



# PON Coexistence Specification Guide

Singlemode devices enabling multiple PON generations to coexist on a common optical distribution network

COMMScope®

# Solutions overview

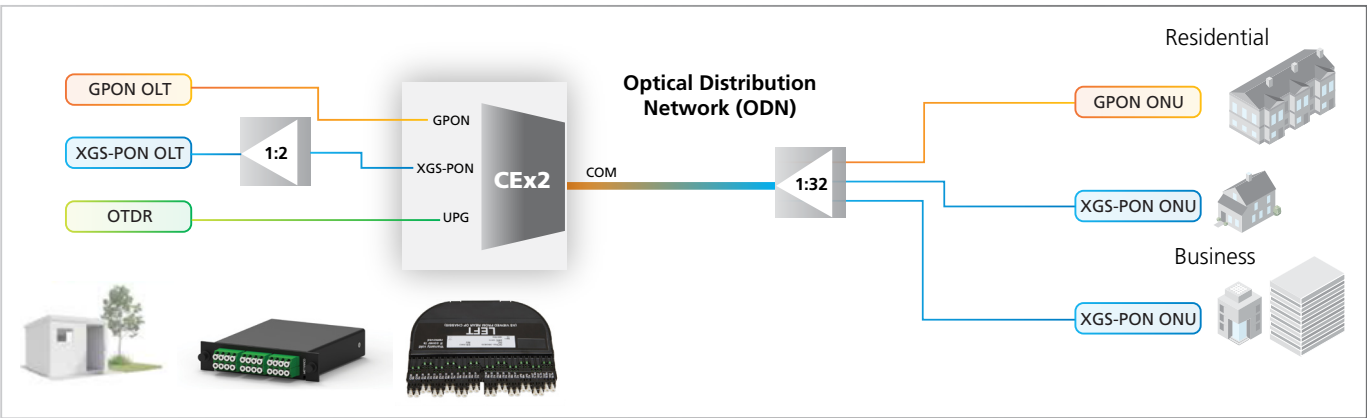
Passive Optical Network (PON) standards have been designed to enable two or more PON systems to co-exist over the same Optical Distribution Network (ODN) thanks to the use of separate wavelengths for both upstream and downstream communications. That allows increased data speed and the delivery of additional services without replacing any of the existing passive fiber network infrastructure, while keeping previous services active.

CommScope's coexistence elements support your migration to next-generation PON services while controlling costs.

Our portfolio of coexistence modules are designed to integrate into the network using fiber panels installed near the optical line terminal (OLT) or inside the optical distribution frame (ODF). They enable different generations of PON technologies such as GPON, XGS-PON, NG-PON2, 25GS MSA, 50GPON to coexist, potentially using different optical split ratio. In addition, some modules have separate ports to enable RF video, optical time domain reflectometry (OTDR), or WDM overlays. Many modules feature an upgrade port enabling the addition of future services over unused wavelengths.

CommScope's CEx elements are available in 2 housing styles, LGX and NG4, offering solutions for both inside plant (ISP) and outside plant (OSP) deployment.

## Example application



|                       |        | LGX                                                                | NG4                              |
|-----------------------|--------|--------------------------------------------------------------------|----------------------------------|
| Connectors            | LC/APC | 24                                                                 | 24                               |
|                       | SC/APC | 12                                                                 | N/A                              |
| Operating Temperature |        | Outside Plant (OSP)-40°C to +70°C                                  | Inside Plant (ISP)-10°C to +65°C |
| Test Standards        |        | IEC 61300-2-1, -9, -21, -22, -26 and GR-1209/GR-1221 requirements. | GR-1209/GR-1221 and GR-63        |

Our LGX solutions meet Outside plant (OSP) requirements of -40°C to +70°C operating temperature environments, and are tested to IEC 61300-2-1, -9, -21, -22, -26 and GR-1209/GR-1221 requirements.

Our NG4 solutions are available with LC/APC connectors, meet inside plant (ISP) requirements of -10°C to +65°C operating temperature environments, and are tested to GR-1209/GR-1221 and GR-63 requirements.



Example NG4™ VAM with LC connectors

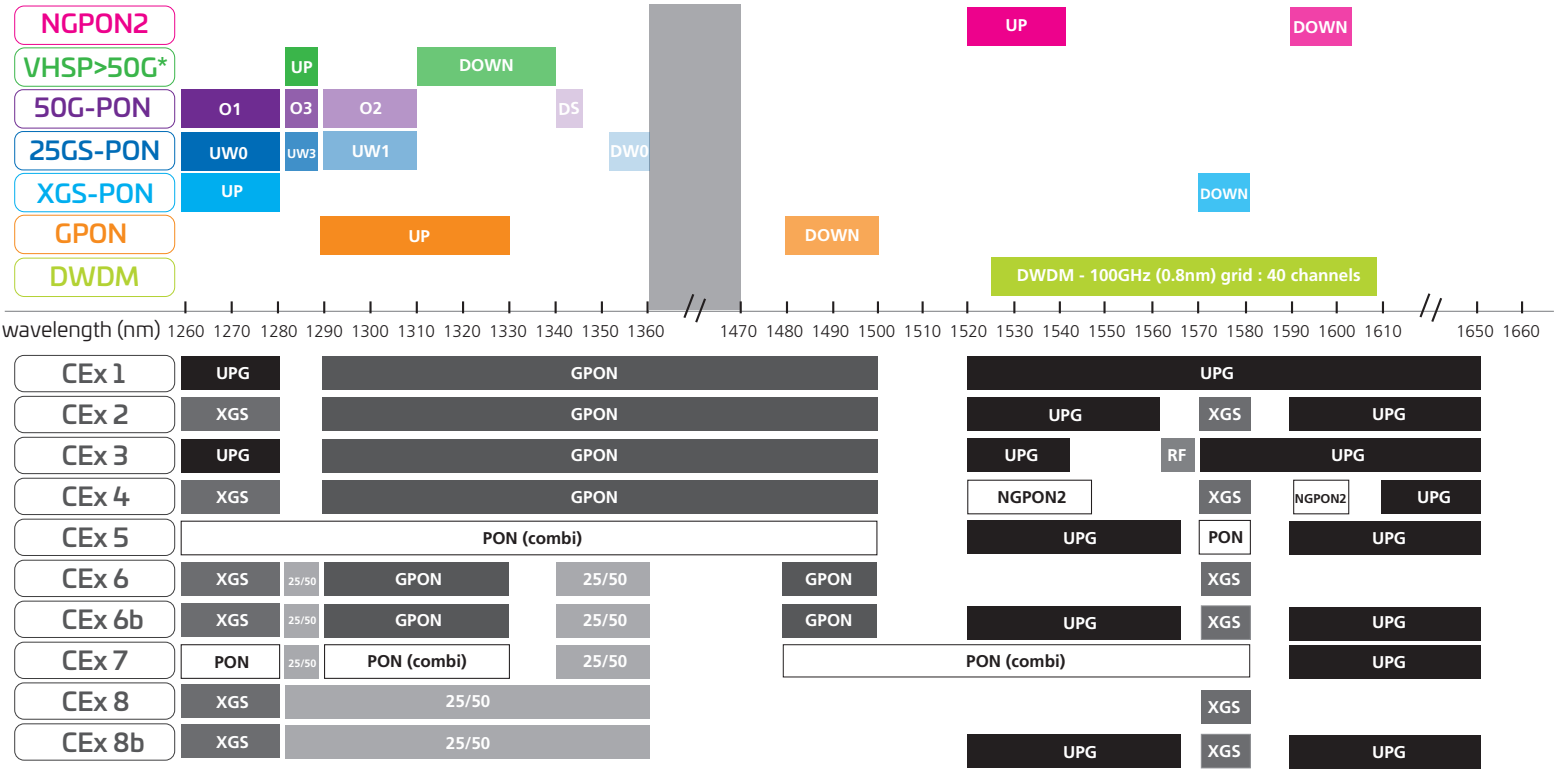


Example LGX with LC connectors

# PON standards - Overview

| Standard           |                                | Wavelengths (nm)                                                     |                             |
|--------------------|--------------------------------|----------------------------------------------------------------------|-----------------------------|
| Application        | Standard Reference             | Upstream (US)                                                        | Downstream (DS)             |
| GPON               | ITU-TG.984.5                   | 1290-1330                                                            | 1480-1500                   |
| XGS-PON            | ITU-TG.9807.1                  | 1260-1280                                                            | 1575-1581                   |
| 25GS-PON           | 25GS-PON Specification 2.0 MSA | 1260-1280 (UW0)<br>1290-1310 (UW1)<br>1284-1288 (UW3)                | 1356-1360 (DW0)             |
| 50G-PON            | ITU-TG.9804.3                  | 1260-1280 (option 1)<br>1290-1310 (option 2)<br>1284-1288 (option 3) | 1340-1344                   |
| G.Sup.VHSP         | ITU.TGsup. VHSP (draft)        | Proposed 1284-1288 (option 3 from 50G)                               | Proposed in 1310-1340 range |
| NG-PON2 (TWDM PON) | ITU-TG.989.2                   | 1524-1544                                                            | 1596-1603                   |

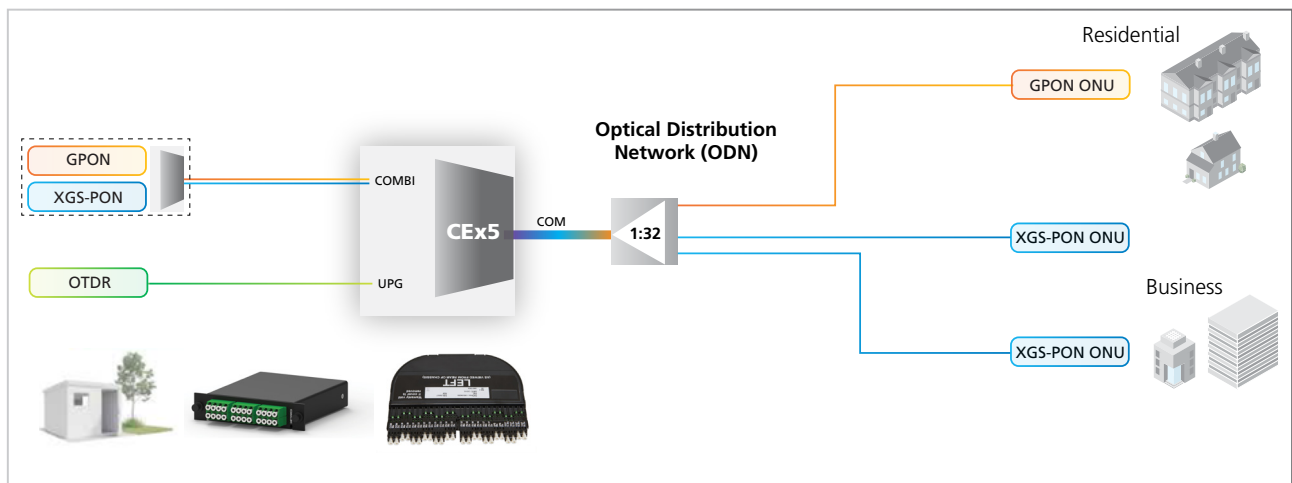
## Coexistence application overview



# Coexistence optical performance

| CEx Configuration                                                    |            | CEx 1                          | CEx 2                              | CEx 3                                         | CEx 4                              | CEx 5                                          |
|----------------------------------------------------------------------|------------|--------------------------------|------------------------------------|-----------------------------------------------|------------------------------------|------------------------------------------------|
| Density<br>(number of circuits in chosen housing and connector type) | NG4-LC/APC | 8                              | 6                                  | 6                                             | 4                                  | 8                                              |
|                                                                      | LGX-LC/APC | 8                              | 6                                  | 6                                             | 4                                  | 8                                              |
|                                                                      | LGX-SC/APC | 4                              | 3                                  | 3                                             | 2                                  | 4                                              |
| Application                                                          |            | GPON with upgrade option       | GPON, XGS-PON and upgrade option   | GPON with RF video overlay and upgrade option | GPON, XGS-PON and NGPON2           | GPON and XGS-PON combi port and upgrade option |
| Passbands Wavelengths                                                | 1          | GPON: 1290-1500nm              | GPON: 1290-1500nm                  | GPON: 1290-1500nm                             | GPON: 1290-1500nm                  | PON (combi): 1260-1500nm & 1575-1581nm         |
|                                                                      | 2          | UPG: 1260-1280nm & 1525-1650nm | XGS-PON: 1260-1280nm & 1575-1581nm | RF: 1550-1560nm                               | XGS-PON: 1260-1280nm & 1575-1581nm | UPG: 1525-1565nm & 1596-1650nm                 |
|                                                                      | 3          | NA                             | UPG: 1525-1560nm & 1596-1650nm     | UPG: 1260-1280nm, 1525-1540nm & 1575-1650nm   | NG-PON2: 1524-1544nm & 1596-1603nm | NA                                             |
|                                                                      | 4          | NA                             | NA                                 | NA                                            | UPG: 1550-1560 & 1613-1650nm       | NA                                             |
| Insertion Loss                                                       | COM to 1   | ≤0.8dB                         | ≤0.8dB                             | ≤0.8dB                                        | ≤0.8dB                             | ≤0.8dB                                         |
|                                                                      | COM to 2   | ≤0.6dB                         | ≤1.2dB                             | ≤1.2dB                                        | ≤1.2dB                             | ≤0.6dB                                         |
|                                                                      | COM to 3   | NA                             | ≤1.2dB                             | ≤1.2dB                                        | ≤1.4dB                             | NA                                             |
|                                                                      | COM to 4   | NA                             | NA                                 | NA                                            | ≤1.4dB                             | NA                                             |
| Maximum Optical Input Power                                          |            | +23dBm                         | +23dBm                             | +23dBm                                        | +23dBm                             | +23dBm                                         |
| Isolation                                                            | COM to 1   | ≥30dB                          | ≥30dB                              | ≥30dB                                         | ≥30dB                              | ≥30dB                                          |
|                                                                      | COM to 2   | ≥15dB                          | ≥30dB                              | ≥30dB                                         | ≥30dB                              | ≥15dB                                          |
|                                                                      | COM to 3   | NA                             | ≥15dB                              | ≥15dB                                         | ≥30dB                              | NA                                             |
|                                                                      | COM to 4   | NA                             | NA                                 | NA                                            | ≥15dB                              | NA                                             |
| Return Loss                                                          |            | ≥50dB                          | ≥50dB                              | ≥50dB                                         | ≥50dB                              | ≥50dB                                          |
| Polarization Dependent Loss (PDL)                                    |            | ≤0.3dB                         | ≤0.3dB                             | ≤0.3dB                                        | ≤0.3dB                             | ≤0.3dB                                         |
| Polarization Mode Dispersion (PMD)                                   |            | ≤0.5ps/km <sup>0.5</sup>       | ≤0.5ps/km <sup>0.5</sup>           | ≤0.5ps/km <sup>0.5</sup>                      | ≤0.5ps/km <sup>0.5</sup>           | ≤0.5ps/km <sup>0.5</sup>                       |
| Directivity                                                          |            | ≥50dB                          | ≥50dB                              | ≥50dB                                         | ≥50dB                              | ≥50dB                                          |

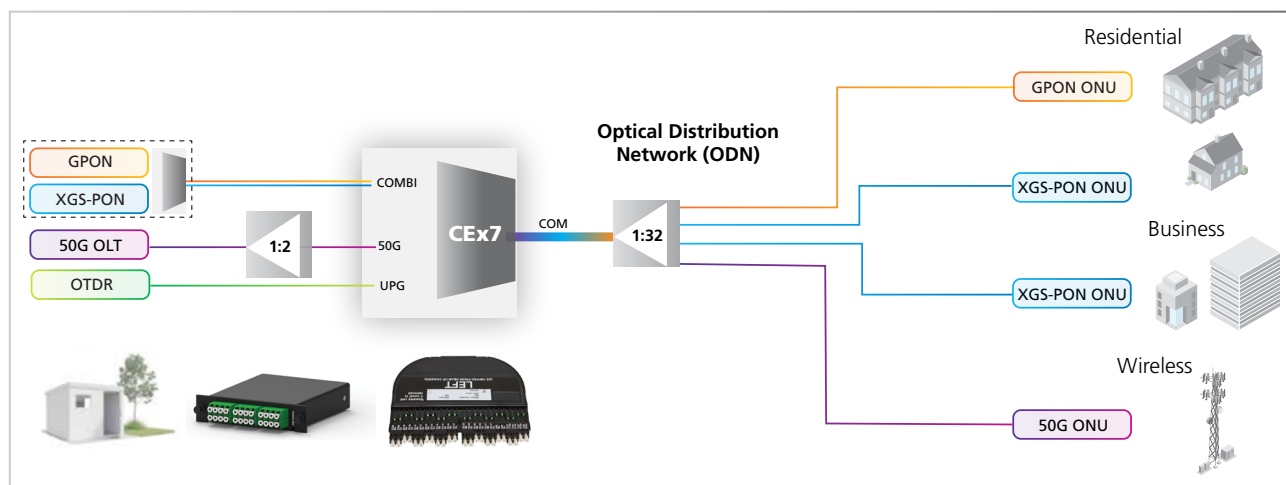
## Example application



# Coexistence optical performance (continued)

| CEx Configuration                                                    |            | CEx6                                        | CEx6b                                      | CEx7                                                | CEx8                               | CEx8b                              |
|----------------------------------------------------------------------|------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------------|------------------------------------|------------------------------------|
| Density<br>(number of circuits in chosen housing and connector type) | NG4-LC/APC | 4                                           | 4                                          | 3                                                   | 8                                  | 6                                  |
|                                                                      | LGX-LC/APC | 4                                           | 4                                          | 3                                                   | 8                                  | 6                                  |
|                                                                      | LGX-SC/APC | 3                                           | 2                                          | 3                                                   | 4                                  | 3                                  |
| Application                                                          |            | GPON, XGS-PON port, 25G or 50G (no upgrade) | GPON, XGS-PON port, 25G or 50G and upgrade | GPON and XGS-PON combi port, 25G or 50G and upgrade | XGS and 25G/50G                    | XGS and 25G/50G and upgrade port   |
| Passbands Wavelengths                                                | 1          | GPON: 1290-1330nm & 1480-1500nm             | GPON: 1290-1330nm & 1480-1500nm            | PON (combi): 1260-1280nm, 1290-1330nm, 1480-1581nm  | XGS-PON: 1260-1280nm & 1575-1581nm | XGS-PON: 1260-1280nm & 1575-1581nm |
|                                                                      | 2          | XGS-PON: 1260-1280nm & 1575-1581nm          | XGS-PON: 1260-1280nm & 1575-1581nm         | 25G/50G: 1284-1288nm & 1340-1360nm                  | 25G/50G: 1284-1360nm               | 25G/50G: 1284-1360nm               |
|                                                                      | 3          | 25G/50G: 1284-1288nm & 1340-1360nm          | 25G/50G: 1284-1288 & 1340-1360nm           | UPG: 1596-1650nm                                    | NA                                 | UPG: 1525-1560nm & 1596-1650nm     |
|                                                                      | 4          | NA                                          | UPG: 1525-1560nm & 1596-1650nm             | NA                                                  | NA                                 | NA                                 |
| Insertion Loss                                                       | COM to 1   | ≤1.4 dB                                     | ≤1.4 dB                                    | ≤1.8 dB                                             | ≤0.8 dB                            | ≤0.8 dB                            |
|                                                                      | COM to 2   | ≤1.8 dB                                     | ≤1.8 dB                                    | ≤2.3 dB                                             | ≤1.0 dB                            | ≤1.0 dB                            |
|                                                                      | COM to 3   | ≤2.1 dB                                     | ≤2.1 dB                                    | ≤1.7 dB                                             | NA                                 | ≤1.0 dB                            |
|                                                                      | COM to 4   | NA                                          | ≤2.1 dB                                    | NA                                                  | NA                                 | NA                                 |
| Maximum Optical Input Power                                          |            | +23 dBm                                     | +23 dBm                                    | +23 dBm                                             | +23 dBm                            | +23 dBm                            |
| Isolation                                                            | COM to 1   | ≥35 dB                                      | ≥35 dB                                     | ≥30 dB                                              | ≥30 dB                             | ≥30 dB                             |
|                                                                      | COM to 2   | ≥35 dB                                      | ≥35 dB                                     | ≥30 dB                                              | ≥30 dB                             | ≥30 dB                             |
|                                                                      | COM to 3   | ≥35 dB                                      | ≥35 dB                                     | ≥15 dB                                              | NA                                 | ≥15 dB                             |
|                                                                      | COM to 4   | NA                                          | ≥15 dB                                     | NA                                                  | NA                                 | NA                                 |
| Return Loss                                                          |            | ≥50 dB                                      | ≥50 dB                                     | ≥45 dB                                              | ≥50 dB                             | ≥50 dB                             |
| Polarization Dependent Loss (PDL)                                    |            | ≤0.2 dB                                     | ≤0.2 dB                                    | ≤0.2 dB                                             | ≤0.2 dB                            | ≤0.2 dB                            |
| Polarization Mode Dispersion (PMD)                                   |            | ≤0.5ps/km <sup>0.5</sup>                    | ≤0.5ps/km <sup>0.5</sup>                   | ≤0.5ps/km <sup>0.5</sup>                            | ≤0.5ps/km <sup>0.5</sup>           | ≤0.5ps/km <sup>0.5</sup>           |
| Directivity                                                          |            | ≥50 dB                                      | ≥50 dB                                     | ≥50 dB                                              | ≥50 dB                             | ≥50 dB                             |

## Example application



# Ordering Information

## NG4 CEx Ordering Information

| MID           | Description                                       | Module Type |
|---------------|---------------------------------------------------|-------------|
| NG4-VXLF08AAN | NG4 Module, CEx 1, 8 circuits, LC/APC connectors  | CEx 1       |
| NG4-VXLF06AAN | NG4 Module, CEx 2, 6 circuits, LC/APC connectors  | CEx 2       |
| NG4-VXLF06AAN | NG4 Module, CEx 3, 6 circuits, LC/APC connectors  | CEx 3       |
| NG4-VXLF04AAN | NG4 Module, CEx 4, 4 circuits, LC/APC connectors  | CEx 4       |
| NG4-VXLF08AAN | NG4 Module, CEx 5, 8 circuits, LC/APC connectors  | CEx 5       |
| NG4-VXLF04AAN | NG4 Module, CEx 6, 4 circuits, LC/APC connectors  | CEx 6       |
| NG4-VXLF04AAN | NG4 Module, CEx 6b, 4 circuits, LC/APC connectors | CEx 6b      |
| NG4-VXLF03AAN | NG4 Module, CEx 7, 3 circuits, LC/APC connectors  | CEx 7       |
| NG4-VXLF08AAN | NG4 Module, CEx 8, 8 circuits, LC/APC connectors  | CEx 8       |
| NG4-VXLF06AAN | NG4 Module, CEx 8b, 6 circuits, LC/APC connectors | CEx 8b      |



## LGX CEx Ordering Information

| MID         | Description                                                    | Module Type |
|-------------|----------------------------------------------------------------|-------------|
| LX1SXA08AAN | Single Width LGX Module, CEx 1, 8 circuits, LC/APC connectors  | CEx 1       |
| LX1SXA04CCN | Single Width LGX Module, CEx 1, 4 circuits, SC/APC connectors  | CEx 1       |
| LX1SXB06AAN | Single Width LGX Module, CEx 2, 6 circuits, LC/APC connectors  | CEx 2       |
| LX1SXB03CCN | Single Width LGX Module, CEx 2, 3 circuits, SC/APC connectors  | CEx 2       |
| LX1SXC06AAN | Single Width LGX Module, CEx 3, 6 circuits, LC/APC connectors  | CEx 3       |
| LX1SXC03CCN | Single Width LGX Module, CEx 3, 3 circuits, SC/APC connectors  | CEx 3       |
| LX1SXD04AAN | Single Width LGX Module, CEx 4, 4 circuits, LC/APC connectors  | CEx 4       |
| LX1SXD02CCN | Single Width LGX Module, CEx 4, 2 circuits, SC/APC connectors  | CEx 4       |
| LX1SXG08AAN | Single Width LGX Module, CEx 5, 8 circuits, LC/APC connectors  | CEx 5       |
| LX1SXG04CCN | Single Width LGX Module, CEx 5, 4 circuits, SC/APC connectors  | CEx 5       |
| LX1SXJ04AAN | Single Width LGX Module, CEx 6, 4 circuits, LC/APC connectors  | CEx 6       |
| LX1SXJ03CCN | Single Width LGX Module, CEx 6, 3 circuits, SC/APC connectors  | CEx 6       |
| LX1SXL04AAN | Single Width LGX Module, CEx 6b, 4 circuits, LC/APC connectors | CEx 6b      |
| LX1SXL02CCN | Single Width LGX Module, CEx 6b, 2 circuits, SC/APC connectors | CEx 6b      |
| LX1SXM03AAN | Single Width LGX Module, CEx 7, 3 circuits, LC/APC connectors  | CEx 7       |
| LX1SXM03CCN | Single Width LGX Module, CEx 7, 3 circuits, SC/APC connectors  | CEx 7       |
| LX1SXN08AAN | Single Width LGX Module, CEx 8, 8 circuits, LC/APC connectors  | CEx 8       |
| LX1SXN04CCN | Single Width LGX Module, CEx 8, 4 circuits, SC/APC connectors  | CEx 8       |
| LX1SXP06AAN | Single Width LGX Module, CEx 8b, 6 circuits, LC/APC connectors | CEx 8b      |
| LX1SXP03CCN | Single Width LGX Module, CEx 8b, 3 circuits, SC/APC connectors | CEx 8b      |



# LGX chassis solutions

## LGX 4RU back-to-back chassis

### Features

- The LGX 4RU back-to-back chassis holds 14 single-width LGX modules per side or seven dual-width LGX modules per side
- Maximum density of 28 single-width LGX modules or 14 dual-width LGX modules
- 19-in. or 23-in. rack mount
- 2.5-in., 5-in., or 8-in. recess mounting options
- Dimensions (H x W x D): 6.9 x 17 x 15 inches

| MID              | Description                                                                                     | Color |
|------------------|-------------------------------------------------------------------------------------------------|-------|
| FBPS-LGX-4RU-BLK | LGX 4RU back-to-back chassis<br>Ships equipped with two pass-through modules (LGX-PASSTHUR-3BK) | Black |

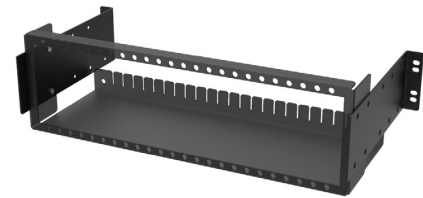


## 3RU chassis

### Features:

- Maximum density of 14 single-width LGX modules or 7 dual-width LGX modules
- 19-in. rack mount
- Dimensions (H x W x D): 132.5 x 482 x 235 mm

| MID       | Description     | Color |
|-----------|-----------------|-------|
| 760252747 | FPS-OCM-I-F-BLK | Black |



## LGX 1RU chassis

### Features

- Holds three single-width LGX modules
- 19-inch rack mount
- Dimensions (H x W x D): 1.7 x 18.9 x 8.9 inches / 44 x 481 x 225 mm

| MID       | Description                      | Color |
|-----------|----------------------------------|-------|
| 760250917 | LGX 1 RU chassis—FPS-OCM-K-F-BLK | Black |





# NG4 chassis solutions

## NG4access® universal chassis

### Features

- Single 4 RU and 2 RU chassis for all applications
- One single-high VAM per access tray loaded from rear side of chassis/frame
- Up to 24 single-high VAMs per 4 RU universal chassis. Up to 12 single-high VAMs per 2 RU universal chassis.
- Can be deployed as a standalone 19"/23" chassis in standard racks

| MID          | Description                              | Color |
|--------------|------------------------------------------|-------|
| NG4-CH100000 | NG4-CH100000: 4RU NG4 CHASSIS W/O ADPTRS | Black |
| 760242618    | NG4-CH100000-2B: 2RU NG4 CHS W/O ADPTRS  | Black |



## NG4 1RU Chassis – All Front Access

### Features

- 3 trays per chassis
- Chassis accepts single high standard NG4 modules (front connectors only)
- 6 modules per 1RU chassis

| MID       | Description   | Color |
|-----------|---------------|-------|
| 760240294 | EHD-1U-NG4VAM | Black |

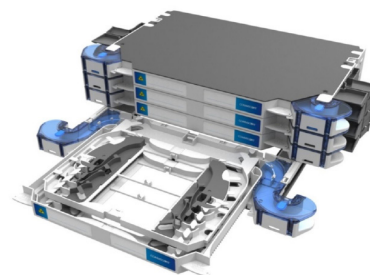


## FACT NG4 Chassis

### Features

- The FACT NG4 element includes two trays
- Each element can accommodate two single-height NG4 VAM modules

| MID       | Description |
|-----------|-------------|
| 760239975 | FACT-1ENG4  |

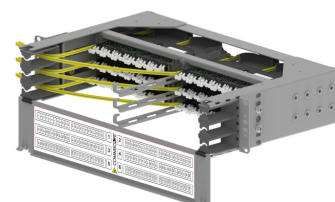


## EQUIPMENT PANEL FOR NG4/FACT MODULES

### Features

- 19 inch/ETSI - 2 HU Panel – full front access
- Can accommodate up to 6 modules

| MID       | Description       |
|-----------|-------------------|
| 760252389 | EQP-2U-6X-MOD-NG4 |





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