

# **SCTE** | **STANDARDS**

---

**Data Standards Subcommittee**

---

**AMERICAN NATIONAL STANDARD**

**ANSI/SCTE 262-1 2020**

**DOCSIS 4.0 Part 1: Physical Layer Specification**

## NOTICE

The Society of Cable Telecommunications Engineers (SCTE) Standards and Operational Practices (hereafter called “documents”) are intended to serve the public interest by providing specifications, test methods and procedures that promote uniformity of product, interoperability, interchangeability, best practices, and the long term reliability of broadband communications facilities. These documents shall not in any way preclude any member or non-member of SCTE from manufacturing or selling products not conforming to such documents, nor shall the existence of such standards preclude their voluntary use by those other than SCTE members.

SCTE assumes no obligations or liability whatsoever to any party who may adopt the documents. Such adopting party assumes all risks associated with adoption of these documents and accepts full responsibility for any damage and/or claims arising from the adoption of such documents.

NOTE: The user’s attention is called to the possibility that compliance with this document may require the use of an invention covered by patent rights. By publication of this document, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer. SCTE shall not be responsible for identifying patents for which a license may be required or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Patent holders who believe that they hold patents which are essential to the implementation of this document have been requested to provide information about those patents and any related licensing terms and conditions. Any such declarations made before or after publication of this document are available on the SCTE web site at <https://scte.org>.

All Rights Reserved  
© 2022 Society of Cable Telecommunications Engineers, Inc.  
140 Philips Road  
Exton, PA 19341

# Table of Contents

<b>Title</b>	<b>Page Number</b>
NOTICE.....	2
Table of Contents.....	3
1. Introduction.....	4
1.1. Executive Summary.....	4
1.2. Scope.....	4
2. Normative References.....	5
2.1. SCTE References.....	5
2.2. Standards from Other Organizations.....	5
2.3. Published Materials.....	5
3. Informative References.....	5
3.1. SCTE References.....	5
3.2. Standards from Other Organizations.....	5
3.3. Published Materials.....	5
4. Compliance Notation.....	6
5. Abbreviations and Definitions.....	6
5.1. Abbreviations.....	6
5.2. Definitions.....	6
6. Endorsement Notice.....	6

## 1. Introduction

### 1.1. Executive Summary

The present document provides the SCTE endorsement of CableLabs specification: CM-SP-PHYv4.0-I02-200429.

### 1.2. Scope

This generation of the DOCSIS®<sup>1</sup> specifications builds upon the previous generations of DOCSIS specifications (commonly referred to as the DOCSIS 3.1 and earlier specifications), leveraging the existing Media Access Control (MAC) and Physical (PHY) layers. It includes backward compatibility for the existing PHY layers in order to enable a seamless migration to the new technology. Further, the DOCSIS 4.0 specifications introduces Full Duplex (FDX) DOCSIS PHY layer technology as an expansion of the OFDM PHY layer introduced in the DOCSIS 3.1 PHY specification to increase upstream capacity without significant loss of downstream capacity versus DOCSIS 3.1. The DOCSIS 4.0 specification also builds upon DOCSIS 3.1 OFDM and OFDMA technology with an extended Frequency Division Duplex (FDD) DOCSIS alternative. DOCSIS 4.0 FDD supports legacy high split and also provides extended splits up to 684 MHz in an operational band plan which is referred to as Ultra-high Split (UHS). DOCSIS 4.0 FDD also introduces expansion of usable downstream spectrum up to 1794 MHz. Both the FDX and FDD DOCSIS 4.0 alternatives are based on OFDM PHY. Many sections refer to basic OFDM sublayer definitions described in [DOCSIS PHYv3.1].

There are differences in the cable spectrum planning practices adopted for different networks in the world. For the PHY layer defined in this specification, there is flexibility to deploy the technology in any spectrum plan; therefore, no special accommodation for different regions of the world is required for this new PHY layer.

However, due to the inclusion of the DOCSIS 3.0 PHY layers for backward-compatibility purposes, there is still a need for different region-specific physical layer technologies. Therefore, three options for physical layer technologies are included in this specification, which have equal priority and are not required to be interoperable. One technology option is based on the downstream channel identification plan that is deployed in North America using 6 MHz spacing. The second technology option is based on the corresponding European multi-program television distribution. The third technology option is based on the corresponding Chinese multi-program television distribution. All three options have the same status, notwithstanding that the document structure does not reflect this equal priority. The first of these options is defined in Sections 5 and 6, whereas the second is defined by replacing the content of those sections with the content of Annex C of [DOCSIS PHYv3.1]. The third is defined by replacing the content of those sections with the content of Annex D of [DOCSIS PHYv3.1]. Correspondingly, [ITU-T J.83-B] and [CTA 542] apply only to the first option, and [EN 300 429] applies to the second and third. Compliance with this document requires compliance with one of these implementations, but not with all three. It is not required that equipment built to one option interoperate with equipment built to the others.

Compliance with frequency planning and EMC requirements is not covered by this specification and remains the operators' responsibility. In this respect, [FCC15] and [FCC76] are relevant to the USA; [CAN/CSA CISPR 22-10] and [ICES 003 Class A] to Canada; [EG 201 212], [EN 50083-1], [EN 50083-2], [EN 50083-7], [EN 61000-6-1], and [EN 61000-6-3] are relevant to the European Union; [GB 8898-2011] and [GB/T 11318.1-1996] are relevant to China.

---

<sup>1</sup> DOCSIS® is a registered trademark of Cable Television Laboratories, Inc

See also [DOCSIS PHYv3.1] section 1.1.

## **2. Normative References**

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

### **2.1. SCTE References**

- No normative references are applicable.

### **2.2. Standards from Other Organizations**

[1] Physical Layer Specification, CM-SP-PHYv4.0-I02-200429, April 29, 2019, Cable Television Laboratories, Inc. [www.cablelabs.com](http://www.cablelabs.com)

### **2.3. Published Materials**

- No normative references are applicable.

## **3. Informative References**

The following documents might provide valuable information to the reader but are not required when complying with this document.

### **3.1. SCTE References**

- No informative references are applicable.

### **3.2. Standards from Other Organizations**

- No informative references are applicable.

### **3.3. Published Materials**

- No informative references are applicable.

## 4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
<i>should not</i>	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
<i>may</i>	This word or the adjective “ <i>optional</i> ” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.
<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of this document. Implementations should avoid use of deprecated features.

## 5. Abbreviations and Definitions

### 5.1. Abbreviations

For the purposes of the present document, the abbreviations given in CableLabs specification: CM-SP-PHYv4.0-I02-200429, [1] apply.

### 5.2. Definitions

For the purposes of the present document, the abbreviations given in CableLabs specification: CM-SP-PHYv4.0-I02-200429 [1] apply.

## 6. Endorsement Notice

All elements of CableLabs specification: CM-SP-PHYv4.0-I02-200429 [1] *shall* apply without modifications.