



SLOVENSKI STANDARD
SIST ETS 300 777-2 E1:2003
01-december-2003

Terminalska oprema (TE) – Protokoli sistema konec-konec za multimedijske informacijske poiskavne storitve – 2. del: Uporaba ukaznih in krmilnih funkcij pri digitalnih pomnilnih nosilcih (DSM-CC) za osnovne multimedijske aplikacije

Terminal Equipment (TE); End-to-end protocols for multimedia information retrieval services; Part 2: Use of Digital Storage Media Command and Control (DSM-CC) for basic multimedia applications

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ICS:

33.160.60	Multimedia systems and teleconferencing equipment
35.180	Terminalska in druga periferna oprema IT IT Terminal and other peripheral equipment

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**Terminal Equipment (TE);
End-to-end protocols for multimedia information
retrieval services;
Part 2: Use of Digital Storage Media Command and Control
(DSM-CC) for basic multimedia applications**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee and later the Multimedia Terminals and Applications (MTA) Project of the European Telecommunications Standards Institute (ETSI).

This ETS consists of 4 parts as follows:

- Part 1: "Coding of multimedia and hypermedia information for basic multimedia applications (MHEG-5)";
- Part 2: "Use of Digital Storage Media Command and Control (DSM-CC) for basic multimedia applications";**
- Part 3: "Application Programmable Interface (API) for MHEG-5";
- Part 4: "Videotex Enhanced Man Machine Interface (VEMMI) enhancements to support broadband multimedia information retrieval services".

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1 Scope

This European Telecommunication Standard (ETS) specifies a profile of Digital Storage Media Command and Control (DSM-CC) for the use in basic multimedia applications. This ETS is applicable to Digital Audio Visual Council (DAVIC), version 1.2, compliant systems.

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] DAVIC 1.2 specifications.
- [2] ISO/IEC 13818-6 (1996): "Information technology; Generic coding of moving pictures and associated audio information; Part 6: Extensions for DSM-CC".
- [3] ISO/IEC 13522-5 (1997): "Information technology; Coding of multimedia and hypermedia information; Part 5: Support for base-level interactive applications".
- [4] ISO/IEC 13522-6 (1996): "Information technology; Coding of multimedia and hypermedia information; Part 6: Support for enhanced interactive applications".
- [5] ETS 300 777-1: "Terminal Equipment (TE); End-to-end protocols for multimedia information retrieval services; Part 1: Coding of multimedia and hypermedia information for basic multimedia applications (MHEG-5)".
- [6] ETS 300 777-3: "Terminal Equipment (TE); End-to-end protocols for multimedia information retrieval services; Part 3: Application Programmable Interface (API) for MHEG-5".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definition of the standards referenced below apply. Should any ambiguity occur, definitions of the following standards apply, in decreasing order:

- ISO/IEC 13818-6 (1996) [2];
- DAVIC 1.2 specifications [1].

Application Programmable Interface (API): A boundary across which a software application uses facilities of programming languages to invoke software services. These facilities may include procedures or operations, shared data objects and resolution of identifiers.

local application: A piece of software which is part of the (telecommunication) application and is running on the considered equipment.

3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

API	Application Programming Interface
ASN.1	Abstract Syntax Notation One
DAVIC	Digital Audio Visual Council
DSM-CC	Digital Storage Media Command and Control
MHEG	Multimedia and Hypermedia information coding Experts Group
SI	Service Information
STU	Set Top Unit
VM	Virtual Machine

4 Overview

This clause positions the API defined by this ETS in the framework of the DAVIC 1.2 specifications [1].

4.1 The DAVIC application interchange format

To deliver multimedia information to Set Top Units (STUs) in an interoperable way, applications shall use the Multimedia and Hypermedia information coding Experts Group (MHEG-5) final form interchange format, as defined by ISO/IEC 13522-5 [3]. The ASN.1 notation and encoding, as defined by ETS 300 777-1 [5], shall be used to interchange MHEG-5 objects. This format defines the semantics and the encoding of the multimedia and hypermedia objects.

To deliver program code to STUs in an interoperable way, applications shall use the MHEG-5 `InterchangedProgram` class to encapsulate Java (note) Virtual Machine (VM) code, according to the semantics and encoding defined by ISO/IEC 13522-6 [4]. Java VM classes are called from MHEG-5 objects using the MHEG-5 `Call` and `Fork` elementary actions.

NOTE: Java is a trademark of Sun Microsystems, Inc.

The Java VM code interchange unit is a Java VM class. Java VM classes shall be encoded as defined by the Class File Format section of the Java Virtual Machine specification. A Java class encapsulates data and methods that consist of sequences of instructions. The instruction set is defined by the Java Virtual Machine instruction set section of the Java Virtual Machine specification.

4.2 Core set of Java APIs

The following set of APIs are used by Java VM code in the DAVIC 1.2 specifications [1] to express access to basic functions of the STU in an interoperable way:

- the `java.lang` package;
- the `java.util` package;
- the `org.iso.mheg5` package;
- the `org.etsi.dsmccuu` package;
- the `org.etsi.dvbsi` package.

NOTE 1: The Java VM specification provides flexible mechanisms to call upon external functions whose interface is defined as a Java package. The DAVIC 1.2 specification [1] only includes a minimum core set of packages required for Java VM code to be useful in a DAVIC environment. It is anticipated that additional Java packages will be standardized at a later stage.

NOTE 2: Especially, the `java.io` package, although strictly speaking not necessary to the useful performance of the VM environment, is part of the Java foundation classes. It is intended that the `java.io` package be added to the DAVIC core set of Java APIs together with an adequate specification of its semantics in a DAVIC environment.

The `java.lang` package, as defined by the Java API documentation, consists of the minimal set of Java VM classes needed to run Java VM code, supporting the following functionality: basic data types, object, mathematic operations, security, thread management, string manipulation, exception handling.

The `java.util` package, as defined by the Java API documentation, consists of Java VM classes supporting a number of utility features common to all Java VM programs.

The `org.iso.mheg5` package, as defined by ETS 300 777-3 [6], provides Java VM code with access to and manipulation of the MHEG-5 multimedia presentation and interaction objects, i.e. access to the dynamic attributes of MHEG-5 objects and invocation of elementary actions on MHEG-5 objects.

The `org.etsi.dsmccuu` package enables Java VM code to use the DSM-CC User-to-User (U-U) interface objects for network data access. It gives access to the Core Consumer Client Application Portability Interface as defined by ISO/IEC 13818-6 [2].

The `org.etsi.dvbsi` package enables Java VM code to access information transmitted in the DAVIC Service Information (SI) stream.

5 Package `org.etsi.dsmccuu`

5.1 Class `NameComponent`

```
/**
 * This class represents a name component composed of an id and a kind
 */
package org.davic.net.dsmcc.uu;

public class NameComponent{

public java.lang.String id;

public java.lang.String kind;
}
```

5.2 Class `Binding`

```
/**
 * This class represents a binding composed of a name and a type
 */
package org.davic.net.dsmcc.uu;

public class Binding{

/**
 * Possible values for the binding type
 */
public static final byte OBJECT = 0;
public static final byte NAMING_CONTEXT = 1;

public NameComponent[] name;

public int type;
}
```

5.3 Exception `NOT_FOUND`

```
/**
 * This exception is thrown when a logical path name does not exist
 */
package org.davic.net.dsmcc.uu;

public class NOT_FOUND
    extends
        java.lang.Exception{

/**
 * Possible values for the exception reason
 */
public static final byte MISSING_NODE = 0;
```

```
public static final byte NOT_A_NAMING_CONTEXT = 1;
public static final byte NOT_AN_OBJECT = 2;
```

```
public byte why;
```

```
public NameComponent[] restOfName;
}
```

5.4 Exception CANNOT_PROCEED

```
/**
This exception is thrown when a Directory does not have permission to resolve
a node in a path name
The caller may attempt to perform the resolve directly at the returned
Directory
*/
package org.davic.net.dsmcc.uu;
```

```
public class CANNOT_PROCEED
    extends
        java.lang.Exception{

public Directory directory;

public NameComponent[] restOfName;
}
```

5.5 Exception INV_NAME

```
/**
This exception is thrown when a path name is incorrectly formatted
*/
package org.davic.net.dsmcc.uu;
```

```
public class INV_NAME
    extends
        java.lang.Exception{
}
```

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5.6 Exception SERVICE_XFR

```
/**
This exception is thrown when a resolve operation was unsuccessful and
provides an alternate Service Domain when the requested Service can be
resolved
*/
package org.davic.net.dsmcc.uu;
```

```
public class SERVICE_XFR
    extends
        java.lang.Exception{

public byte[] serviceDomain;

public NameComponent[] pathName;

public byte[] initialContext;
}
```