

# Cisco Network Convergence System 1004

Video traffic continues to grow rapidly. It would take more than 5 million years to watch the amount of video that will cross global IP networks each month in 2021. Every second, a million minutes of video content will cross the network. Content Delivery Networks (CDNs) will carry 71 percent of Internet traffic by 2021. Content providers will need to scale their networks at speed to keep up with the demand for more video. Networks need to be designed with “web-scale” in mind. A web-scale network needs to scale at deployment speed while being operationally simple. Network Convergence System 1004 uses state of the art silicon along with complete automation and real-time visibility to deliver a universal transponder solution that provides best-in-class performance for metro, long-haul and submarine applications while being simple to deploy and manage.

## Product Features and Benefits

The Cisco NCS 1004 (Figure 1) is mechanically optimized to maximize capacity at minimum space and power footprint. At 2RU, the system supports up to 4.8Tbps of client and 4.8Tbps of trunk traffic. The NCS 1004 will double capacity provided to the user compared to the NCS 1002.

The system uses a Linux kernel with the 64 bit IOS XR OS in a Linux Container (LxC) and admin plane operating in a separate LxC. It encompasses carrier-class software with a number of features such as machine-to-machine APIs based on YANG data models, streaming telemetry agent for real time, granular device monitoring and also an infrastructure for 3<sup>rd</sup> party applications.

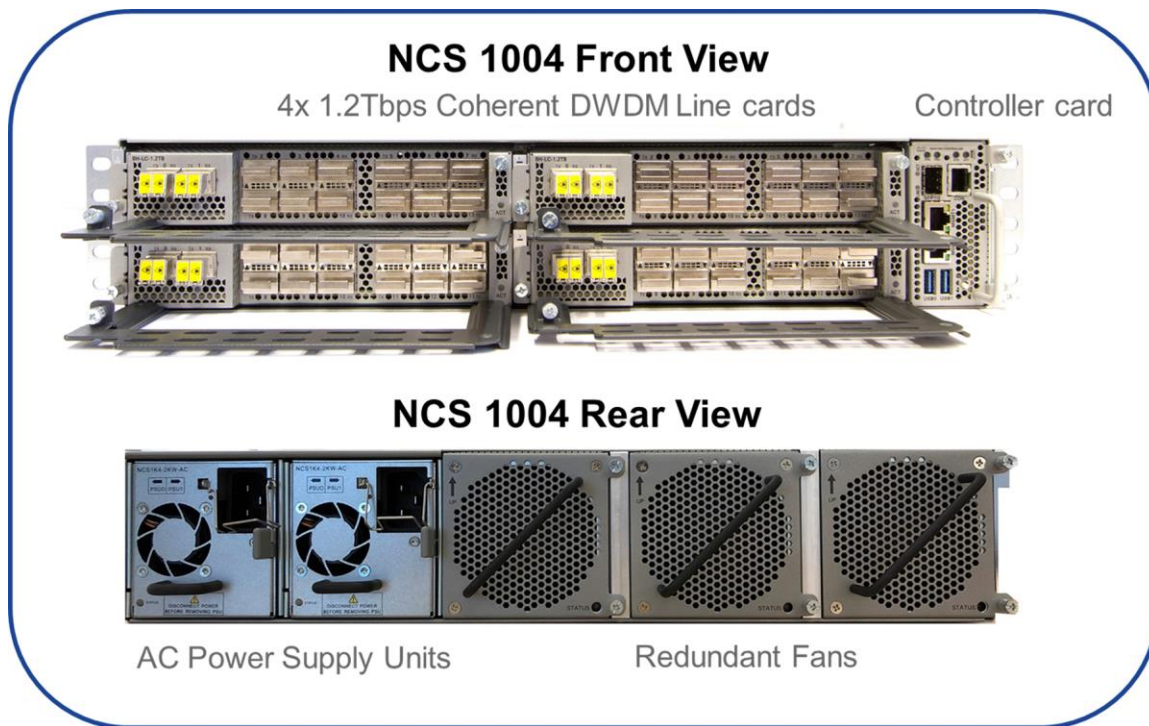
The NCS 1004 has two redundant and field replaceable AC & DC power supply units and three redundant and field replaceable fans. It also provides a field replaceable controller card and SSD disks both on-board the chassis and on the controller card for resiliency (Figure 1). Each NCS 1004 chassis provides four line card slots. Each slot can host a 1.2Tbps coherent DWDM line card with 12 QSFP-28 based clients and 2 DWDM trunk ports.

The trunk ports are capable of several line rates with fine control of modulation format, baud-rate and forward error correction allowing the solution to be used for metro, terrestrial long-haul or submarine applications:

- The baud-rate can be controlled between 28Gbd/s and 72Gbd/s.
- The modulation format can be controlled between BPSK, QPSK, 8-QAM, 16QAM, 32QAM and 64QAM.
- Hybrids between modulation formats can be configured to achieve 0.001 bits/symbol of granularity.
- Forward Error Correction (FEC) of 27% and 15% overhead.
- Trunk line rate from 50G to 600G in 50G increments.

Each line card can provide up to 12 100Gbe/OTU4 or 3 400GE client ports. The client ports map to two trunk ports operating any rate between 100G and 600G in 50G increments. The baud-rate, modulation format and FEC of each trunk port is software-configurable per slice.

**Figure 1.** Cisco NCS 1004 Front and Rear Views



The Cisco NCS 1004 system provides the following hardware benefits:

- Transport of any trunk rate between 100 and 600-Gbps wavelengths on the same platform through software provisioning.
- Support of granular control of baud-rate and modulation format to maximize spectral efficiency.
- One universal transponder that is performance optimized for metro, long-haul and submarine applications.
- Support for up to 350,000 ps/nm of residual chromatic dispersion compensation.
- Transport of 100GE, OTU4 and 400GE on the same platform through software provisioning.
- 600G DWDM provides unparalleled scale and density. With 64 channels of 600G at 75Ghz, the NCS 1004 provides 38.4Tbps in 16RU.
- State of the art AES-256 Encryption at scale – 4.8Tbps of encrypted trunk capacity per 2RU.

**Figure 2.** Cisco NCS 1004 1.2Tbps Line Card



## Modulation Schemes

The Cisco NCS 1004 features a software configurable modulation scheme per slice, allowing the operator to customize the spectral efficiency and reach characteristics of individual wavelengths. Compared to PM-16QAM, 64-QAM modulation more than doubles the spectral efficiency. 69Gbaud/s symbol rate doubles capacity per interface when compared to 32Gbaud/s signals today. Supported modulation formats are detailed in Table 1.

**Table 1.** Supported Modulation Formats

Modulation Type	Bits/Symbol	Baud-rate (GBaud/s)	Line rate supported (Gbps)
PM-BPSK	1	69.4351	100
PM-BPSK-QPSK hybrid	1.5	69.4351	150
PM-QPSK	2	69.4351	200
PM-QPSK-8QAM hybrid	2.5	69.4351	250
PM-8QAM	3	69.4351	300
PM-8QAM-16QAM hybrid	3.5	69.4351	350
PM-16QAM	4	69.4351	400
PM-16QAM-32QAM hybrid	4.5	69.4351	450
PM-32QAM	5	69.4351	500
PM-32QAM-64QAM hybrid	5.5	69.4351	550
PM-32QAM-64QAM hybrid	5.266	71.8485	600

## Wavelength Tunability

The line interface supports software-provisionable tunability across the full C band, covering 96 channels on the 50-GHz grid. Grid-less tuning support allows for continuous tunability in increments of 0.1 GHz and the ability to create multicarrier super-channels over flex spectrum line systems.

## Protocol Transparency

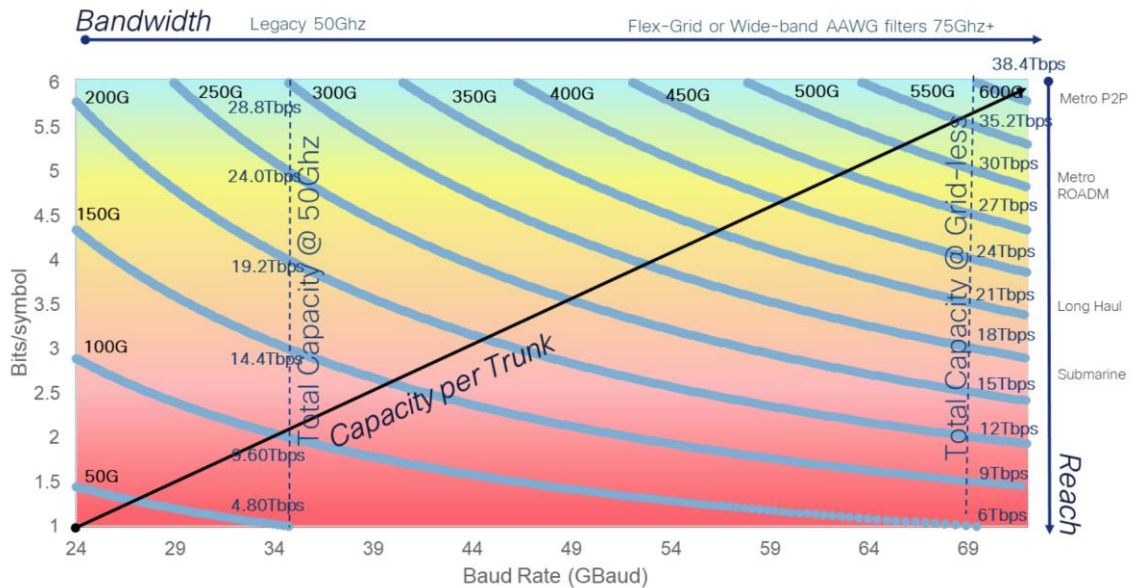
The Cisco NCS 1004 can transparently deliver 100Gbe, 400Gbe and OTU4 clients over 2x 100G-600G. Table 3 shows transponder/muxponder client options and mapping.

## Fine Control of Coherent DWDM interface

The Cisco NCS 1004 provides the ability to modify baud-rate and modulation format with fine control to meet capacity and reach requirements for a range of use-cases as shown in Figure 3.

- Use 69Gbaud/s line rates to maximize capacity at lowest price per bit for Metro and Long Haul networks.
- Use real-time network bandwidth and performance data to maximize line rate capacity on coherent DWDM interface.
- Support line rates that can maximize capacity for bandwidth constrained 50Ghz and 100Ghz spaced legacy ROADMs networks.
- Maximize spectral efficiency on submarine cable line system for the target Q-margin.

**Figure 3.** Controlling baud-rate and bits/symbol for line rates from 50G to 600G to meet reach and capacity needs with NCS 1004 1.2Tbps line card



## Encryption

With increasing asks for data privacy and data protection across the globe, encryption of any data that leaves the Data Center facility is becoming an important requirement for cloud operators. The NCS 1004 provides AES256 based OTN-Sec encryption for 100GE, OTU4 and 400GE clients. IKEv2 is used for authentication of the devices in an encryption session and the protocol provides pre-shared keys, certificates or 802.1X based authentication options. Elliptical Curve Diffie Hilman (ECDH) Key Exchange protocol runs over a GCC (Generic Communication Channel) between two NCS1000 nodes.

## Management

The Cisco NCS 1004 provides comprehensive management capabilities to support Operations, Administration, Maintenance, and Provisioning (OAM&P) capabilities through IOS-XR CLI, SNMP, Syslog, and XML. In addition, iPXE for automated software download and Zero Touch Provisioning (ZTP) for automated configuration download are available for simplified installation. For machine-to-machine configuration and management of NCS 1004, NETCONF, RESTCONF and gRPC transport protocols with JSON, XML and GPB encoding are provided. OpenConfig protocols for management GNMI and operations GNOI are also supported. The NCS 1004 provides a set of native YANG models as well as the ability to map into any industry standard or customer defined YANG data models. For monitoring, NCS 1004 provides a streaming telemetry feature that relies on a push mechanism to disseminate user selected PM and status information at user specified frequencies at granular 10 second intervals. This improves monitoring speed and scale compared to traditional pull based mechanisms such as SNMP. The telemetry infrastructure also allows for events such as alarms, port-state changes to be notified.

The NCS 1004 can also support third application hosting. Such an application can be hosted in a container or docker and can perform provisioning and monitoring on the NCS 1004.

## Performance Monitoring

The Cisco NCS 1004 supports performance monitoring of optical parameters on the client and DWDM line interface including laser bias current, transmit and receive optical power. Ethernet RMON statistics for the client ports and OTN error counters for the trunk are also available. Calculation and accumulation of the performance-monitoring data are supported in 15-minute and 24-hour intervals as per G.7710. Physical system parameters measured at the wavelength level, such as mean polarization mode dispersion, accumulated chromatic dispersion, pre-FEC Bit Error Rate and received Optical Signal-to-Noise Ratio (OSNR) are also included in the set of performance-monitoring parameters. These parameters can greatly simplify troubleshooting operations.

The NCS 1004 provides a set of port and system LEDs for a quick visual check of the operational status. The various LEDs are described in detail in Table 9.

## Headless Operation

The headless operation allows for NCS 1004 data plane to operate errorless during software upgrades and when the controller card is either physically absent or in a failed state. Trunk and client statistics will be accumulated and will be available to the user once the controller is up. In addition, fault propagation will continue to operate for client and trunk failures without the presence of the controller module.

## Feature Summary

The following table summarizes the features of the NCS 1004.

**Table 2.** Feature Summary

Feature	Description
<b>Software Compatibility</b>	<ul style="list-style-type: none"><li>• IOS-XR 7.0.1 or later</li></ul>
<b>Port Density</b>	<ul style="list-style-type: none"><li>• 48 /QSFP28 client side ports</li><li>• 8 DWDM line/trunk ports</li></ul>
<b>OTN feature summary</b>	<ul style="list-style-type: none"><li>• Alarm reporting for Loss of Signal (LOS), Loss of Frame (LOF), Loss of Multi-frame (LOM), Alarm Indication Signal (AIS), Backward Defect Indicator (BDI)</li><li>• OTUk, ODUk, OPUk Performance Monitoring</li><li>• Threshold Crossing Alerts (TCAs)</li><li>• Local (internal) and line (network) loopbacks</li><li>• Trunk Trace Identifier, Generic Communication Channel</li><li>• L1 AES-256 encryption</li></ul>
<b>Optical Feature Summary</b>	<ul style="list-style-type: none"><li>• 50GHz and flex-grid (0.1GHz) tunable lasers</li><li>• Nyquist shaping</li><li>• Non Linear Equalization</li><li>• Electronically compensated CD and PMD</li><li>• Performance Monitoring and Threshold Crossing Alerts (TCAs)</li><li>• Tx and Rx power monitoring</li></ul>
<b>Ethernet Feature Summary</b>	<ul style="list-style-type: none"><li>• Alarms and Performance Monitoring</li><li>• Squelch and Local Fault Propagation</li><li>• LLDP Snooping</li><li>• Performance Monitoring and Threshold Crossing Alerts (TCAs)</li><li>• Local (internal) and line (network) loopbacks</li></ul>
<b>Availability</b>	<ul style="list-style-type: none"><li>• Online insertion and Removal of the Controller</li><li>• Headless mode of operation</li></ul>

Feature	Description
<b>Network Management</b>	<ul style="list-style-type: none"> <li>• iPXE and Zero Touch Provisioning (ZTP)</li> <li>• IOS XR CLI</li> <li>• SNMP</li> <li>• Streaming Telemetry including event driven telemetry</li> <li>• NETCONF, RESTCONF, gRPC with YANG data models</li> </ul>
<b>Physical Dimensions (NCS 1002-K9)</b>	<ul style="list-style-type: none"> <li>• Occupies 2RU and fits into 2 or 4 post 19inch, 21inch, 23inch racks</li> <li>• Weight: 56 pounds</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• &lt;30W per 100G</li> </ul>
<b>Physical Summary</b>	<ul style="list-style-type: none"> <li>• Front to Back Straight-through airflow</li> <li>• 2KW 40-72 Vdc DC PSU</li> <li>• 2KW 90-264Vac 20A AC PSU</li> <li>• 1+1 FRU AC &amp; DC Power</li> <li>• 2+1 FRU FANS</li> <li>• FRU Controller</li> <li>• 4x pluggable line cards</li> <li>• 2 console</li> <li>• 1 RJ45 and 1 GE SFP management port</li> <li>• 2 USB2.0 1.8A</li> <li>• System, trunk, client, FAN, PSU, ATT LEDs</li> </ul>
<b>Environmental Conditions</b>	<ul style="list-style-type: none"> <li>• Operating Temperature: 0 to 40 °C (32 to 104 °F)</li> </ul>

## Regulatory Compliance

Table 3 lists regulatory compliance information for the trunk card. Note that all compliance documentation may not be completed at the time of product release. Please check with your Cisco sales representative for countries other than Canada, the United States, and the European Union.

**Table 3.** Regulatory Compliance

ANSI System	ETSI System
<b>Countries and Regions Supported</b>	
<ul style="list-style-type: none"> <li>• Canada</li> <li>• United States</li> <li>• Korea</li> <li>• Japan</li> <li>• European Union</li> </ul>	<ul style="list-style-type: none"> <li>• European Union</li> <li>• Africa</li> <li>• CSI</li> <li>• Australia</li> <li>• New Zealand</li> <li>• China</li> <li>• Korea</li> <li>• India</li> <li>• Saudi Arabia</li> <li>• South America</li> </ul>
<ul style="list-style-type: none"> <li>• <b>EMC (Emissions)</b></li> </ul>	<ul style="list-style-type: none"> <li>• FCC 47CFR15, Class A</li> <li>• AS/NZS CISPR 22, Class A</li> <li>• CISPR 22, Class A</li> <li>• EN55022, Class A</li> <li>• ICES-003, Class A</li> <li>• VCCI, Class A</li> <li>• KN 22, Class A</li> <li>• CNS-13438, Class A</li> </ul>

ANSI System	ETSI System
<ul style="list-style-type: none"> <li>• <b>EMC (Immunity)</b></li> </ul>	<ul style="list-style-type: none"> <li>• IEC/EN61000-4-2 Electrostatic Discharge Immunity</li> <li>• IEC/EN61000-4-3 Radiated Immunity</li> <li>• IEC/EN61000-4-4 EFT-B Immunity</li> <li>• IEC/EN61000-4-5 Surge AC Port</li> <li>• IEC/EN61000-4-6 Immunity to Conducted Disturbances</li> <li>• IEC/EN61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations</li> <li>• KN 24</li> </ul>
<ul style="list-style-type: none"> <li>• <b>EMC (ETSI/EN)</b></li> </ul>	<ul style="list-style-type: none"> <li>• EN 300 386 Telecommunications Network Equipment (EMC)</li> <li>• EN55022 Information Technology Equipment (Emissions)</li> <li>• EN55024/CISPR 24 Information Technology Equipment (Immunity)</li> <li>• EN50082-1/EN61000-6-1 Generic Immunity Standard</li> <li>• EN61000-3-2 Power Line Harmonics</li> <li>• EN61000-3-3 Voltage Changes, Fluctuations, and Flicker</li> </ul>
<b>Safety</b>	
<ul style="list-style-type: none"> <li>• CSA C22.2 #60950-1 – Edition 7, March 2007</li> <li>• UL 60950-1 - Edition 2, 2014</li> </ul>	<ul style="list-style-type: none"> <li>• IEC 60950-1 Information technology equipment Safety Part 1: General requirements - Edition 2, 2005 + Amendment 1 2009 + Amendment 2 2013</li> <li>• EN 60950-1: Edition 2 (2006) Information technology equipment - Safety - Part 1: General requirements + A11:2009 + A1:2010 + A12:2011 + A2:2013</li> <li>• CE Safety Directive: 2006/95/EC</li> </ul>
<b>Laser</b>	
<ul style="list-style-type: none"> <li>• 21CFR1040 (2008/04) (Accession Letter and CDRH Report) Guidance for Industry and FDA Staff (Laser Notice No. 50), June 2007</li> </ul>	<ul style="list-style-type: none"> <li>• IEC 60825-1: 2007 Ed. 2.0 Safety of laser products Part 1: Equipment classification, requirements and users guide</li> <li>• IEC60825-2 Ed.3.2 (2010) Safety of laser products Part 2: Safety of optical fibre communication systems</li> </ul>
<b>Optical</b>	
<ul style="list-style-type: none"> <li>• ITU-T G.691</li> </ul>	<ul style="list-style-type: none"> <li>• ITU-T G.975</li> </ul>
<b>Quality</b>	
<ul style="list-style-type: none"> <li>• TR-NWT-000332, Issue 4, Method 1 calculation for 20-year Mean Time Between Failure (MTBF)</li> </ul>	

Table 4 provides the DWDM specifications, Table 5 details receive-side optical performances, Table 6 lists performance-monitoring parameters, Table 7 provides card specifications, Table 8 gives ordering information.

**Table 4.** DWDM Specifications

Parameter	Value
<b>Baud rate</b>	24 to 72Gbaud/s
<b>Automatic laser shutdown and restart</b>	ITU-T G.664 (06/99)
<b>Nominal wavelengths (<math>\lambda_{Tnom}</math>)</b>	Fully tunable between 1528.77 and 1566.72 nm
<b>Connector type (TX/RX)</b>	LC, duplex (shuttered)
<b>Optical Transmitter</b>	
<b>Type</b>	PM-BPSK modulation format PM-QPSK modulation format PM-8QAM modulation format PM-16QAM modulation format PM-32QAM modulation format PM-64QAM modulation format Hybrids of adjacent modulation allowing 1 to 6 bits/symbol in 0.001 bits/symbol increments.
<b>Output power</b>	+3 to -10 dBm in 0.01 dBm increments
<b>Required optical return loss, minimum (ORLmin)</b>	24 dB
<b>Laser safety class</b>	1



Parameter	Value
<b>Optical Receiver</b>	
Frequency range	191.25 to 196.10 THz (1528.77 to 1566.72 nm)
Input Power Range (64QAM)	-8 to +5 dBm
Input Power Range (32QAM)	-15 to +5 dBm
Input Power Range (16QAM)	-17 to +5 dBm
Input Power Range (8QAM,QPSK)	-22 to +5 dBm
Power accuracy	+/- 1 dBm
Optical Return Loss	27 dB
PMD tolerance @ 69Gbaud/s	64ps max DGD
Chromatic Dispersion tolerance @ 0.5db penalty	+/-100,000 ps for QPSK/8QAM +/-80,000 ps for 16QAM +/-15,000 ps for 32QAM +/-10,000 ps for 64QAM
Chromatic Dispersion tolerance @ 1db penalty	+/-350,000 ps for BPSK, QPSK, 1.5bits/sym, 2.5 bits/sym +/-280,000 ps for 8QAM +/-200,000 ps for 3.5 bits/sym +/-150,000 ps for 16QAM
State of Polarization change tolerance	100,000 rad/s for QPSK/8QAM 50,000 rad/s for 16QAM, 32QAM, 64QAM

**Table 5.** DWDM Receive-Side Optical Performances

Modulation Type	FEC Type	Pre-FEC BER	Post-FEC BER	Input Power Sensitivity	CD Tolerance	DGD	Required worst case OSNR (0.1 nm RBW)
<b>PM-BPSK (100G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -16 dBm	0 ps/nm	-	11 dB
					+/- 100,000 ps/nm	64 ps	11.5 dB
					+/- 350,000 ps/nm	64 ps	12 dB
<b>PM-QPSK (200G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -16 dBm	0 ps/nm	-	14.1 dB
					+/- 100,000 ps/nm	64 ps	14.6 dB
					+/- 350,000 ps/nm	64 ps	15.1 dB
<b>PM-8QAM (300G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -13 dBm	0 ps/nm	-	18.5 dB
					+/- 100,000 ps/nm	64 ps	19 dB
					+/- 280,000 ps/nm	64 ps	19.5 dB
<b>PM-16QAM (400G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -10 dBm	0 ps/nm	-	22 dB
					+/- 80,000 ps/nm	64 ps	22.5 dB
					+/- 150,000 ps/nm	64 ps	23 dB
<b>PM-32QAM (500G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -9 dBm	0 ps/nm	-	27.3 dB
					+/- 15,000 ps/nm	64 ps	27.8 dB
<b>PM-64-QAM (600G)</b>	SD-FEC (27% overhead)	<3.75x10E (-2)	<10E (-15)	0 to -6 dBm	0 ps/nm	-	32.5 dB
					+/- 10,000 ps/nm	64 ps	33 dB



**Table 6.** Trunk Performance-monitoring parameters

Area	Parameter Name	Description
<b>OTUk Monitoring (Near-end, Far-end, OTUk-SM, ODUk-PM)</b>	BBE	Number of background block errors
	BBER	Background block error ratio
	ES	Number of errored seconds
	ESR	Errored seconds ratio
	SES	Number of severely errored seconds
	SESR	Severely errored seconds ratio
	UAS	Number of unavailable seconds
	FC	Number of failure counts
	<b>FEC</b>	Bit errors
Uncorrectable words		Number of uncorrectable words
<b>Trunk optical performance monitoring</b>		
OPT	Transmitter optical power	
LBC	Transmitter laser bias current	
OPR	Receiver optical power	
RCD	Residual chromatic dispersion	
PMD	Mean polarization mode dispersion	
OSNR	Optical signal-to-noise ratio, calculated with 0.5-nm RBW	
SOPMD	Second Order PMD (SOPMD) Estimation	
SOPCR	Polarization Change Rate Estimation	
PDL	Polarization Dependent Loss (PDL) Estimation	

**Table 7.** NCS 1004 specifications

<b>Management</b>	
<b>Attention LED</b>	Blue
<b>Client and DWDM port LEDs</b>	
<ul style="list-style-type: none"> <li>No alarms</li> <li>Minor alarms</li> <li>Critical and Major alarms</li> </ul>	Green Amber Red
<b>Fan LED</b>	
<ul style="list-style-type: none"> <li>All 3 FANs are present and running</li> <li>One or more FANs are absent or failed</li> </ul>	Green Red
<b>PSU LED</b>	
<ul style="list-style-type: none"> <li>At least 1 PSU present and operational</li> <li>2 PSUs are present but, one has no power</li> </ul>	Green Red
<b>Status LED</b>	
<ul style="list-style-type: none"> <li>No active system alarms</li> <li>Presence of major or minor alarms</li> <li>Presence of critical alarms</li> </ul>	Green Amber Red
<b>OIR LED</b>	
<ul style="list-style-type: none"> <li>Controller is seated but, not ready</li> <li>Controller card seated and software is ready</li> <li>Controller is absent</li> </ul>	Amber blinking Amber solid Blank
<b>Power fully loaded (including pluggable)</b>	<b>48x100</b>
<ul style="list-style-type: none"> <li>Typical</li> <li>Maximum</li> </ul>	1350W 1600W

Management	
<b>Physical</b>	
<b>Dimensions</b>	NCS1004 17.4" wide x 19" deep x 3.5" tall NCS1K4-DC-PSU 2.9" wide x 7.4" deep x 3.1" tall NCS1K4-AC-PSU 2.9" wide x 7.4" deep x 3.1" tall NCS1K4-FAN 3.3" wide x 6.9" deep x 3.2" tall NCS1K4-1.2T-K9 1.6" wide x 12.4" deep x 3.3" tall NCS1K4-CNTRLR-K9 6.4" wide x 11" deep x 1.1" tall
<b>Weight</b>	NCS 1004 8 Kg NCS1K4-DC-PSU 1.3 Kg NCS1K4-AC-PSU 1.3 Kg NCS1K4-FAN 0.8 Kg NCS1K4-1.2T-K9 3.2 Kg NCS1K4-CNTRLR-K9 1 Kg
<b>Storage temperature</b>	-28°C to 70°C (-20°F to 158°F)
<b>Operating temperature</b>	0°C to 40°C (32°F to 104°F)
<b>Relative humidity</b>	5% to 85%, noncondensing
• Normal	
• Short-term <sup>1</sup>	5% to 90% but not to exceed 0.024 kg water/kg of dry air
<sup>1</sup> Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year (a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period). The values shown are valid for M6 or M2 chassis.	

**Table 8.** Ordering information

Part Number	Description
<b>NCS1004=</b>	Network Convergence System 1004 4 line card slots
<b>NCS1K4-1.2T-L-K9=</b>	NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card - Licensed
<b>S-NCS1K4-LIC-100G=</b>	NCS1K4 smart license - one QSFP28 client
<b>E-NCS1K4-LIC-100G=</b>	NCS1K4 electronic license - one QSFP28 client
<b>S-NCS1K4-LIC-100X=</b>	NCS1K4 smart license - one QSFP28 client with encryption
<b>E-NCS1K4-LIC-100X=</b>	NCS1K4 electronic license - one QSFP28 client with encryption
<b>NCS1K4-1.2T-K9=</b>	NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
<b>NCS1K4-SYS</b>	NCS1004 Assemble To Order
<b>NCS1K4-CNTRLR-K9=</b>	Network Convergence System 1004 Controller
<b>NCS1K4-FAN=</b>	Network Convergence System 1004 Fan
<b>NCS1K4-AC-PSU=</b>	Network Convergence System 1004 AC Power Supply Unit
<b>NCS1K4-AC-PSU-CBL=</b>	Network Convergence System 1004 AC Power Supply Cable
<b>NCS1K4-DC-PSU=</b>	Network Convergence System 1004 DC Power Supply Unit

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