

# FINAL VERSION

## VERSION FINALE

**Cable networks for television signals, sound signals and interactive services –  
Part 7-1: Hybrid Fibre Coax Outside Plant status monitoring – Physical (PHY)  
layer specification**

**Réseaux de distribution par câbles pour signaux de télévision, signaux de  
radiodiffusion sonore et services interactifs –  
Partie 7-1: Surveillance de l'état des installations extérieures des réseaux  
hybrides à fibre optique et câble coaxial – Spécification de la couche  
physique (PHY)**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CABLE NETWORKS FOR TELEVISION SIGNALS,  
SOUND SIGNALS AND INTERACTIVE SERVICES –**

**Part 7-1: Hybrid Fibre Coax Outside Plant status monitoring –  
Physical (PHY) layer specification**

FOREWORD

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**This Consolidated version of IEC 60728-7-1 bears the edition number 1.1. It consists of the first edition (2003-10) [documents 100/576/CDV and 100/683/RVC] and its amendment 1 (2015-04) [documents 100/2417/FDIS and 100/2481/RVD]. The technical content is identical to the base edition and its amendment.**

**This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.**

International Standard IEC 60728-7-1 has been prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The following differences exist in some countries:

The Japanese *de facto* standard (NCTEA S-006) concerning requirements for the HFC outside plant management, which was published in 1995, has already been available in Japan. The purpose of this standard is to support the design and implementation of interoperable management systems for HFC cable networks used in Japan. (see Table 4)

## INTRODUCTION

Standards and other deliverables of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television and sound signals and for processing, interfacing and transmitting all kinds of data signals for interactive services using all applicable transmission media. These signals are typically transmitted in networks by frequency-multiplexing techniques.

This includes for instance

- regional and local broadband cable networks,
- extended satellite and terrestrial television distribution systems,
- individual satellite and terrestrial television receiving systems,

and all kinds of equipment, systems and installations used in such cable networks, distribution and receiving systems.

The extent of this standardization work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input of the customer premises equipment.

The standardization work will consider coexistence with users of the RF spectrum in wired and wireless transmission systems.

The standardization of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals, etc.) as well as of any coaxial and optical cables and accessories thereof is excluded.

## CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

### Part 7-1: Hybrid Fibre Coax Outside Plant status monitoring – Physical (PHY) layer specification

#### 1 Scope

This part of IEC 60728 specifies requirements for The Hybrid Fibre Coax (HFC) Outside Plant (OSP) Physical (PHY) Layer Specification and is part of the series of specifications developed by the Hybrid Management Sub-Layer (HMS) subcommittee under the SCTE. The purpose of the HMS specification is to support the design and implementation of interoperable management systems for evolving HFC cable networks. The HMS Physical (PHY) Layer Specification describes the physical layer portion of the protocol stack used for communication between HMS-compliant transponders interfacing to managed outside plant network elements (NE) and a centralized head-end element (HE).

This standard describes the PHY layer requirements that must be implemented by all *Type 2* and *Type 3* compliant OSP HMS transponders on the HFC plant and the controlling equipment in the head-end. Any exceptions to compliance with this standard will be specifically noted herein as necessary. Refer to Table 1 for a full definition of the type classifications.

Electromagnetic Compatibility (EMC) is not specified in this standard and is left to the vendor to ensure compliance with local EMC regulatory requirements. Other than operating temperature, physical parameters such as shock, vibration, humidity, etc., are also not specified and left to the vendor's discretion.

Transponder type classifications referenced within the HMS series of standards are defined in Table 1.

**Table 1 – Transponder type classifications**

Type	Description	Application
Type 0	Refers to legacy transponder equipment, which is incapable of supporting the HMS specifications	This transponder interfaces with legacy network equipment through proprietary means.  This transponder could be managed through the same management applications as the other types through proxies or other means at the head-end
Type 1	Refers to stand-alone transponder equipment (legacy or new) which can be upgraded to support the HMS specifications	This transponder interfaces with legacy network equipment through proprietary means.  Type 1 is a standards-compliant transponder (either manufactured to the standard or upgraded) that connects to legacy network equipment via a proprietary interface
Type 2	Refers to a stand-alone, HMS-compliant transponder	This transponder interfaces with network equipment designed to support the electrical and physical specifications defined in the HMS standards.  It can be factory or field-installed.  Its RF connection is independent of the monitored NE
Type 3	Refers to a stand-alone or embedded, HMS-compliant transponder	This transponder interfaces with network equipment designed to support the electrical specifications defined in the HMS standards.  It may or may not support the physical specifications defined in the HMS standards.  It can be factory-installed. It may or may not be field-installed.  Its RF connection is through the monitored NE