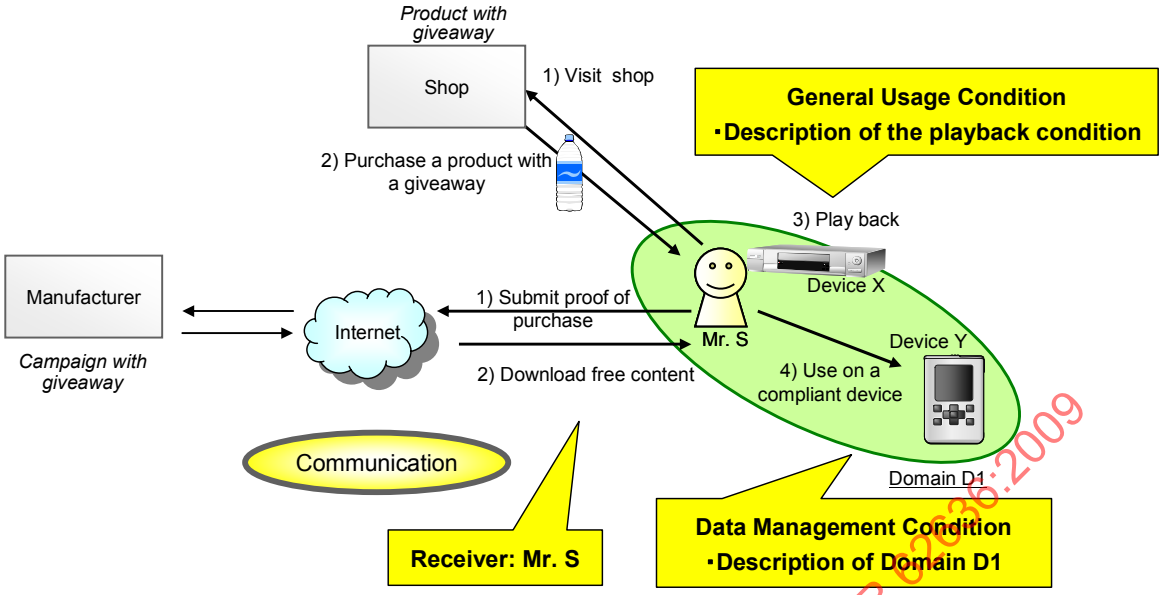


Figure 18 – Giveaways

5.20 Coupons (discount points)

Mr. S purchases a soft drink at a shop where he can earn points. He purchases a video at a discount price using the points, downloads it, and plays it back. He also plays it back on Device Y, which belongs to domain D1, see Clauses B.2 to B.4, No.22.

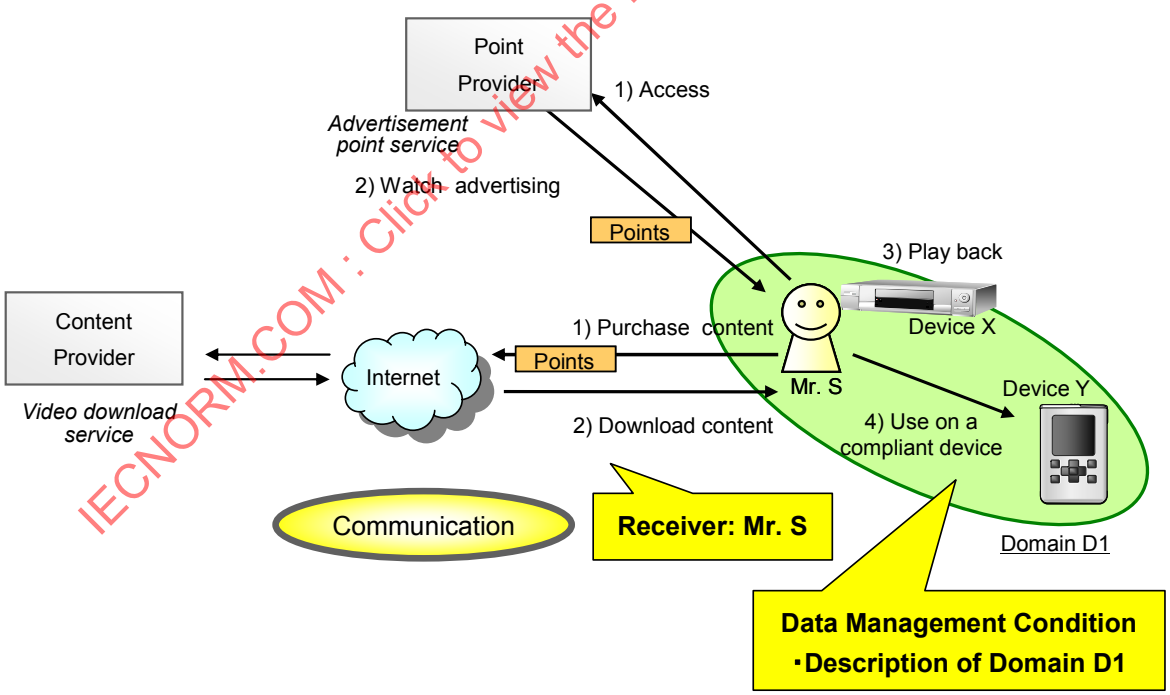


Figure 19 – Coupons (discount points)

5.21 Privacy information disclosure

Mr. S exchanges privacy information with a content provider for a video. He downloads the video and then plays it back on Device X, see Clauses B.2 to B.4, No.23.

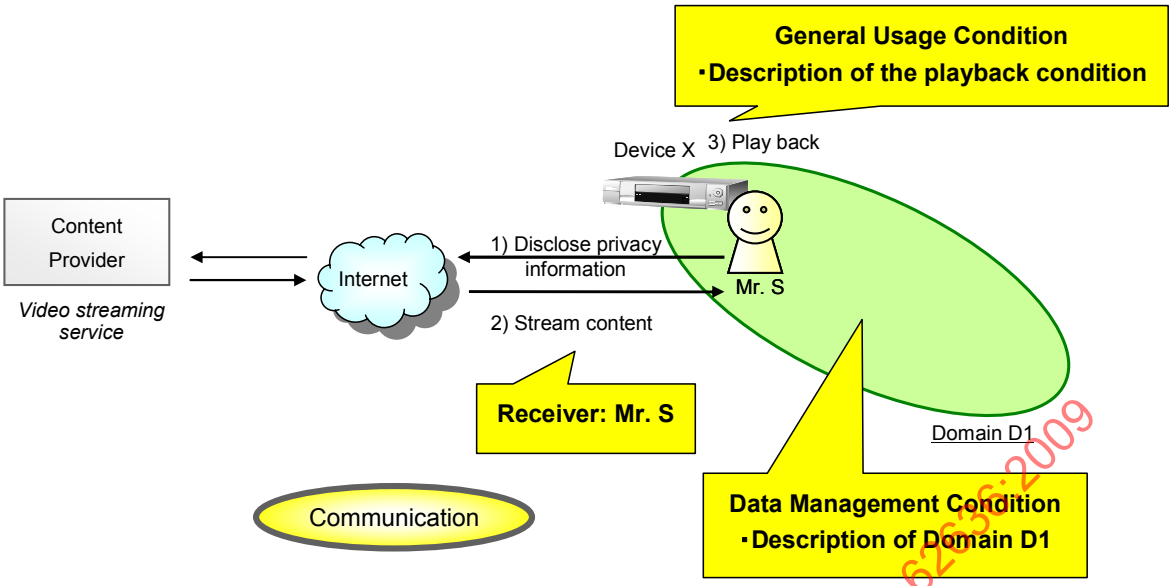


Figure 20 – Privacy information disclosure

5.22 Copying 9 times with unlimited moving

Mr. S concludes a contract with a broadcaster to receive content. He stores the broadcast content on Device X and plays it back. He can copy it among permission code-compliant devices, such as Media SM1, Media SM2, and Media SM3, and he can play it back on Device Y. The number of copies is limited to 9, see Clauses B.2 to B.4, No.24.

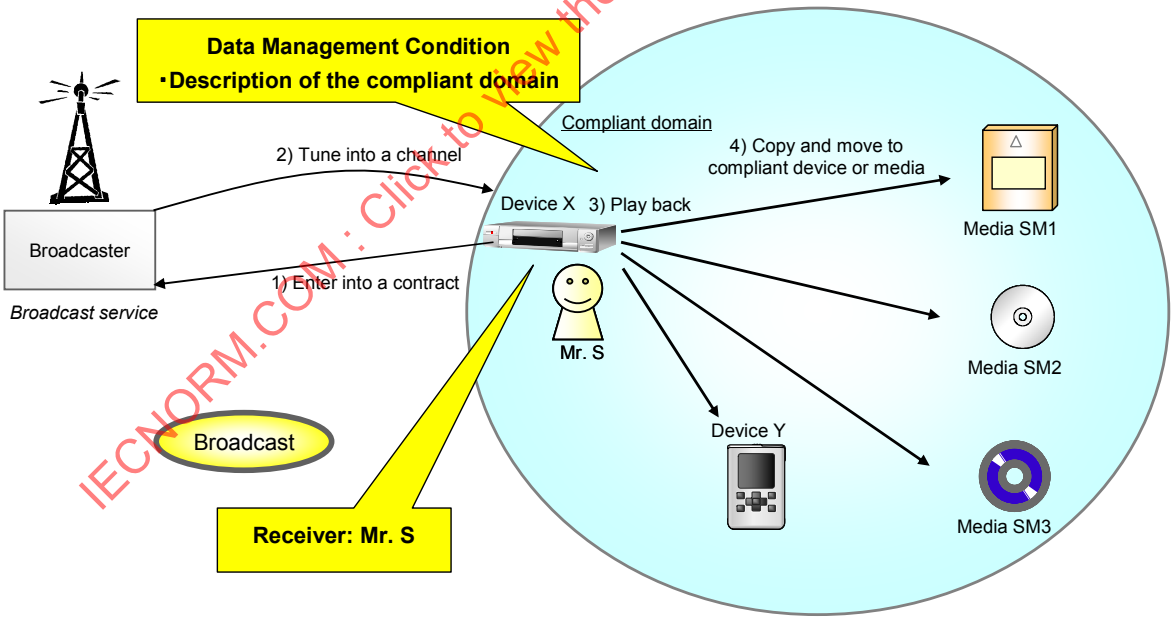


Figure 21 – Copying 9 times with unlimited moving

5.23 Subscription games

Mr. S enters into a monthly subscription contract for games with a content provider. He downloads the games and runs them on Device X. The games can be used for a month after they are downloaded, see Clauses B.2 to B.4, No.25.

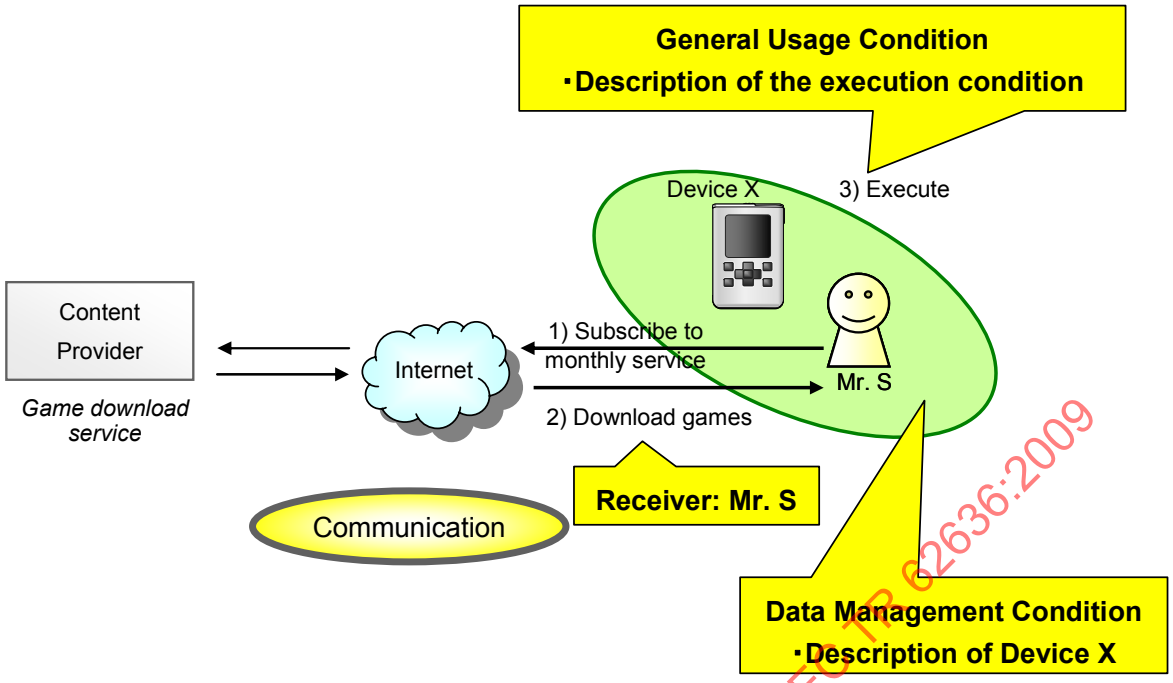


Figure 22 – Subscription games

5.24 Software rental

Mr. S concludes a time-limited software usage contract with a content provider. He downloads the software and runs it on Device X. The software can be run for a month after it is downloaded, see Clauses B.2 to B.4, No.26.

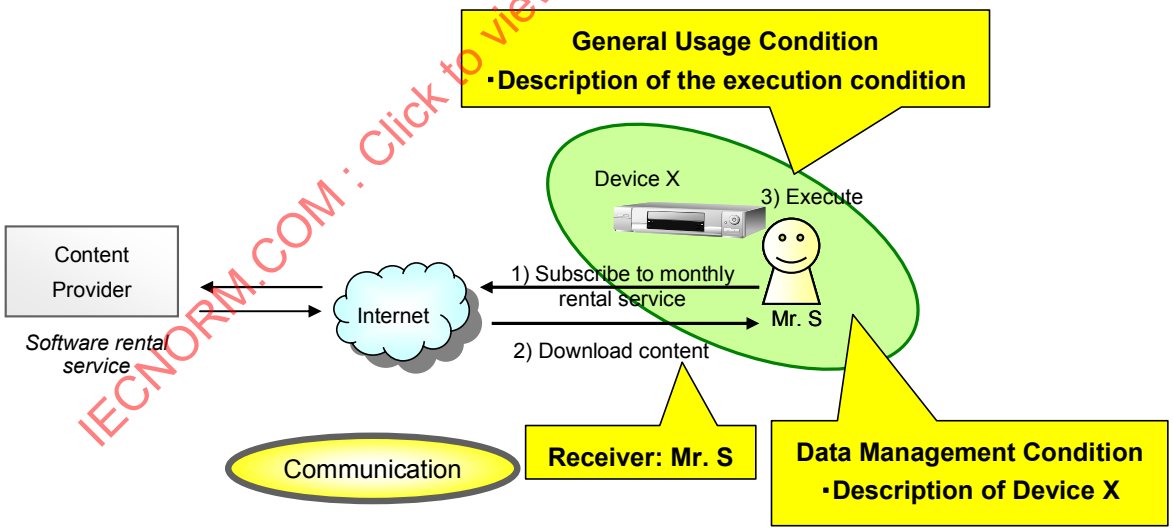


Figure 23 – Software rental

6 DRPC profiling

6.1 Profiling process

The profiles for DRPC were defined by examining the permission code derived for each usage scenario and using the four steps below.

a) Examine the unit occurrence pattern and permission code length for each scenario.

b) Group the permission code lengths based on occurrence patterns (see Table 1).

c) Select the maximum code length from each group (see Table 2).

d) Profile the permission code using unit occurrence patterns and maximum code lengths. (see Table 3).

6.2 Unit occurrence patterns and DRPC lengths

Table 1 shows the relationship between the code length and the permission actor unit, the permission classification unit, the general usage condition unit, the data management condition unit, and the data output condition unit for each scenario. It shows a "1" if a unit occurs and a "0" if a unit does not occur, and it provides a complete list of the DRPC lengths and unit occurrence patterns for all of the scenarios defined for use in DRPC.

Not all units are valid for each scenario. The units that are valid for each scenario are listed within each scenario definition.

Table 1 – Unit occurrence patterns and DRPC lengths

		VERSION	Permission Actor	Permission Classification	General Usage Condition	Data Management Condition	Data Output Condition	Pattern	Size (Bytes)
		Num	Num	Num	Num	Num	Num		
1	Content purchase	1	1	1	1	1	1	**1111-11**	**170**
2	Rental with time or playback limit	1	1	1	1	1	0	**1111-10**	**134**
3	Subscription	1	1	1	0	1	0	**1110-10**	**101**
4	Subscription child 1	1	1	1	1	0	0	**1111-00**	**92**
5	Subscription child 2	1	1	1	1	0	0	**1111-00**	**92**
6	Direct retrieval of content from a device: Case 1	1	1	1	1	1	0	**1111-10**	**134**
7	Direct retrieval of content from a device: Case 2	1	1	1	1	0	0	**1111-00**	**92**
8	Unlimited play	1	1	1	1	1	0	**1111-10**	**134**
9	Preview	1	1	1	1	0	0	**1111-00**	**92**
10	Multiple permissions for a multipart DCF (Lyrics)	1	1	1	1	1	0	**1111-10**	**155**
11	Multiple permissions for a multipart DCF (Song)	1	1	1	1	1	0	**1111-10**	**134**
12	Inheritance	1	1	1	1	0	0	**1111-00**	**159**
13	Export of OMA DRM Content	1	1	1	1	0	1	**1111-01**	**128**
14	Combinations of constraint elements	1	1	1	1	0	0	**1111-00**	**117**
15	FairPlay	1	1	1	1	1	1	**1111-11**	**170**
16	CPRM	1	1	1	1	0	1	**1111-01**	**128**
17	SAFIA	1	1	1	1	1	1	**1111-11**	**170**
18	Ringtones	1	1	1	1	1	1	**1111-11**	**170**
19	Download of content free with advertising	1	1	1	1	1	0	**1111-10**	**134**
20	Streaming of content free with advertising	1	1	1	1	0	0	**1111-00**	**92**
21	Giveaways	1	1	1	1	1	0	**1111-10**	**134**
22	Coupons (discount points)	1	1	1	1	1	0	**1111-10**	**134**
23	Privacy information disclosure	1	1	1	1	1	0	**1111-10**	**134**
24	Copying 9 times with unlimited moving	1	1	1	1	1	0	**1111-10**	**134**
25	Subscription games	1	1	1	1	1	0	**1111-10**	**130**
26	Software rental	1	1	1	1	1	0	**1111-10**	**130**

6.3 Grouping scenarios by unit occurrence pattern

Table 2 shows the results of grouping scenarios based on their unit occurrence patterns. Each scenario can only have one unit occurrence pattern. Therefore, if multiple types of permission codes are handled within a scenario, the following processing is run to group the units into a single occurrence pattern.

a) If there is a unit occurrence, the pattern count shall be 1.

b) The code length shall be the maximum permission code length within the scenario.

For example, in the "Subscription" scenario, two types of permission codes, a parent permission and a child permission, are handled, and the occurrence pattern for a subscription is the combination of the parent permission (1110-10) and the child permission (1111-00), which is 1111-10. In addition, the code length is the larger of the parent permission (101) and the child permission (92), which is 101. Similarly, in the "Multiple permissions for a multipart DCF" scenario, two types of permission codes are handled, one for lyrics and one for songs, and the code length is the larger of the lyrics permission code length (155) and the song permission code length (134), which is 155.

Table 2 – Grouping scenarios by unit occurrence pattern

Pattern	Size (Bytes)	No	Title
1111-00	**92**	7	Direct retrieval of content from a device: Case 2
	92	9	Preview
	92	20	Streaming of content free with advertising
	117	14	Combinations of constraint elements
	159	12	Inheritance
1111-01	**128**	13	Export of OMA DRM Content
	128	16	CPRM
1111-10	**130**	25	Subscription games
	130	26	Software rental
	134	3	Subscription
	134	2	Rental with time or playback limit
	134	6	Direct retrieval of content from a device: Case 1
	134	8	Unlimited play
	134	19	Download of content free with advertising
	134	21	Giveaways
	134	22	Coupons (discount points)
	134	23	Privacy information disclosure
	134	24	Copying 9 times with unlimited moving
	155	10	Multiple permissions for a Multipart DCF (Lyrics)
1111-11	**170**	1	Content purchase
	170	15	FairPlay
	170	17	SAFIA
	170	18	Ringtones

6.4 Maximum code length for each scenario group

The maximum length of the permission code for each occurrence pattern is taken as the permission code length for that occurrence pattern. Table 3 shows the results of profiling permission codes using the unit occurrence patterns and maximum code lengths in Table 2.

Table 3 – Maximum code length for each scenario group

Pattern	Size (Bytes)	No	Title
1111-00	**159**	7	Direct retrieval of content from a device: Case 2
		9	Preview
		20	Streaming of content free with advertising
		10	Multiple permissions for a multipart DCF (Lyrics)
		14	Combinations of constraint elements
		12	Inheritance
1111-01	**128**	13	Export of OMA DRM content
		16	CPRM
1111-10	**155**	3	Subscription
		25	Subscription games
		26	Software rental
		2	Rental with time or playback limit
		6	Direct retrieval of content from a device: Case 1
		8	Unlimited play
		19	Download of content free with advertising
		21	Giveaways
		22	Coupons (discount points)
		23	Private information disclosure
		24	Copying 9 times with unlimited moving
1111-11	**170**	1	Content purchase
		15	FairPlay
		17	SAFIA
		18	Ringtones

6.5 DRPC profiles

The process resulted in the DRPC profiles shown in Table 4. The unit occurrence patterns in Table 3 are set as the profile names, and the code lengths are set as the profile values.

Table 4 – DRPC profiles

Profile	Size (Bytes)	Data Management Condition	Data Export Condition
1111-00	**159**	**No**	**No**
1111-01	**128**	**No**	**Yes**
1111-10	**155**	**Yes**	**No**
1111-11	**170**	**Yes**	**Yes**

Annex A
(informative)

Services

A.1 General

This annex shows examples of services in which permission profile “1111-11” is used.

A.2 1: Service that allows the user to select from a permission conditions list

The first service example shows an IPTV Service that allows consumers to select one of several permission conditions (see Figure A.1). In this case, the user is watching an IPTV program and she hears one of her favorite songs as background music. She clicks the program ID and gets the song ID. Using the song ID, she can access a shopping site. There are multiple usage conditions, such as "free with advertising" or "limited 48-h playback". Multiple permission codes for these conditions are available on a back end server. She can select one of these conditions. She purchases the song and plays it back. This is a typical “content purchase” scenario.

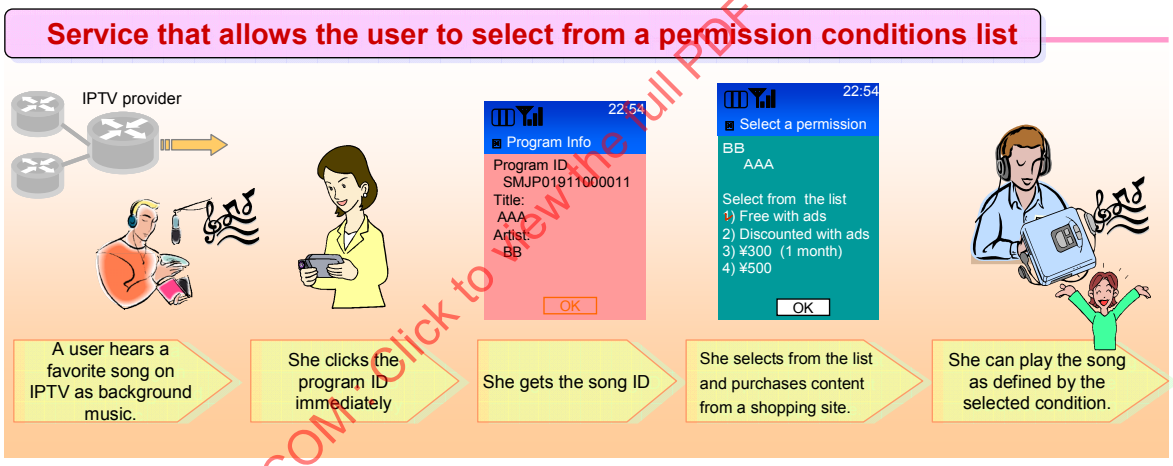


Figure A.1 – Selection from a permission conditions list

A.3 2: Service that allows content to be played on several devices

The second service example shows a user who connects to a wireless LAN service on a special class railroad car and receives a free song from a portal site. The permission condition for the purchased song includes not only permission to play the song on a mobile phone, but also permission to play it on a PC and mobile audio player. Based on the selected conditions, she can move the song to an SD card or play it on a PC or a mobile audio player (see Figure A.2).