

## **CI Plus Specification. Content Security Extensions to the Common Interface.**

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# 1 Scope

This specification provides the description of a CI Plus LLP implementation based on the TS 103 205 [3], Bluebook A173-2 [5] and CI Plus 1.3 specification [2], pulling together those specifications and specifying what parts need to be implemented in order to realise a device compliant with CI Plus LLP.

This specification is intended to be used in combination with the appropriate certification process, and subject to conformance by the manufacturers to the CI Plus Compliance and Robustness Rules [4].

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## 2 References

- [1] CI Plus Licensee Specification, available under licence from the CI Plus Trust Authority.
- [2] CI Plus Specification V1.3.2 (03-2015): “Content Security Extensions to the Common Interface”.
- [3] ETSI TS 103 205 V1.2.1 (2015-11): “Digital Video Broadcasting (DVB); Extensions to the CI Plus Specification”.
- [4] CI Plus DEVICE INTERIM LICENSE AGREEMENT, January 1st 2015.
- [5] Bluebook A173-2 (2015-06): “Digital Video Broadcasting (DVB); Second Generation Common Interface (CI); Part 2: Extension to the CI Plus Specification”.
- [6] ETSI TS 103 285 V1.1.1: “MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks”.
- [7] ISO/IEC 14496-12 (2012): "Information technology -- coding of audio-visual objects -- Part 12: ISO Base File Format".
- [8] High-bandwidth Digital Content Protection System, Interface Independent Adaptation, Revision 2.0.
- [9] High-bandwidth Digital Content Protection System, Interface Independent Adaptation, Revision 2.2.
- [10] Digital Transmission Content Protection Specification Volume 1 (Informational Version) Revision 1.7.
- [11] HbbTV 2.0 Specification (2015-05-01)
- [12] ETSI TS 102 809 V1.2.1: "Digital Video Broadcasting (DVB); Signalling and carriage of interactive applications and services in Hybrid Broadcast/Broadband environments".
- [13] ETSI TS 102 034 V1.5.1 (2014-05): “Digital Video Broadcasting (DVB); Transport of MPEG-2 TS Based DVB Services over IP Based Networks”
- [14] Open IPTV Forum Release 2 specification, volume 2 (V2.3): "Media Formats".
- [15] EN 50221:1996 (February, 1997): “Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications”.  
<https://www.dvb.org/resources/public/standards/En50221.V1.pdf>
- [16] ETSI TS 101 699 V1.1.1 (November, 1999): “Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification”.

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply in addition to those defined in CI Plus Specification 1.3 [2]:

**Broadcast application:** As defined in TS 103 205 [3]

**CICAM AppMMI application:** As defined in TS 103 205 [3]

### 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply in addition to those defined in CI Plus Specification 1.3 [2]:

|        |   |
|--------|---|
| CSUV   | Critical Security Update Version            |
| EPG    | Electronic Program Guide                    |
| FCC    | Fast Channel Change                         |
| IGMP   | Internet Group Management Protocol          |
| IPTV   | Internet Protocol TeleVision                |
| LCN    | Logical Channel Number                      |
| LLP    | Limited Liability Partnership               |
| LTS_id | Local Transport Stream identifier           |
| OSDT   | Online SDT                                  |
| RAMS   | Rapid Acquisition of Multicast RTP Sessions |
| RET    | RETransmission                              |
| RR     | Receiver Report                             |
| RTCP   | Real-time Transport Control Protocol        |
| SDT    | Service Descriptor Table                    |
| SR     | Sender Report                               |
| TS     | Transport Stream                            |

### 3.3 Use of Words

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the specification and from which no deviation is permitted (*shall equals is required to*).

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*should equals is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the specification (*may equals is permitted to*).

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## 4 Mandatory Resources

A CI Plus LLP compliant device shall support the mandatory resources shown in Table 4.1:

**Table 4.1: Mandatory resources**

| Resource Name           | Identifier  | Class | Type | Version | Comment | Specification   |
|-------------------------|-------------|-------|------|---------|---------|-----------------|
| Resource Manager        | 00 01 00 41 | 1     | 1    | 1       |         | EN 50221 [15]   |
|                         | 00 01 00 42 | 1     | 1    | 2       |         | TS 101 699 [16] |
| Application Information | 00 02 00 41 | 2     | 1    | 1       |         | EN50221 [15]    |
|                         | 00 02 00 42 | 2     | 1    | 2       |         | TS 101 699 [16] |
|                         | 00 02 00 43 | 2     | 1    | 3       |         | CI Plus 1.3 [2] |

|                            |             |     |    |   |  |                 |
|----------------------------|-------------|-----|----|---|--|-----------------|
|                            | 00 02 00 45 | 2   | 1  | 5 |  | Bluebook A173-2 |
| Conditional Access Support | 00 03 00 41 | 3   | 1  | 1 |  | EN 50221 [15]   |
| Host Control               | 00 20 00 41 | 32  | 1  | 1 |  | EN 50221 [15]   |
|                            | 00 20 00 42 | 32  | 1  | 2 |  | CI Plus 1.3 [2] |
|                            | 00 20 00 43 | 32  | 1  | 3 |  | TS 103 205 [3]  |
| Date-Time                  | 00 24 00 41 | 36  | 1  | 1 |  | EN 50221 [15]   |
| MMI                        | 00 40 00 41 | 64  | 1  | 1 | High level only                          | EN 50221 [15]   |
| LSC                        | 00 60 18 01 | 96  | 96 | 1 | where Host IP support exists             | EN 50221 [15]   |
|                            | 00 60 18 02 | 96  | 96 | 2 | where Host IP support exists             | CI Plus 1.3 [2] |
|                            | 00 60 18 03 | 96  | 96 | 3 | where Host IP support exists             | CI Plus 1.3 [2] |
|                            | 00 60 18 04 | 96  | 96 | 4 | where Host IP support exists             | TS 103 205 [3]  |
| Content Control            | 00 8C 10 01 | 140 | 64 | 1 |  | CI Plus 1.3 [2] |
|                            | 00 8C 10 02 | 140 | 64 | 2 |  | CI Plus 1.3 [2] |
|                            | 00 8C 10 04 | 141 | 64 | 4 |  | Bluebook A173-2 |
| Host Lang & Country        | 00 8D 10 01 | 141 | 64 | 1 |  | CI Plus 1.3 [2] |
| CICAM Upgrade              | 00 8E 10 01 | 142 | 64 | 1 |  | CI Plus 1.3 [2] |
| Operator Profile           | 00 8F 10 01 | 143 | 64 | 1 |  | CI Plus 1.3 [2] |
|                            | 00 8F 10 02 | 143 | 64 | 2 |  | TS 103 205 [3]  |
| Application MMI            | 00 41 00 41 | 65  | 1  | 1 |  | TS 101 699 [16] |
|                            | 00 41 00 42 | 65  | 1  | 2 | Mandatory for CICAM<br>Optional for Host | CI Plus 1.3 [2] |

## 4.1 Operator Profile Version 2

The Host shall implement profile\_type=0 and profile\_type=1 defined in CI Plus 1.3 [2] clause 14.7.2 as well as profile\_type=2 defined in TS 103 205 [3] clause 15.2.

The installation of IP delivered services by use of the OSDT as defined in TS 103 205 [3] clause 15.4 is optional. However, when a Host implements installation of IP delivered services by use of the OSDT, it shall be available for both profile\_type 1 and 2.

The Host shall support the Virtual Channel as defined in TS 103 205 [3] clause 15.3 for both profile\_type 1 and 2.

The Host shall manage the Virtual Channel in a similar manner to other installed broadcast services. It is recommended that Hosts treat the Event Information associated with the Virtual Channel as if it were the event name in a short\_event\_descriptor(). The Host may ignore the service\_provider\_name of the cicam\_virtual\_channel\_descriptor().

The Host shall make the Virtual Channel as accessible as other services, including but not limited to:

- Direct LCN tune
- CH+ and CH- keys
- EPG
- Accessible from any interactive applications i.e. HbbTV/MHEG LCN tuning operation.

The CICAM Virtual Channel descriptor shall:

- Assign a valid service name to the Virtual Channel of between 1 and 14 characters
- Limit the event\_information\_length to 40 characters

The Host may ignore the declaration of the Virtual Channel when the `service_name_length` of the `cicam_virtual_channel_descriptor()` is set to zero.

When installing a profile with profile type 2, the CICAM may attempt to use any `logical_channel_number` (LCN), including zero. With profile\_type 2, the Host is not guaranteed to honour this LCN request and may re-negotiate with the CICAM for a new LCN.

## 4.2 Host Control Version 3

The Host shall interpret a `tune_triplet_req()` with a `service_id` of value 0x0000 as a tune operation to a multiplex with no service selection. The recommendations of CI Plus 1.3 [2] in Annex E.16.2 should be observed in this case. The CICAM shall only rely on the `tune_reply()` APDU for the confirmation that the tune has been done.

Support for `tune_ip_req()` is not mandatory; Hosts not supporting tuning to IP-delivered services shall return a `tune_reply()` with `status_field` set to 0x01 (unsupported delivery system descriptor) in reply to a `tune_ip_req()` APDU sent by the CICAM.

## 4.3 Low Speed Communication Version 4 for IP connection

The Low Speed Communication resource version 4 as defined in TS 103 205 [3] with device type 0x60 (IP connection) is mandatory for all Hosts that support an IP connection.

The Host shall support connection requests for LSC resource with device\_type 0x60 with the following connection descriptor types:

- IP\_descriptor
- Hostname\_descriptor

The Host may support connection requests with `IP_multicast_descriptor` for LSC resource with device\_type 0x60. If connections with `IP_multicast_descriptor()` are not supported the Host shall reply with a `comms_reply()` indicating the error.

The CICAM shall not use the following connection descriptors when sending a connection request for LSC resource with device\_type 0x60:

- telephone\_descriptor()
- hybrid\_descriptor()

If the CICAM sends a `comms_cmd()` APDU with a connection descriptor type that is not supported by the Host, the Host shall respond with a `comms_reply()` APDU with `comms_reply_id=Connect_Ack` and set the field `return_value` to 0xFE (Connection protocol not supported).

If the CICAM sends a `comms_info_req()` APDU for LSC resource with device type 0x60 the Host shall return a `comms_info_reply()` APDU with `status_field` set to 0b0. The CICAM shall not use this APDU to determine if a connection has succeeded, and should rather rely on the `comms_reply()` APDU.

The CICAM may send the `comms_IP_config_req()` APDU for LSC resource with device type 0x60 at any time; the Host shall respond with the `comms_IP_config_reply()` APDU.

## 4.4 High-Level MMI

The Host shall support the requirements for implementation of the High-Level MMI resource as defined in TS 103 205 [3] clause 16 with the following exceptions, which represent limits that are practically used in the field:

- Host shall be able to display a `menu()` object containing up to 50 items.
- Host shall be able to display a `list()` object containing up to 50 items.

The High-Level MMI shall have priority over any broadcast application where the CICAM is descrambling the service being presented, which may require the broadcast application to be terminated. Whenever the High-Level MMI is displayed by the Host, it shall have focus and be visible to the user.

## 4.5 Application MMI

### 4.5.1 CI Plus CI Plus Browser Extensions

Host support of the CI Plus Browser Extensions defined in clause 4.4 of TS 103 205 [3] is optional.

### 4.5.2 Application Life Cycle Management

The Host shall give priority to broadcast applications as defined in clause 12.4.4.2 of TS 103 205 [3]. Where the Host is unable to execute the CICAM AppMMI application then the Host shall respond to the RequestStart() APDU with a RequestStartAck() APDU with an AckCode value of 0x03 (API Busy) or refuse to open the session to Application MMI resource.

When the CICAM application is running, it shall not be interrupted until the application exits or the Application MMI session is closed, or specific user interaction takes place.

When a CICAM AppMMI application is running, if the Host terminates the application, then the AppAbortRequest() APDU shall be sent by the Host to inform the CICAM.

## 4.6 Content Control

A CI Plus compliant device shall support

- versions 1, 2 and 4 of the Content Control resource and the requirements of this chapter. Support of version 3 of the Content Control resource is not required.
- versions 0x01, 0x02 and 0x04 of the URI and may ignore other URI versions. The support of the URI version 3 is not required.

The CICAM shall not request a session to version 3 of the Content Control resource and shall not use the URI version 0x03.

Refer to the ILA [4] for compliance rules for the trick\_mode\_control\_info parameter of the URI.

### 4.6.1 Critical Security Update Version protocol

Table 4.7.1 shows the critical security update version protocol. The critical security update version parameter allows the Host to inform the CICAM that it is running a software version that includes a critical security update. The CICAM may use the Host's critical security update version as part of its revocation process.

**Table 4.7.1: critical security update version protocol**

| Step | Action   | APDU            | Content                |                    |                     |
|------|--|-----------------|------------------------|--------------------|---------------------|
| 1    | CICAM requests the Host critical security update version                             | cc_sac_data_req | request_datatype_nbr=1 |                    |                     |
|      |  |                 | <b>index</b>           | <b>datatype_id</b> |                     |
|      |  |                 | 0                      | 49 (csuv)          |                     |
| 2    | Host sends an acknowledgement with its critical security update version to the CICAM | cc_sac_data_cnf | send_datatype_nbr=1    |                    |                     |
|      |  |                 | <b>index</b>           | <b>datatype_id</b> | <b>datatype_len</b> |
|      |  |                 | 0                      | 49 (csuv)          | 8 bits              |

The CICAM may request the Host critical security update version at any time but shall wait for the acknowledgement from the Host before sending any further critical security update version protocol message. The Host shall implement the critical security update version protocol.

The critical security update version is maintained by the Host, the version starts at 0x00 and shall only be incremented when the hardware or software is modified such that it improves or fixes a security or non-conformance issue. The Host shall not use the version value of 0xFF.

There is no requirement to increment critical security update version for every software update.

A CICAM shall not request the critical security update version in Content Control versions 1 or 2 for resource\_type 64.

## 4.6.2 SRM file transmission for DTCP

The Host shall support the SRM delivery protocol for DTCP as defined in clause 5.13 of CI Plus 1.3 [2].

## 4.6.3 Transport stream output protection

A CI Plus compliant device shall support the AES-128-CBC scrambler option as defined in clause 5.6.2.1 of CI Plus 1.3 [2]. The DES-56-ECB scrambler option is not required for a CI Plus compliant device, implementation is optional.

The scrambler capabilities present in each device certificate shall be interpreted according to table 4.7.3

**Table 4.7.3: scrambler capabilities**

| Value      | Meaning                 |
|------------|-------------------------|
| 0          | Forbidden (note 1)      |
| 1          | AES                     |
| all others | reserved for future use |

**Note 1:** DES only scrambler capability is not allowed for new device registrations and has never been deployed in the market.

## 4.7 Application Information

A CI Plus compliant device shall support the version 1, 2, 3 and 5 of the Application Information resource. The support of the version 4 of the Application Information resource is not required. The CICAM shall not request a session to version 4 of the Application Information resource.

# 5 Optional Functionalities

## 5.1 Multi-Stream

Support of multi-stream functionality as described in clause 6 of TS 103 205 [3] is optional for both Host and CICAM devices. Multi-stream capable devices shall meet the requirements of the current chapter and clause 6 of TS 103 205 [3].

### 5.1.1 Additional mandatory resources for multi-stream

A CI Plus LLP compliant device supporting the multi-stream functionality shall support the additional mandatory resources shown in Table 5.1.1:

**Table 5.1.1: Mandatory resources for Multi-stream**

| Resource Name              | Identifier  | Class | Type | Version | Specification       |
|----------------------------|-------------|-------|------|---------|---------------------|
| Conditional Access Support | 00 03 00 81 | 3     | 2    | 1       | TS 103 205 [3]      |
| Host Control               | 00 20 00 81 | 32    | 2    | 1       | TS 103 205 [3]      |
| MMI                        | 00 40 00 81 | 64    | 2    | 1       | TS 103 205 [3]      |
| Content Control            | 00 8C 10 42 | 140   | 65   | 2       | Bluebook A173-2 [3] |
| Application MMI            | 00 41 00 81 | 65    | 2    | 1       | TS 103 205 [3]      |
| Multi-stream               | 00 90 00 41 | 144   | 1    | 1       | TS 103 205 [3]      |

The requirements of chapter 4 for single-stream resources are applicable to the corresponding multi-stream resources of this chapter.

### 5.1.2 Resource advertisement

A Host shall advertise in the profile\_reply() APDU the resources as listed in table 4.1 and table 5.1.1. The Host may advertise the resources in any order and the CICAM shall not make any assumptions on the ordering of the resource identifiers in the profile\_reply().

Where the Host advertises some but not all of the resources listed in table 5.1.1, the CICAM shall not open a session to the multi-stream resource and it shall restrict to the single stream versions of the resources.

### 5.1.3 Diversification of CCK computation

When operating in multi-stream mode, the Host and the CICAM shall compute a CCK for each Local TS, identified by its LTS\_id, and use the function  $f_{CC}(Kp, LTS\_id)$  as defined in the CI Plus Licensee Specification [1].

### 5.1.4 Application MMI

The Host shall implement the Application MMI resource with resource\_type 2 and version 1 with the following restrictions:

- The Host may ignore the Application Domain Query (ADQ) option.
- The Host may not implement the caching mechanism.

A CICAM shall implement the caching mechanism and shall not include the ADQ option in the RequestStart() APDU.

### 5.1.5 Allocation of LTS\_id

A Host shall not allocate LTS\_id 0x00 or 0xFF.

### 5.1.6 PID selection

A Host implementing multi-stream should include a sufficient number of PID filters to allow the smooth operation of the CICAM. In addition to the set of PIDs that the Host shall select for a LTS\_id, as described in clause 6.3.2 and 6.3.3 of TS 103 205, it is recommended that the Host provisions for at least 8 additional PIDs filters per LTS\_id to be selected by the CICAM with the PID\_select\_req() APDU.

Below is a typical selection of PIDs filtering:

- 1 for the CAT (EMM)
- 1 for the PAT (TS changes, PMTs)
- 1 for Current PMT (Availability of the whole PMT)
- 1 for TS scan (Channel change time improvement)
- 1 for SDT, BAT (Parental Control, CICAM Upgrade, revocation)
- 1 for NIT (CICAM Upgrade, revocation)
- 1 for EIT (Parental Control)
- 1 for TOT, TDT (Date and time for authentication)
- 1 for carousel download (CICAM Upgrade, revocation)

### 5.1.7 Content Control

A CI Plus compliant device shall support:

- resource\_type 65 and version 2. The support of the Content Control resource with resource\_type 65 and version 1 is not required.
- Versions 0x01, 0x02 and 0x04 of the URI and may ignore other URI versions. The support of the URI version 3 is not required
- Output control protocol as defined in Bluebook A173-2 [5]
- Critical Security Update Version protocol as defined in clause 4.7.1
- SRM file transmission protocol for DTCP as defined in clause 4.7.2

The CICAM shall not request a session to resource\_type 65 and version 1 of the Content Control resource and shall not use the URI version 0x03.

## 5.1.8 Host Control

The Host shall implement the Host Control resource with resource\_type 2 and version 1 with the restrictions as defined in clause 4.2.

## 5.1.9 High-Level MMI

The Host shall implement the High-level MMI resource with resource\_type 2 and version 1 with the requirements as defined in clause 4.4.

## 5.1.10 Application MMI

The Host shall implement the application MMI resource with resource\_type 2 and version 1 with the requirements as defined in clause 4.6.

# 5.2 CICAM Player Mode

Support of the CICAM Player Mode is optional for both Host and CICAM devices. CICAM Player Mode capable devices shall meet the requirements of clauses 8 and 10 of TS 103 205 [3] and the requirements of this chapter.

## 5.2.1 Additional Mandatory resources

A CI Plus LLP compliant device supporting the CICAM Player functionality shall support the additional mandatory resources shown in Table 5.2.1:

**Table 5.2.1: Mandatory resources for CICAM Player Mode**

| Resource Name | Identifier  | Class | Type | Version | Specification  |
|---------------|-------------|-------|------|---------|----------------|
| CICAM Player  | 00 93 00 41 | 147   | 1    | 1       | TS 103 205 [3] |
| LSC           | 00 60 1C 04 | 96    | 112  | 4       | TS 103 205 [3] |

## 5.2.2 Low Speed Communication Version 4 for Hybrid connection

The Low Speed Communication resource version 4 as defined in TS 103 205 [3] with device type 0x70 (Hybrid connection) is mandatory for a Host that is CICAM Player capable.

The Host shall support connection requests for LSC resource with device\_type 0x70 with the following connection descriptor types:

- IP\_descriptor
- Hostname\_descriptor
- IP\_multicast\_descriptor

It is recommended that the Host minimally supports 12 concurrent LSC sessions, with device types 0x60 or 0x70. The allocation of those 12 sessions with device\_type 0x60 or 0x70 is determined by the CICAM. A representative system using the CICAM player mode is described in Annex B, showing a possible allocation of concurrent LSC sessions with different device types.

## 5.2.3 Access from Virtual Channel

When the Virtual Channel is accessed, a Host that is CICAM Player capable shall allow the CICAM to initiate a play session with CICAM\_player\_start\_req() APDU.

# 5.3 Host Player Mode

Support of the Host Player Mode is optional for both Host and CICAM devices. Host Player Mode capable devices shall meet the requirements of clause 7 of TS 103 205 [3] and the requirements of this chapter.

### 5.3.1 Additional Mandatory resources

A CI Plus LLP compliant device supporting the Host Player functionality shall support the additional mandatory resources shown in Table 5.3.1:

**Table 5.3.1: Mandatory resources for Host Player Mode**

| Resource Name     | Identifier  | Class | Type | Version | Specification  |
|-------------------|-------------|-------|------|---------|----------------|
| Sample Decryption | 00 92 00 41 | 146   | 1    | 1       | TS 103 205 [3] |

### 5.3.2 Formats and protocols

A Host shall minimally support ISOBMFF [7] or DVB-DASH [6] with the following minimum requirements:

- Support of AVC\_SD\_25 video format as defined in OIPF “Media Formats” [14] clause 5.1.2.1
- Support of HEAAC audio format as defined in OIPF “Media Formats” [14] clause 8.1.1
- Support of video bitrate of at least 1 Mbps

## 5.4 CICAM AppMMI HbbTV Application

Support for execution of a CICAM AppMMI HbbTV Application is optional for both Host and CICAM devices.

### 5.4.1 Additional Mandatory resources

A CI Plus LLP compliant device supporting the execution of a CICAM AppMMI HbbTV Application shall support the additional mandatory resources shown in Table 5.4.1:

**Table 5.4.1: Mandatory resources for CICAM AppMMI HbbTV Application**

| Resource Name         | Identifier  | Class | Type | Version | Specification  |
|-----------------------|-------------|-------|------|---------|----------------|
| Auxiliary File System | 00 91 00 41 | 145   | 1    | 1       | TS 103 205 [3] |

### 5.4.2 Application Domain and InitialObject

When the CICAM requests the launching of an HbbTV Application resident in the CICAM by use of the Application MMI resource, the CICAM shall use the Application MMI resource RequestStart() APDU with:

- The AppDomainIdentifier set to “HbbTVEngineProfile1”.
- The InitialObject shall be a text string containing a URL of the path of an XML AIT from the CICAM File System advertised with the Auxiliary File System resource.

The XML AIT file shall be as defined in clause 5.4 of TS 102 809 [12].

The URL schemes for the HbbTV Application accessing files are as defined in the clause 9.2 of HbbTV Specification [11].

The CICAM shall offer the file system by use of the Auxiliary File System resource FileSystemOffer() APDU with the DomainIdentifier set to “HbbTVEngineProfile1” as defined in clause 11.4.3 of HbbTV Specification [11].

The semantic of table 7 of HbbTV Specification [11] shall apply except that the applicationTransport field in the XML AIT shall be either HTTPtransportType (as defined in table 7 of HbbTV Specification [11]) or CITransportType (as defined in clause 12.4.3.3.3 of TS 103 205 [3]).

The XML file shall contain an application discovery record containing one or more <application> elements, all with the same orgId and appld values but with different application types.

The application launched by this method shall be broadcast independent.

The application launched by this method shall be considered as a CICAM AppMMI application and the requirements of the clause 4.5.2 are then applicable for its life cycle.

In case of multiple CICAMs in a Host, the Host should use the Auxiliary File System resource of the CICAM that started the HbbTV application.

## Annex A (normative): Parameters exchanged in APDUs

| datatype_id | Key or variable     | No. of bits | Description   | Defined in      |
|-------------|---------------------|-------------|---|-----------------|
| 0           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 1           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 2           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 3           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 4           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 5           | HOST_ID             | 64          | Generated by the ROT and included in the X.509 certificate.   | CI Plus 1.3 [2] |
| 6           | CICAM_ID            | 64          | Generated by the ROT and included in the X.509 certificate  | CI Plus 1.3 [2] |
| 7           | Host_BrandCert      | variable    | Host Brand Certificate  | CI Plus 1.3 [2] |
| 8           | CICAM_BrandCert     | variable    | CICAM Brand Certificate   | CI Plus 1.3 [2] |
| 9           |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 10          |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 11          |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 12          | Kp                  | 256         | CICAM's key precursor to Host for CCK   | CI Plus 1.3 [2] |
| 13          | DHPH                | 2048        | DH Public Key of the Host   | CI Plus 1.3 [2] |
| 14          | DHPM                | 2048        | DH Public Key of the CICAM  | CI Plus 1.3 [2] |
| 15          | Host_DevCert        | variable    | Host Device Certificate Data  | CI Plus 1.3 [2] |
| 16          | CICAM_DevCert       | variable    | CICAM Device Certificate Data   | CI Plus 1.3 [2] |
| 17          | Signature_A         | 2048        | The signature of Host DH public key   | CI Plus 1.3 [2] |
| 18          | Signature_B         | 2048        | The signature of CICAM DH public key  | CI Plus 1.3 [2] |
| 19          | auth_nonce          | 256         | Random nonce of 256 bits generated by the CICAM and transmitted by the CICAM to the Host for use in the authentication protocol | CI Plus 1.3 [2] |
| 20          | Ns_Host             | 64          | Host's challenge to CICAM for SAC   | CI Plus 1.3 [2] |
| 21          | Ns_CICAM            | 64          | CICAM's challenge to Host for SAC   | CI Plus 1.3 [2] |
| 22          | AKH                 | 256         | Authentication Key Host   | CI Plus 1.3 [2] |
| 23          | AKM                 | 256         | Authentication Key Module/CICAM   | CI Plus 1.3 [2] |
| 24          |                     |             | Reserved for future use   | CI Plus 1.3 [2] |
| 25          | uri_message         | 64          | Data message carrying the Usage Rules Information   | CI Plus 1.3 [2] |
| 26          | program_number      | 16          | MPEG program number   | CI Plus 1.3 [2] |
| 27          | uri_confirm         | 256         | Hash on the data confirmed by the Host  | CI Plus 1.3 [2] |
| 28          | key_register        | 8           | Selection of the odd (1) or even (0) key register in the descrambler  | CI Plus 1.3 [2] |
| 29          | uri_versions        | 256         | Bitmask expressing the URI versions that can be supported by the Host. Format is 'uimbsf'                                       | CI Plus 1.3 [2] |
| 30          | status_field        | 8           | Status field in APDU confirm messages   | CI Plus 1.3 [2] |
| 31          | srm_data            | variable    | SRM for HDCP (note 1)   | CI Plus 1.3 [2] |
| 32          | srm_confirm         | 256         | Hash on the data confirmed by the Host  | CI Plus 1.3 [2] |
| 33          | cicam_license       | variable    | Licence from CICAM associated with content (note 2)   | CI Plus 1.3 [2] |
| 34          | license_status      | 8           | Current status of the content licence   | CI Plus 1.3 [2] |
| 35          | license_rcvd_status | 8           | Status from the exchange of content licence   | CI Plus 1.3 [2] |
| 36          | Host_license        | variable    | Licence for which the Host requires current status. (note 2)  | CI Plus 1.3 [2] |
| 37          | play_count          | 8           | Remaining Play Count  | CI Plus 1.3 [2] |
| 38          | operating_mode      | 8           | Record operating mode   | CI Plus 1.3 [2] |
| 39          | PINcode_data        | variable    | CICAM PIN code one byte for each pin code digit   | CI Plus 1.3 [2] |
| 40          | record_start_status | 8           | CICAM status after a record_start protocol  | CI Plus 1.3 [2] |
| 41          | mode_change_status  | 8           | CICAM status after a change operating mode protocol   | CI Plus 1.3 [2] |
| 42          | record_stop_status  | 8           | CICAM status after a record_stop protocol   | CI Plus 1.3 [2] |
| 43          | srm_data_dtcp       | variable    | SRM for DTCP (see note 3)   | CI Plus 1.3 [2] |
| 44          |                     |             | Reserved for future use   |                 |
| 45          |                     |             | Reserved for future use   |                 |
| 46          |                     |             | Reserved for future use   |                 |
| 47          |                     |             | Reserved for future use   |                 |
| 48          |                     |             | Reserved for future use   |                 |
| 49          | csuv                | 8           | Critical Security Update Version (see note 4)   | Clause 4.9.1    |

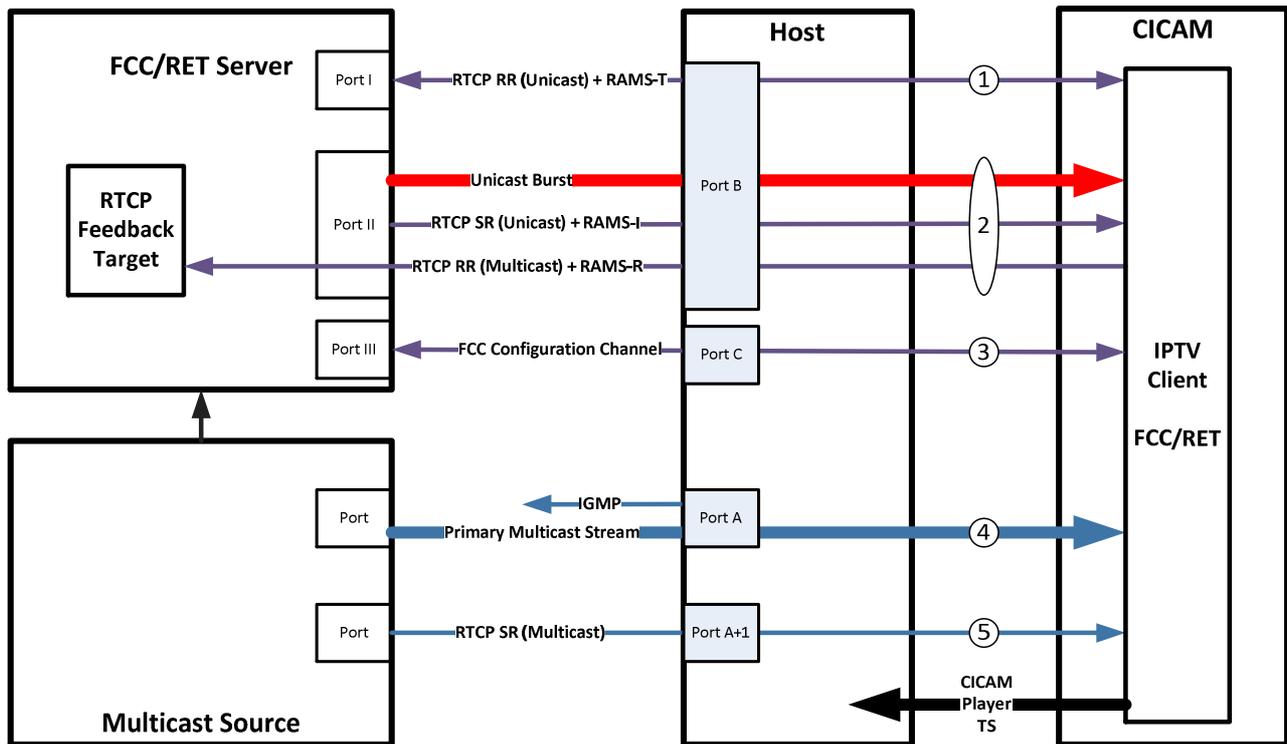
| <b>datatype_id</b>   | <b>Key or variable</b> | <b>No. of bits</b> | <b>Description</b>   | <b>Defined in</b>  |
|--|------------------------|--------------------|--|--------------------|
| 50   | LTS_id                 | 8                  | Local Transport Stream identifier  | TS 103 205[3]      |
| 51   | output_num             | 8                  | number of additional, simultaneous outputs of CI Plus controlled content to client devices | Bluebook A173-2[5] |
| 52 to 255  |                        |                    | Reserved for future use  |                    |
| <p>NOTE 1: SRMs for HDCP are defined in the HDCP specification [8] and [9]. First generation SRMs do not exceed 5 kilobytes.</p> <p>NOTE 2: Licenses are not zero length, and are padded to the next byte boundary. Licenses are no larger than 1024 bytes.</p> <p>NOTE 3: SRMs for DTCP are defined in the DTCP specification [10]. First generation SRMs do not exceed 5 kilobytes.</p> <p>NOTE 4: This definition replaces the reservation for SRM from CI Plus 1.3 [2]</p> |                        |                    |  |                    |

## Annex B (Informative): DVB-IPTV FCC/RET in the CICAM

This annex describes a typical usage of the LSC resources where the CAM uses the CICAM Player Mode to implement an IPTV client supporting the FCC and RET.

The figure 1 depicts the implementation of a IPTV client with the support of FCC and RET in the CICAM, where the FCC Server is compliant with the definition of Annex I of DVB-IPTV [13]. The figure shows the involved LSC sessions and their corresponding device type is indicated in table B.1.

**Figure 1: LSC sessions for FCC use case**



**Table B.1: LSC sessions for FCC use case**

| LSC Session | Device Type              | Purpose   |
|-------------|--------------------------|---|
| 1           | 0x60 (IP connection)     | Session for the RET request (of the unicast traffic) and FCC termination message  |
| 2           | 0x70 (Hybrid connection) | Session for RET request (of multicast) and FCC request. The reply consists of FCC information, RET sender reports and the unicast burst (and RET packets) |
| 3           | 0x60 (IP connection)     | Session for the Management Channel for configuration of the FCC client  |
| 4           | 0x70 (Hybrid connection) | Multicast session – initiated by an IGMP request  |
| 5           | 0x60 (IP connection)     | Multicast session for FCC reporting channel   |

Some further LSC sessions may be necessary for the purposes as described in the table B.2:

**Table B.2: LSC sessions for further usage**

| <b>LSC Session</b> | <b>Device Type</b>       | <b>Purpose</b>   |
|--------------------|--------------------------|--|
| 6                  | 0x70 (Hybrid connection) | Multicast session for audio – initiated by an IGMP request |
| 7, 8               | 0x60 (IP connection)     | x2sessions for the CAS/DRM traffic                         |
| 9                  | 0x60 (IP connection)     | Session for the quality monitoring traffic                 |
| 10,11              | 0x60 (IP connection)     | x2 sessions for authentication                             |

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## History

| Document history |             |   |
|------------------|-------------|---|
| Version          | Date        | Description   |
| 1.4              | 29-Jun-2015 | Publication for comments  |
| 1.4.1            | 20-Nov-2015 | Update of reference [3] from DVB Bluebook A165 to ETSI TS 103 205<br>Typos error correction<br>Clarification on handling of multiple CICAMs with Auxiliary File System resource |