IEC 63246-2

Edition 1.0   2022-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Configurable car infotainment services (CCIS) –
Part 2: Requirements

Services d'infodivertissements configurables pour les véhicules (CCIS) –
Partie 2: Exigences

IEC 63246-2:2022-01(en-fr)

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CONFIGURABLE CAR INFOTAINMENT SERVICES (CCIS) –

Part 2: Requirements

FOREWORD

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IEC 63246-2 has been prepared by technical area 17: Multimedia systems and equipment for vehicles, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
100/3508/CDV	100/3627/RVC

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

The language used for the development of this International Standard is English.

A list of all parts in the IEC 63246 series, published under the general title *Configurable car infotainment services (CCIS)*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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- replaced by a revised edition, or
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INTRODUCTION

The market for car infotainment services (also known as "in-vehicle infotainment systems") has been growing rapidly, as reflected by the growth of the associated industries. It is expected that a variety of car infotainment (or multimedia) devices and services will be developed in the future. Such devices include navigation, cameras, speakers, headrest displays, air-conditioners, thermometers, heated seats, and lights. It is also expected that some devices will be developed to provide 4-dimensional experiences for users.

Car infotainment systems typically include A/V features (such as standard radio and CD players), and two-way communications tools, as well as hands-free phone connections, vehicle voice commands, and other types of interactive audios or videos. Car infotainment systems have evolved to allow passengers to watch movies and other visual media (for example, DVD players installed on the rear seats). Another distinctive feature of future car infotainment systems is mobile device connectivity. Newer vehicles will provide a wide range of systems that allow devices (e.g. smartphones and laptops) to be connected to a variety of services embedded in the vehicle.

From this observation, there is a crucial need for standardization to provide car infotainment users with more enhanced services so as to easily manage and control infotainment devices as well as content within a car.

The purpose of the IEC 63246 series is to specify the general considerations, requirements, framework, and protocols to provide car users with the functionality of managing and controlling device and content resources within a car.

The IEC 63246 series consists of the following parts:

– Part 1: General;
– Part 2: Requirements;
– Part 3: Framework; and
– Part 4: Protocol.

IEC 63246-1 describes the general considerations of CCIS, which includes the CCIS system model and the types of CCIS users with the associated service flows.

IEC 63246-2 describes the requirements for CCIS, which include the CCIS functional entities, the communication model, and the functional requirements.

IEC 63246-3 describes the CCIS framework, which includes the information flows between functional entities and the CCIS operations, such as registration, device monitoring and control, and data transfer.

IEC 63246-4 describes the CCIS protocol, which includes the protocol messages and parameters, protocol procedures, implementation guidelines, etc.

CONFIGURABLE CAR INFOTAINMENT SERVICES (CCIS) –

Part 2: Requirements

1   Scope

This part of IEC 63246 specifies the CCIS requirements, which include the general, functional and service requirements for CCIS.

2   Normative references

The following document is referred to in the text in such a way that some or all of their content constitutes requirements 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 63246-1, *Configurable car infotainment services – Part 1: General*

3   Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63246-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

* IEC Electropedia: available at http://www.electropedia.org/
* ISO Online browsing platform: available at http://www.iso.org/obp

4   General requirements

4.1   General

Clause 4 describes the general requirements for CCIS. CCIS can provide a wide variety of services for CCIS users, with the help of a CCIS master and CCIS devices. CCIS shall be able to support multiple users and to control and monitor many infotainment devices.

In general, CCIS shall provide the following functionalities:

* user registration and deregistration;
* device registration;
* service provisioning as per the authority;
* device monitoring
* device control; and
* content delivery.

4.2   User registration and deregistration

CCIS provides the services for one or more users at the same time via the CCIS master. Each user shall have a different level of authority to access the devices. To effectively support many users, all users shall be registered and certified with the CCIS master. The profile of the public

client shall be temporarily stored in the CCIS master, whereas the profile of the car owner, the temporary owner, and the private client shall be stored long-term by the CCIS master.

CCIS users shall obtain authorization through the appropriate authentication process before accessing the CCIS devices. Such authentication or authority information shall be generated with a security index that is specific to the client. Once the clients have registered with the CCIS master and have been authorized, they can use the CCIS services with the security index.

4.3   Device registration and deregistration

CCIS should be able to support the dynamic addition and removal of CCIS devices to provide CCIS services. For this purpose, all devices shall be registered with the CCIS master. The registration process begins with the identification notification of a CCIS device to the CCIS master. The CCIS master shall maintain all profiles of CCIS devices.

4.4   Profile management

To provide enhanced CCIS services, all CCIS users/devices should be registered with the CCIS master. The CCIS master continues to keep and update the profile information of registered CCIS users/devices, and the profile information can be used to provide enhanced CCIS services, such as authorization check.

4.5   Service provisioning according to authority

The CCIS users are divided into the four types: car owner, temporary owner, private client, and public client. Each user has different level of authority for service usage. Car owners and temporary owners have a high level of authority for CCIS services, whereas private clients and public clients shall use a subset of CCIS services and they can need to obtain permission from car owners or temporary owners. When a CCIS user asks the CCIS master for a service, the CCIS master verifies the authority level of the client. If the CCIS user has the proper authority and the concerned device is available, the user can use the associated CCIS service.

4.6   Device monitoring

All CCIS devices shall be monitored by the CCIS master. The CCIS master shall be able to provide the CCIS users with the monitored information on the status of CCIS devices.

4.7   Device control

CCIS users can control the CCIS devices via the CCIS master. For example, car owners can change the status of a specific CCIS device by requesting the associated control to the CCIS master.

4.8   Content delivery

CCIS shall support the exchange of various audio and video contents among CCIS users, the CCIS master and CCIS devices. For example, CCIS users shall download or upload the multimedia contents from or to CCIS devices via the CCIS master. For this purpose, the CCIS user can request a metadata list of available contents from the CCIS master, such as file name, file size, type, creation date, modification date, and so on.

5   Functional requirements for functional entity

5.1   General

Clause 5 describes the functional requirements for CCIS entities, as summarized in Table 1.

Table 1 – CCIS functions required for CCIS entities

	CCIS user	CCIS device	CCIS master
Registration and deregistration	✓	✓	✓
Profile management		✓	✓
Service provisioning	✓	✓	✓
Device monitoring		✓	✓
Device control	✓	✓	✓
Content delivery	✓	✓	✓

5.2   CCIS user

5.2.1   General

CCIS users exploit a variety of CCIS services associated with the CCIS devices. CCIS users shall have a different level of authority for each service or device, depending on the type of CCIS user. CCIS users shall meet the following functional requirements:

- registration and deregistration;
- authentication and authorization;
- device control; and
- content delivery.

5.2.2   Registration and deregistration

To use the CCIS services, each CCIS user shall be registered with the CCIS master. For this purpose, the CCIS user shall deliver its own profile information to the CCIS master in the registration process. Such information shall include user type, user identifier, security index, and the authority level to services and devices.

Car owners and temporary owners shall be registered with the CCIS master in the initialization phase, before the CCIS service starts. In the meantime, private clients and public clients shall be registered with the CCIS master during the CCIS service phase, in which these clients shall be authenticated and authorised by the car owner or the temporary owner.

The profile information stored in the CCIS master may be kept permanently or temporarily. The profile information registered by the car owner is permanently stored, but the profile information registered by the temporary owner, the private client and the public client may be stored with a specific time limit.

The deregistration functionality of the CCIS users shall also be provided. Temporary owners and public clients have a specific expiration time. These users will be deregistered automatically after the specific time limit. Private clients registered by temporary owners shall be deregistered when the temporary owner is deregistered. In addition, the CCIS user performs the deregistration process explicitly by requesting the deletion of the associated information to the CCIS master.

5.2.3   Authentication and authorization

Authentication is performed for each user. Before using the CCIS service, the CCIS user shall receive an authentication key from the CCIS master through a certification procedure. This authentication key shall always be included in the request messages that are exchanged for CCIS services.

Car owners or temporary owners have the authority to allow private clients or public clients through the authentication and authorization process.

5.2.4 Device control

CCIS users can control CCIS devices via the CCIS master, according to their authority level. For this purpose, CCIS users shall ask the CCIS master for the list of CCIS devices available. Based on such information, the CCIS user shall issue the device control message.

5.2.5 Content delivery

CCIS users shall be able to perform the content delivery operation with CCIS devices via the CCIS master. For this purpose, CCIS users shall first get a profile list of available devices and services from the CCIS master. Each user will then upload or download the content data to or from the CCIS master or a specific CCIS device. All CCIS contents shall be transferred via the CCIS master.

5.3 CCIS device

5.3.1 General

All CCIS devices shall be registered and managed with the CCIS master in order to provide the service for CCIS users. Each device can be controlled by CCIS users via the CCIS master. Each CCIS device shall meet the following requirements:

- registration and deregistration with the CCIS master;
- status report to the CCIS master;
- interaction with the CCIS master for device control; and
- interaction with the CCIS master for content delivery.

5.3.2 Registration and deregistration

The CCIS device shall be registered with the CCIS master. In the registration process, the following information needs to be delivered to the CCIS master:

- device type (e.g. speaker, display);
- device features (e.g. shared by many clients, or dedicated to a specific client); and
- device parameters (to be controlled by clients).

5.3.3 Status report

For device monitoring, each CCIS device shall send its profile, such as status information, to the CCIS master. The profile information shall include the operational status of device (e.g. keep-aliveness) and the device-specific information (e.g. the volume of speakers). For this purpose, each CCIS device transmits periodic report messages to the CCIS master.

5.3.4 Interaction for device control

CCIS users can control CCIS devices via the CCIS master. When CCIS users request the CCIS master to control one or more CCIS devices, the CCIS master will send some messages for device control to the concerned CCIS devices. For this purpose, each CCIS device shall be able to interact with the CCIS master for such device control operations.

5.3.5 Interaction for content delivery

CCIS users can exchange multimedia contents with CCIS devices via the CCIS master. For content delivery, CCIS users request permission from the CCIS master to upload or download the associated contents to or from CCIS devices, and then the CCIS master interacts with the concerned CCIS devices for content delivery. For this purpose, each CCIS device shall be able to interact with the CCIS master for such content-delivery operations.

5.4   CCIS master

5.4.1   General

The CCIS master performs the overall management for CCIS users and devices. The CCIS master shall provide the following functionalities:

- registration of CCIS users;
- device registration and discovery;
- device control;
- device monitoring; and
- content delivery.

5.4.2   Registration of CCIS users

All CCIS users shall be registered with the CCIS master. In CCIS, it is assumed that car owners and temporary owners are registered with the CCIS master in the initialization process, before the CCIS services begin. On the other hand, private clients and public clients shall be registered with the CCIS master in the registration process, after CCIS services begin.

For registration, some messages will be exchanged between the CCIS master and the concerned clients. During the registration process, appropriated authentication and authorization operations shall be performed between CCIS clients and the CCIS master. The authentication and authorization of private clients and public clients shall need the permission of the car owner or the temporary owner.

5.4.3   Device registration

All CCIS devices shall be registered with the CCIS master. The CCIS master is responsible for the registration of CCIS devices. When a CCIS device is powered on and ready for communication, it shall perform the registration operation with the CCIS master. The CCIS devices shall be registered with the CCIS master through the device discovery operation. The CCIS master will initiate the registration process to discover the unregistered CCIS devices by sending a periodic advertisement message to the concerned CCIS devices. In this way, all CCIS devices shall be registered with the CCIS master with the help of device registration or a discovery process. In addition, the CCIS master shall be able to dynamically add new CCIS devices and remove unused CCIS devices.

5.4.4   Device control

The CCIS master should support CCIS users to control CCIS devices. For example, the profile of CCIS devices can be changed in the device control process. When a user wants to control a specific device, it shall send the device occupation and control request message to the CCIS master. Based on this request, the CCIS master shall perform the functional interaction with the concerned device and give feedback to the requesting client.

5.4.5   Device monitoring

The CCIS master shall be able to manage and monitor all CCIS devices so as to keep up-to-date information about all devices. For this purpose, the CCIS master shall exchange the associated messages with all CCIS devices periodically.

5.4.6   Content delivery

The CCIS master shall be able to support the content delivery operation between CCIS users and CCIS devices. All CCIS clients and devices shall perform the content delivery operation through the CCIS master. The CCIS master shall be able to relay the contents between CCIS users and CCIS devices.