Executive Summary

- Product Development Roadmaps

- Ultraspan Product Family
  - Existing Products
  - Roadmap Products
    - Higher-Order Raman
    - Next-Gen Ultraspan

- Other Products
  - Next-Gen Switched Gain EDFA in MSA Form Factor
  - Pluggable EDFA
    - CFP
    - CFP2
  - Pluggable OTDR
UltraSpan® Roadmap
UltraSpan Product Family

- **Amplifier Product Families – UltraSpan**

**UltraSpan™ Products**

### 1RU EDFAs and Raman
- **EDFAs**
  - Fixed or Variable Gain
  - Single/Dual EDFA
  - Pout up to 23dBm
- **Power Booster**
  - 26dBm Pout
- **Raman**
  - Up to 800mW Raman pump power

### 1RU GateWays
- All-in-one transmission and amplification solution
  - 622Mb/s up to 10Gb/s
  - 1 to 4 client and line side interfaces
  - Enabling point to point connectivity up to 350Km
  - Integrates with other UltraSpan products to extend reach up to 500Km

### 3RU High Power Raman
- Up to 2W Raman pump power
- Up to 6 Raman pumps with redundancy
- Redundant, hot-swappable power supplies
Existing 3RU Raman Platform

- **Existing Platform**

- **Chassis equipped with slide-in units**
- **Hot-Swappable Fan Unit**
- **Hot-Swappable Pump Laser Unit**
- **Hot-Swappable Power Supply Unit**
3RU 3rd Order Raman - Architecture

Existing 3RU Chassis

Master Unit
- Controls
- Low-power lasers

Slave Unit
- Raman Fiber Laser

New High-Power Raman
Uses two 1RU Raman Units
RFL introduction will enable new variants:
- 3rd order counter Raman
- 3rd order co-Raman
- High order receiver ROPA
- Receiver ROPA using dedicated pump fiber
- Transmitter ROPA using dedicated pump fiber

### Roadmap Products

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<thead>
<tr>
<th>Product Part Number</th>
<th>Short Description</th>
<th>Q3CY16</th>
<th>Q4CY16</th>
<th>Q1CY17</th>
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<td>3rd Order Counter Raman</td>
<td>Alpha</td>
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<td>FOA-R9x00Sx-RPAnC-AAannn</td>
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<td>FOA-R9x00Sx-RPAnC-AAannn</td>
<td>3rd Order ROPA with dedicated pump fiber</td>
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Now Selecting Customers for Alpha Samples testing
Next-Gen Ultraspan

- **New Features**
  - **Electronics**
    - New, powerful and streamlined control board for best performance and cost
    - Flexible architecture to accommodate a variety of different internal configurations
  - **Mechanical - Enhancement of existing 1RU platform**
    - Pluggable, hot-swappable power supplies and fan units
    - Front to back or left to right airflow depending on application
  - **Software**
    - Based on Linux
      - development underway: running already on eval boards and virtual machines
      - Enabling flexible controls / interface
        - SNMP, netconf, other SDN-ready protocols

- **AVAILABILITY**
  - Alpha Q1/Q2 CY2017
Next-Gen EDFA in MSA Package

- Standard MSA Package

Features
- Possible configurations
  - Variable Gain EDFA
  - Variable Switched Gain EDFA (2 gain ranges)
  - Dual Fixed Gain EDFAs (2 amps in 1 box)
- Integrated controls for gain/power and transient control
- High-Level Specifications
  - Up to 21dBm Pout
  - Up to 35dB gain
  - Optimized NF across full gain range

Availability
- Alpha Q4 CY2016 / Q1 CY2017
Pluggable EDFA – CFP Form Factor

- Widely deployed pluggable form factor
- Based on feasibility study, platform can support
  - Fixed, Variable Gain EDFAs up to 20/23dBm Pout (TBC)
  - Switched-Gain EDFA
  - Up to 2 Fixed Gain amplifiers in 1CFP module

AVAILABILITY
- Alpha Q4 CY2016
  - To be confirmed based on market demand
Pluggable EDFA – Option 2

- CFP2 Form Factor

Features

- Single Variable Gain EDFA or Dual Fixed Gain
- Integrated controls for gain/power and transient control
- High-Level Specifications
  - Up to 20dBm Pout
  - Up to 30dB gain

Availability

- Alpha To Be Confirmed
  - Project currently under review
Pluggable OTDR

**Benefits**

- **OTDR functionality embedded in the optical network**
  - Anywhere a CFP2 slot is available
- **Fiber plant testing without technician intervention or extra test equipment**
- **Out-of-band wavelength**
  - Non-Traffic-Affecting testing

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<td>Dynamic Range</td>
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<td>Reflective Dead zone</td>
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<td>Spatial resolution</td>
<td>0.1 m at 1Km range Or 100m at 100Km range</td>
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<tr>
<td>Distance range</td>
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<tr>
<td>Maximum Processing time</td>
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Can be used as add-on to Next-Gen Ultraspan
Thank You

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