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MULTIMEDIA SIGNALS

Interactive systems for digital television distribution  
(DOCSIS third to fifth generations)

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**Second-generation modular headend  
architecture in systems for interactive cable  
television services – IP cable modems**

Recommendation ITU-T J.216



# Recommendation ITU-T J.216

## Second-generation modular headend architecture in systems for interactive cable television services – IP cable modems

### Summary

Recommendation ITU-T J.216 defines the second generation of headend architectures for high-speed data-over-cable systems. The second-generation of headend architecture introduces a number of new features that build upon what was present in previous CableLabs Recommendations ITU-T J.223.1 and ITU-T J.223.2. This Recommendation includes key new features for the CMC III device (also known as the remote-PHY device).

NOTE – The structure and content of this Recommendation have been organized for ease of use through direct reference to the original source material, based on the recognition of CableLabs by ITU in accordance with Recommendation ITU-T A.5.<sup>1</sup>

### History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T J.216	2019-07-29	9	<a href="https://www.itu.int/11.1002/1000/13969">11.1002/1000/13969</a>
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### Keywords

CMC (cable media converter), Data over Cable Service Interface Specification, DOCSIS.

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<sup>1</sup> Recommendation ITU-T A.5 (2019), *Generic procedures for including references to documents of other organizations in ITU-T Recommendations*. See: <https://www.itu.int/en/ITU-T/extcoop/Pages/sdo.aspx>

\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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# Recommendation ITU-T J.216

## Second-generation modular headend architecture in systems for interactive cable television services – IP cable modems

### 1 Scope

This Recommendation defines the second generation of headend architectures for high-speed data-over-cable systems. The second-generation of headend architecture introduces a number of new features that build upon what was present in previous Cabinet DOCSIS Recommendations [b-ITU-T J.223.1] and [b-ITU-T J.223.2]. This Recommendation includes key new features for the CMC III device (also known as the remote-PHY device).

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [DOCSIS MHA<sub>v2</sub> GCP] Cable Television Laboratories, Inc., CM-SP-GCP-I04-180509, (2018), *Generic Control Plane Specification*.
- [DOCSIS R-DEPI] Cable Television Laboratories, Inc., CM-SP-R-DEPI- I13-190912, (2019), *Remote Downstream External PHY Interface Specification*.
- [DOCSIS R-DTI] Cable Television Laboratories, Inc., CM-SP-R-DTI-I07-180509, (2018), *Remote DOCSIS Timing Interface*.
- [DOCSIS R-OOB] Cable Television Laboratories, Inc., CM-SP-R-OOB- I11-190912, (2019), *Remote Out-of-Band Specification*.
- [DOCSIS R-OSSI] Cable Television Laboratories, Inc., CM-SP-R-OSSI- I13-190828, (2019), *Remote PHY OSS Interface Specification*.
- [DOCSIS R-PHY] Cable Television Laboratories, Inc., CM-SP-R-PHY- I13-190912, (2019), *Remote PHY Specification*.
- [DOCSIS R-UEPI] Cable Television Laboratories, Inc., CM-SP-R-UEPI- I11-190912, (2019), *Remote Upstream External PHY Interface Specification*.

### 3 Definitions

#### 3.1 Terms defined elsewhere

See *Section 3 – Terms and Definitions* in each of the Specifications listed in clause 2.

#### 3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

**3.2.1 remote PHY device:** Equipment in the network that implements the second-generation modular headend architecture (MHA<sub>v2</sub>) specifications technology to provide conversion from digital Ethernet transport to analogue radio frequency (RF) transport.

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CMC	Cable Media Converter
DOCSIS	Data over Cable Service Interface Specification
IP	Internet Protocol
MHAv2	Second-generation Modular Headend Architecture
PHY	Physical layer
RF	Radio Frequency

For other abbreviations, see Section 4 – *Abbreviations and Acronyms* in each of the Specifications listed in clause 2.

## 5 Conventions

None.

## 6 Second-generation modular headend architecture (MHAv2) in high-speed data-over-cable systems

### 6.1 Specifications for second generation modular headend architecture

The second-generation modular headend architecture (MHAv2) suite of Specifications are also known as DOCSIS MHAv2 Specifications. They have been readily and widely available since 2015.<sup>2</sup>

This Recommendation is comprised of the specifications identified in clause 2. Preceding relevant ITU-T Recommendations are provided in Appendix I. Other references for the specifications listed in clause 2 are provided in the bibliography of this Recommendation.

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<sup>2</sup> DOCSIS® is a registered trademark of Cable Television Laboratories, Inc. and is used in ITU-T Recommendations with permission.



## Appendix I

### Preceding relevant ITU-T Recommendations

(This appendix does not form an integral part of this Recommendation.)

The following is the list of preceding relevant ITU-T Recommendations:

- [b-ITU-T G.8260] Recommendation ITU-T G.8260 (2015), *Definitions and terminology for synchronization in packet networks.*
- [b-ITU-T G.8261] Recommendation ITU-T G.8261/Y.1361 (2019), *Timing and synchronization aspects in packet networks.*
- [b-ITU-T G.8275.2] Recommendation ITU-T G.8275.2/Y.1369.2 (2016), *Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network.*
- [b-ITU-T J.112] Recommendation ITU-T J.112 (1998), *Transmission systems for interactive cable television services.*
- [b-ITU-T J.122] Recommendation ITU-T J.122 (2007), *Second-generation transmission systems for interactive cable television services – IP cable modems.*
- [b-ITU-T J.126] Recommendation ITU-T J.126 (2007), *Embedded Cable Modem device specification.*
- [b-ITU-T J.162] Recommendation ITU-T J.162 (2007), *Network call signalling protocol for the delivery of time-critical services over cable television networks using cable modems.*
- [b-ITU-T J.163] Recommendation ITU-T J.163 (2007), *Dynamic quality of service for the provision of real-time services over cable television networks using cable modems.*
- [b-ITU-T J.179] Recommendation ITU-T J.179 (2005), *IPCablecom support for multimedia.*
- [b-ITU-T J.210] Recommendation ITU-T J.210 (2006), *Downstream RF interface for cable modem termination systems.*
- [b-ITU-T J.211] Recommendation ITU-T J.211 (2006), *Timing interface for cable modem termination systems.*
- [b-ITU-T J.212] Recommendation ITU-T J.212 (2006), *Downstream external Physical layer interface for modular cable modem termination systems.*
- [b-ITU-T J.213] Recommendation ITU-T J.213 (2006), *Layer 2 virtual private networks for IP cable modem systems.*
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### Other references for specifications listed in clause 2

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- [b-DOCS-IF31-MIB] DOCSIS Interface 3.1 MIB Module, DOCS-IF31-MIB.  
<http://www.cablelabs.com/MIBs/DOCSIS/>
- [b-DOCS-IFEXT2-MIB] DOCSIS Interface Extension 2 MIB Module, DOCS-IFEXT2-MIB.  
<http://www.cablelabs.com/MIBs/DOCSIS/>
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