QDD-ZRPH-400G

OPTICAL TRANSCEIVER MODULE

Scenario Application Test Report (Juniper)

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1. Test Purpose

By building test scenarios and simulating the customer's usage environment, we test whether the module's performance meets the customer's requirements.

2. Test Results Summary

Table 2: Test Results

Items	Test Data	Remarks
Multi-Version	Pass	/
Connectivity	Pass	/
Module Basic Information	Pass	/
Digital Diagnostic Monitoring	Pass	/

3. Test Environment

3.1 Test Equipment Used

Table 3-1: Test Equipment Used

Vendor	Device	Soft Version
Juniper Switch	PTX10001-36MR	5.0.0-64

3.2 Test Sample

Table 3-2: Test Sample

Product ID	P/N	Serial Number
#193129	QDD-ZRPH-400G	2414W05GH

4. Test Data

4.1 Test Scenario

Table 4-1: Test Scenario

Test Topology	
Test Premise	1. Confirm the brand, quantity and placement of the switches to be tested. 2. Prepare control cables, test software and optical fiber patch cords. Power on the switches in advance. 3. Locate the Console port on the switch, which is usually marked as "CON" on the switch, although some switches may display it as "IOIOI" or a computer monitor icon, etc. Use a control cable to connect the switch to the computer.  4. Before connecting the software, it is necessary to confirm the connection port of the control cable. Go to the computer device manager, click on the ports (COM and LPT) to view the ports. After confirming the ports, proceed with the next step.
Test Method	Click to open the SecureCRT Portable software and enter the quick connection interface. ① Protocol selection: Serial ② Port selection: The same as the port you viewed in the previous step ③ Baud rate selection: The same as the baud rate of the port on the target switch ④ Flow control: Do not check this option The remaining configurations can keep the default values.

Test Steps	① Insert the module into the corresponding rate port of the switch, and connect the TX-RX ends with an optical fiber jumper or an MTP self-loop device. Observe whether the module is connected. If not connected, please check the jumper connection or the switch port configuration (login to the switch is required). ② Enter the test interface, input the account and password, log in to the switch and enter privileged mode. ③ According to the switch command configuration table, input the corresponding test command and view the relevant information: port status (connectivity), connection rate, alarm status, module basic information, DDM information, etc. Determine whether it meets the requirements.

4.2 Test Result

Table 4-2: Test Result

Test Information	1. Read the switch model name and software version, and read the status of all ports on the switch root@re0> show version Hostname: re0 Model: ptx10001-36mr Junos: 23.4R2-S2.3-EVO Yocto: 3.0.2 Linux Kernel: 5.2.60-yocto-standard-gbbed0c6 JUNOS-EVO OS 64-bit [junos-evo-install-ptx-fixed-x86-64-23.4R2-S2.3-EVO] External Software: JET app aos 5.0.0-64 root@re0> show chassis hardware Hardware inventory: Item Version Part number Serial number Description Chassis GH645 JNP10001-36MR [PTX10001-36MR] PSM 0 REV 09 740-073765 1GE2C411433 AC AFO 3000W PSU PSM 1 REV 09 740-073765 1GE2C411518 AC AFO 3000W PSU Routing Engine 0 REV 16 750-100243 BCEB9400 RE-JNP10001-36MR CB 0 REV 33 750-099260 BCEB8902 Control Board FPC 0 BUILTIN BUILTIN FPC-JNP10001-36MR PIC 0 BUILTIN BUILTIN 8X400GE-MR + 4X100GE-MR Xcvr 9 REV 11 740-131169 A2312210001 QSFP56-DD-400G-ZR-M Xcvr 10 REV 11 740-131169 A2312210002 QSFP56-DD-400G-ZR-M PIC 1 BUILTIN BUILTIN 8X400GE-MR + 4X100GE-MR Xcvr 9 XXXX NON-JNPR P3E2013226 QSFP56-DD-400G-ZR-M PIC 2 BUILTIN BUILTIN 8X400GE-MR + 4X100GE-MR SIB 0 BUILTIN BUILTIN SIB-JNP10001-36MR Fan Tray 0 JNP10001 Fan Tray, Front to Back Airflow - AFO Fan Tray 1 JNP10001 Fan Tray, Front to Back Airflow - AFO Fan Tray 2 JNP10001 Fan Tray, Front to Back Airflow - AFO Fan Tray 3 JNP10001 Fan Tray, Front to Back Airflow - AFO Fan Tray 4 JNP10001 Fan Tray, Front to Back Airflow - AFO Fan Tray 5 JNP10001 Fan Tray, Front to Back Airflow - AFO

```
root@re0>

root@re0> show interfaces et-0/0/9 detail
Physical interface: et-0/0/9, Enabled, Physical link is Up
  Interface index: 1241, SNMP ifIndex: 650, Generation: 562640716872
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 400Gbps, BPDU Error: None, Loop Detect PDU Error: None, Ethernet-Switching Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Disabled, Media type: Fiber
  Wavelength    : 1550.12 nm, Frequency: 193.400 THz
  Optic-loopback : Disabled , Optic-loopbacktype : nil
  Media Code    : ZR-400-OFEC-16QAM
  Host Code     : 400GAUI-8 C2M (Annex 120E)
  Device flags  : Present Running
  Interface flags: SNMP-Traps
  CoS queues    : 8 supported, 8 maximum usable queues
  Hold-times    : Up 0 ms, Down 0 ms
  Damping       : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0, state: unsuppressed
  Current address: 80:43:3f:77:47:26, Hardware address: 80:43:3f:77:47:26
  Last flapped  : 2025-03-07 09:08:33 UTC (00:02:24 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes :              5253                 1232 bps
   Output bytes :              5219                    0 bps
   Input  packets:               17                    0 pps
   Output packets:               17                    0 pps
  Egress queues: 8 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets     Dropped packets
    0                          0               0                0
    1                          0               0                0
    2                          0               0                0
    3                         17              17                0
  Queue number:         Mapped forwarding classes
    0                   best-effort
    1                   expedited-forwarding
    2                   assured-forwarding
    3                   network-control
  Active alarms  : None
  Active defects : None
  PCS statistics                  Seconds
    Bit errors                          0
    Errored blocks                      0
  Ethernet FEC Mode  :               FEC119
    FEC Codeword size                   544
    FEC Codeword rate                 0.945
  Ethernet FEC statistics           Errors
    FEC Corrected Errors              100729
    FEC Uncorrected Errors               403
    FEC Corrected Errors Rate              1
    FEC Uncorrected Errors Rate            0
  Optic FEC Mode  :                   OFEC
  Optic FEC statistics:
    Corrected Errors                      45014359842
    Uncorrected Words                            18
    Corrected Error rate                    274353094
    Uncorrected Error rate                          0
    Corrected Error Ratio (       232 seconds average)  6.62e-04
  PRBS Mode : Disabled
  Interface transmit statistics: Disabled
  Link Degrade :
    Link Monitoring                 :  Disable

  Logical interface et-0/0/9.16386 (Index 1008) (SNMP ifIndex 596) (Generation 562640716908)
    Flags: Up SNMP-Traps Encapsulation: ENET2 DF
  Traffic statistics:
   Input  bytes :              4656
   Output bytes :              5757
   Input  packets:               16
   Output packets:               19
   Local statistics:
    Input  bytes :              5185
    Output bytes :              5757
    Input  packets:               17
    Output packets:               19
   Transit statistics:
    Input  bytes :                 0                 0 bps
    Output bytes :                 0                 0 bps
    Input  packets:                0                 0 pps
    Output packets:                0                 0 pps
    Protocol multiservice, MTU: Unlimited, Generation: 562640716910, Route table: 0
      Flags: None
```

```
root@re0>

root@re0> show interfaces et-0/0/10 detail
Physical interface: et-0/0/10, Enabled, Physical link is Up
  Interface index: 1244, SNMP ifIndex: 651, Generation: 562640716875
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 400Gbps, BPDU Error: None, Loop Detect PDU Error: None, Ethernet-Switching Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Disabled, Media type: Fiber
  Wavelength    : 1550.12 nm, Frequency: 193.400 THz
  Optic-loopback : Disabled , Optic-loopbacktype : nil
  Media Code    : ZR-400-OFEC-16QAM
  Host Code     : 400GAUI-8 C2M (Annex 120E)
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  CoS queues    : 8 supported, 8 maximum usable queues
  Hold-times    : Up 0 ms, Down 0 ms
  Damping       : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0, state: unsuppressed
  Current address: 80:43:3f:77:47:30, Hardware address: 80:43:3f:77:47:30
  Last flapped   : 2025-03-07 09:08:32 UTC (00:02:31 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes :                5219                 0 bps
   Output bytes :                5253                 0 bps
   Input  packets:                 17                 0 pps
   Output packets:                 17                 0 pps
  Egress queues: 8 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets
    0                          0               0               0
    1                          0               0               0
    2                          0               0               0
    3                         17              17               0
  Queue number:       Mapped forwarding classes
    0                 best-effort
    1                 expedited-forwarding
    2                 assured-forwarding
    3                 network-control
  Active alarms  : None
  Active defects : None
  PCS statistics                    Seconds
    Bit errors                        0
    Errored blocks                    0
  Ethernet FEC Mode  :              FEC119
    FEC Codeword size                 544
    FEC Codeword rate               0.945
  Ethernet FEC statistics           Errors
    FEC Corrected Errors             12238
    FEC Uncorrected Errors             118
    FEC Corrected Errors Rate           18
    FEC Uncorrected Errors Rate          0
  Optic FEC Mode  :                  OFEC
  Optic FEC statistics:
    Corrected Errors                 28279451441
    Uncorrected Words                       17
    Corrected Error rate                167498923
    Uncorrected Error rate                  0
    Corrected Error Ratio (       233 seconds average)  3.91e-04
  PRBS Mode : Disabled
  Interface transmit statistics: Disabled
  Link Degrade :
    Link Monitoring                :  Disable

  Logical interface et-0/0/10.16386 (Index 1009) (SNMP ifIndex 597) (Generation 562640716912)
    Flags: Up SNMP-Traps Encapsulation: ENET2 DF
  Traffic statistics:
   Input  bytes :                4913
   Output bytes :                5490
   Input  packets:                 17
   Output packets:                 18
   Local statistics:
    Input  bytes :                5151
    Output bytes :                5490
    Input  packets:                 17
    Output packets:                 18
   Transit statistics:
    Input  bytes :                   0                 0 bps
    Output bytes :                   0                 0 bps
    Input  packets:                  0                 0 pps
    Output packets:                  0                 0 pps
    Protocol multiservice, MTU: Unlimited, Generation: 562640716914, Route table: 0
      Flags: None
```

2. Read the module's basic information from the switch side

```
root@re0> show chassis pic fpc-slot 0 pic-slot 0
FPC slot 0, PIC slot 0 information:
 Type                  8X400GE-MR + 4X100GE-MR
 State                 Online
 PIC version           255.09
 Uptime                2 days, 1 hour, 56 minutes, 36 seconds

PIC port information:
             Fiber           Xcvr vendor    Wave-            Xcvr      JNPR    MSA
 Port Cable type   type  Xcvr vendor    part number    length          Firmware    Rev    Version
 9   400G-ZR-M    SM   FS           740-131169    1528.77 nm - 1567.13 nm  2.10     REV 11  CMIS 5.1
 10  400G-ZR-M    SM   FS           740-131169    1528.77 nm - 1567.13 nm  2.10     REV 11  CMIS 5.1

Port speed information:

 Port  PFE    Capable Port Speeds
 0     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 1     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 2     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 3     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 4     0     1x10G 4x10G 1x40G 4x25G 1x100G
 5     0     1x10G 1x100G
 6     0     1x10G 4x10G 1x40G 4x25G 1x100G
 7     0     1x10G 1x100G
 8     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 9     0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 10    0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G
 11    0     1x10G 4x10G 1x40G 4x25G 1x100G 2x50G 8x25G 8x50G 2x100G 1x200G 3x100G 4x100G 2x200G 1x400G

PIC Config Violations:

 No.   Error-Message
 1     Port 5: Speed 4x100G not supported
 2     port 5 cannot be used when port 4 is 10G
```

3. Read the DDM information of the module

```
root@re0>

root@re0> show interfaces diagnostics optics et-0/0/9
Physical interface: et-0/0/9
    Module temperature                      :  65 degrees C / 149 degrees F
    Module voltage                         :  3.229 V
    Module max power                        :  22.5 W
    Wavelength channel number                :  28
    Wavelength setpoint                     :  1550.12 nm
    Tx dither                          :  Disabled
    Frequency error                        :  0.00 GHz
    Wavelength error                        :  0 nm
    TEC fault alarm                       :  False
    Wavelength unlocked alarm                 :  False
    Tx tune alarm                         :  False
    Module temperature high alarm             :  Off
    Module temperature low alarm              :  Off
    Module temperature high warning            :  Off
    Module temperature low warning             :  Off
    Module voltage high alarm               :  Off
    Module voltage low alarm                :  Off
    Module voltage high warning              :  Off
    Module voltage low warning               :  Off
    Module temperature high alarm threshold   :  80 degrees C / 176 degrees F
    Module temperature low alarm threshold    :  -5 degrees C / 23 degrees F
    Module temperature high warning threshold :  75 degrees C / 167 degrees F
    Module temperature low warning threshold  :  0 degrees C / 32 degrees F
```

```
  Module voltage high alarm threshold      : 3.63 V
  Module voltage low alarm threshold       : 2.97 V
  Module voltage high warning threshold    : 3.46 V
  Module voltage low warning threshold     : 3.13 V
  Laser bias current high alarm threshold  : 120 mA
  Laser bias current low alarm threshold   : 80 mA
  Laser bias current high warning threshold : 110 mA
  Laser bias current low warning threshold : 90 mA
  Laser output power high alarm threshold  : 2.511 mW / 4.00 dBm
  Laser output power low alarm threshold   : 0.125 mW / -8.99 dBm
  Laser output power high warning threshold : 1.995 mW / 3.00 dBm
  Laser output power low warning threshold : 0.158 mW / -7.99 dBm
  Laser rx power high alarm threshold      : 2.511 mW / 4.00 dBm
  Laser rx power low alarm threshold       : 0.004 mW / -23.01 dBm
  Laser rx power high warning threshold    : 1.995 mW / 3.00 dBm
  Laser rx power low warning threshold     : 0.006 mW / -22.00 dBm
  Laser temperature high alarm threshold   : 59 degrees C / 138 degrees F
  Laser temperature low alarm threshold    : 39 degrees C / 102 degrees F
  Laser temperature high warning threshold : 54 degrees C / 129 degrees F
  Laser temperature low warning threshold  : 44 degrees C / 111 degrees F
Lane 0
  Laser bias current                 : 100 mA
  Laser output power                 : 1.009 mW / 0.03 dBm
  Laser temperature                  : 49 degrees C / 120 degrees F
  Laser receiver power               : 0.996 mW / -0.01 dBm
  Rx power (signal)                  : 0.95 mW / -0.21 dBm
  Lane chromatic dispersion          : 0.0 ps/nm
  Lane differential group delay      : 0.9 ps
  Lane carrier frequency offset      : 11.0 MHz
  Lane polarization dependent loss   : 0.2 dB
  Lane snr                           : 17.1 dB
  Lane Optical signal-to-noise ratio : 29.7 dB
  Lane sopmd                         : 29.2
  Laser bias current high alarm      : Off
  Laser bias current low alarm       : Off
  Laser bias current high warning    : Off
  Laser bias current low warning     : Off
  Laser temperature high alarm       : Off
  Laser temperature low alarm        : Off
  Laser temperature high warning     : Off
  Laser temperature low warning      : Off
  Laser receiver power high alarm    : Off
  Laser receiver power low alarm     : Off
  Laser receiver power high warning  : Off
  Laser receiver power low warning   : Off
  Laser output power high alarm      : Off
  Laser output power low alarm       : Off
  Laser output power high warning    : Off
  Laser output power low warning     : Off
  Tx loss of signal functionality alarm : Off
  Rx loss of signal alarm            : Off
  Tx laser disabled alarm            : Off


root@re0> show interfaces diagnostics optics et-0/0/10
Physical interface: et-0/0/10
  Module temperature                 : 56 degrees C / 132 degrees F
  Module voltage                     : 3.236 V
  Module max power                   : 22.5 W
  Wavelength channel number          : 28
  Wavelength setpoint                : 1550.12 nm
  Tx dither                          : Disabled
  Frequency error                    : 0.00 GHz
  Wavelength error                   : 0 nm
  TEC fault alarm                    : False
  Wavelength unlocked alarm          : False
  Tx tune alarm                      : False
  Module temperature high alarm      : Off
  Module temperature low alarm       : Off
  Module temperature high warning    : Off
  Module temperature low warning     : Off
  Module voltage high alarm          : Off
  Module voltage low alarm           : Off
  Module voltage high warning        : Off
  Module voltage low warning         : Off
```

	Module temperature high alarm threshold : 80 degrees C / 176 degrees F Module temperature low alarm threshold : -5 degrees C / 23 degrees F Module temperature high warning threshold : 75 degrees C / 167 degrees F Module temperature low warning threshold : 0 degrees C / 32 degrees F Module voltage high alarm threshold : 3.63 V Module voltage low alarm threshold : 2.97 V Module voltage high warning threshold : 3.46 V Module voltage low warning threshold : 3.13 V Laser bias current high alarm threshold : 120 mA Laser bias current low alarm threshold : 80 mA Laser bias current high warning threshold : 110 mA Laser bias current low warning threshold : 90 mA Laser output power high alarm threshold : 2.511 mW / 4.00 dBm Laser output power low alarm threshold : 0.125 mW / -8.99 dBm Laser output power high warning threshold : 1.995 mW / 3.00 dBm Laser output power low warning threshold : 0.158 mW / -7.99 dBm Laser rx power high alarm threshold : 2.511 mW / 4.00 dBm Laser rx power low alarm threshold : 0.004 mW / -23.01 dBm Laser rx power high warning threshold : 1.995 mW / 3.00 dBm Laser rx power low warning threshold : 0.006 mW / -22.00 dBm Laser temperature high alarm threshold : 59 degrees C / 138 degrees F Laser temperature low alarm threshold : 39 degrees C / 102 degrees F Laser temperature high warning threshold : 54 degrees C / 129 degrees F Laser temperature low warning threshold : 44 degrees C / 111 degrees F Lane 0 Laser bias current : 100 mA Laser output power : 1.009 mW / 0.03 dBm Laser temperature : 49 degrees C / 120 degrees F Laser receiver power : 0.953 mW / -0.20 dBm Rx power (signal) : 1.03 mW / 0.14 dBm Lane chromatic dispersion : 0.0 ps/nm Lane differential group delay : 1.1 ps Lane carrier frequency offset : 2.0 MHz Lane polarization dependent loss : 0.2 dB Lane snr : 17.4 dB Lane Optical signal-to-noise ratio : 29.7 dB Lane sopmd : 34.4 Laser bias current high alarm : Off Laser bias current low alarm : Off Laser bias current high warning : Off Laser bias current low warning : Off Laser temperature high alarm : Off Laser temperature low alarm : Off Laser temperature high warning : Off Laser temperature low warning : Off Laser receiver power high alarm : Off Laser receiver power low alarm : Off Laser receiver power high warning : Off Laser receiver power low warning : Off Laser output power high alarm : Off Laser output power low alarm : Off Laser output power high warning : Off Laser output power low warning : Off Tx loss of signal functionality alarm : Off Rx loss of signal alarm : Off Tx laser disabled alarm : Off
Test Conclusion	After completing the above test content, all the test information should be copied and pasted into a TXT document.
Remarks	/