

The logo consists of a solid blue square with the word "SOLID" in white, uppercase, sans-serif font.

SOLID

The background of the slide is a black and white, low-angle photograph of several tall skyscrapers reaching towards the sky. The perspective creates a sense of height and scale.

Introduction of **INFINITY ACCESS™** Tunable Optical Access Platform

April 2021

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Part 1: SOLiD Company Overview

**Established in 1998, IPO in 2005
(KOSDAQ)**

2020 Revenue \$154M

**Robust R&D based RAN & WDM
Solution Development**

Expansive Global Deployments

***Korean Engineering &
Manufacturing !***

***Customers in 20+
countries, 4 local offices
worldwide***

***Over 592K units
Commercially
Deployed***



Business Units

**WIRELESS
COVERAGE SOLUTIONS**

**WIRELIN
SOLUTIONS**

GOVERNMENT

**4G/5G DAS
RF Repeaters
4G/5G RAN**

**WDM
Fronthaul/Backhaul
Tunable SFPs**

**R&D Innovation
Development**



Global Presence

OPERATIONS IN 4 COUNTRIES



Key Customers

DAS & Repeater Customers: Carriers



WDM Customers

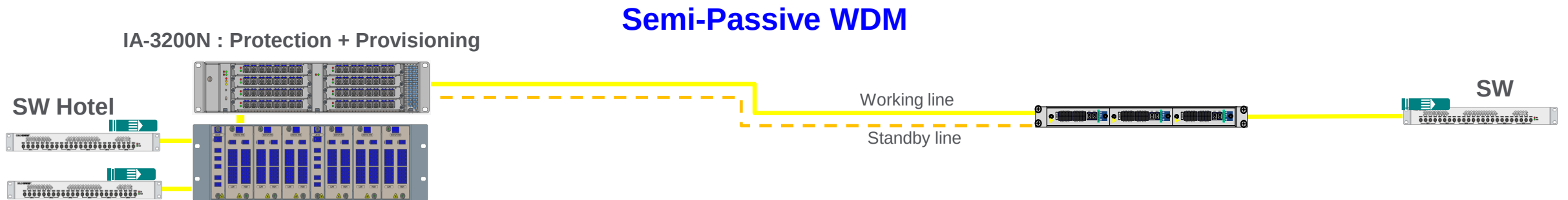
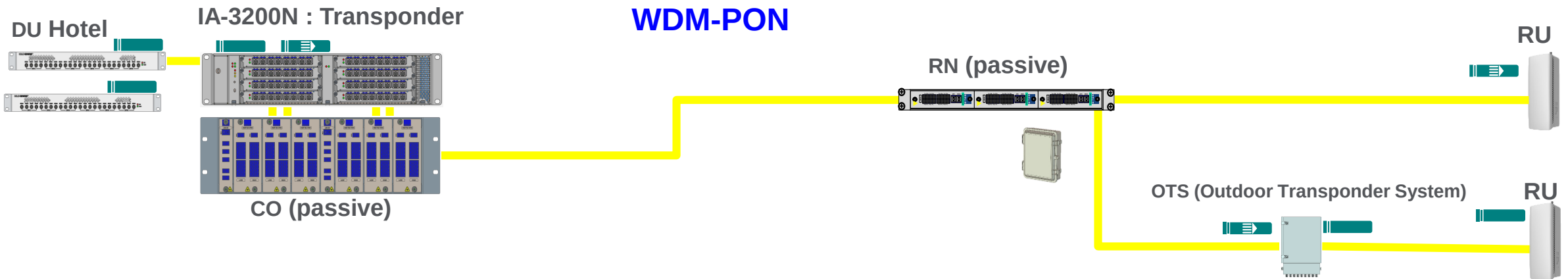


DAS & Repeater Customers: Tower companies, Neutral hosts, Enterprises and Integrators

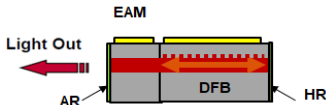
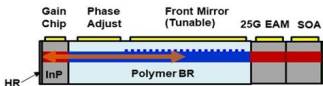


Part 2: SOLiD WDM Solution

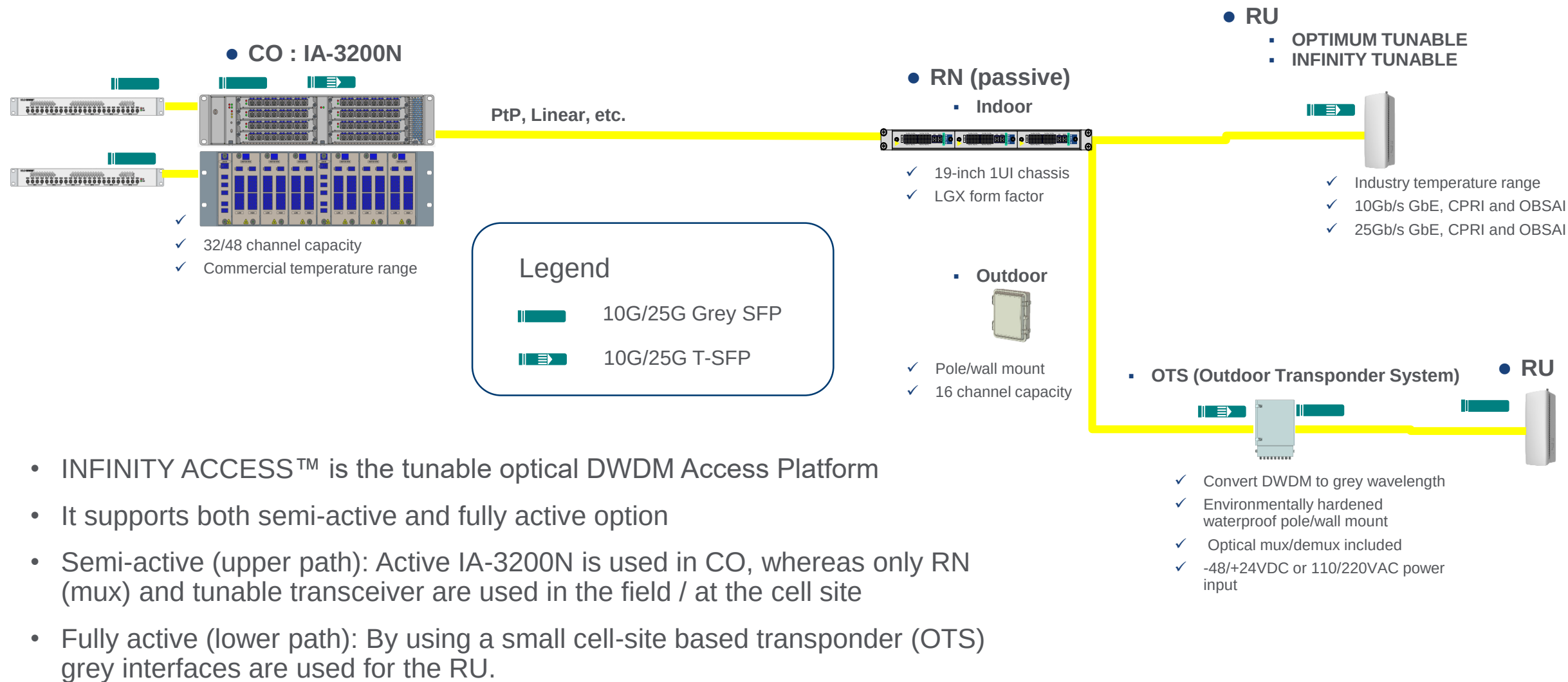
SOLiD WDM solution



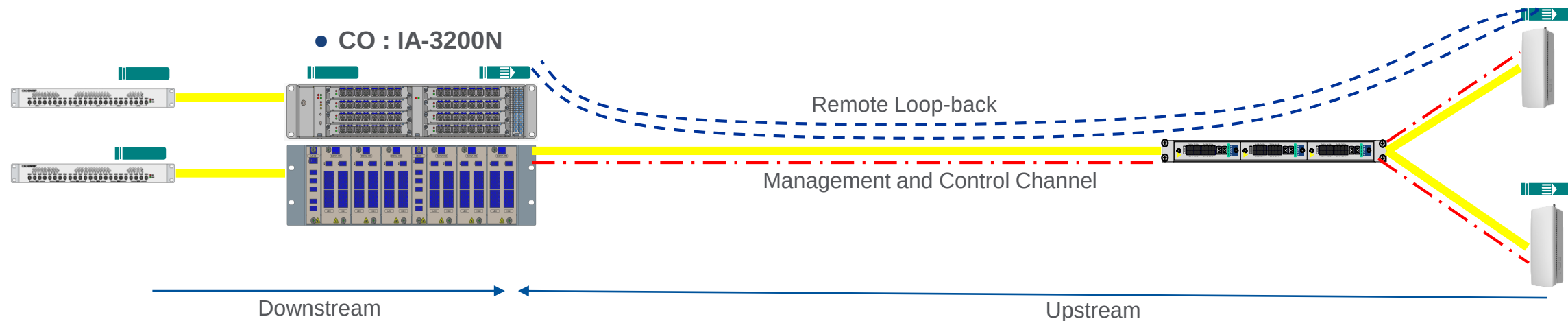
INFINITY ACCESS Solution

	WDM-PON	Semi passive WDM	Passive WDM
IA-3200N 	- Channel transponder unit - Ring protection unit	1+1 protection unit - Channel provisioning unit	
OTS 	Outdoor transponder unit placed in remote node		
OPTIMUM 	8 wavelengths tunable self-tuning transceiver in C and O band 10G/25G data rate		
INFINITY 	32 wavelengths tunable self-tuning transceiver in C band 10G/25G data rate		
CO Passive 	- AWG multiplexer/demultiplexer - LGX form factor - Commercial grade		
RN Passive 	- AWG multiplexer/demultiplexer - LGX form factor - Industrial grade		

WDM PON End to End Solution



WDM PON Benefits



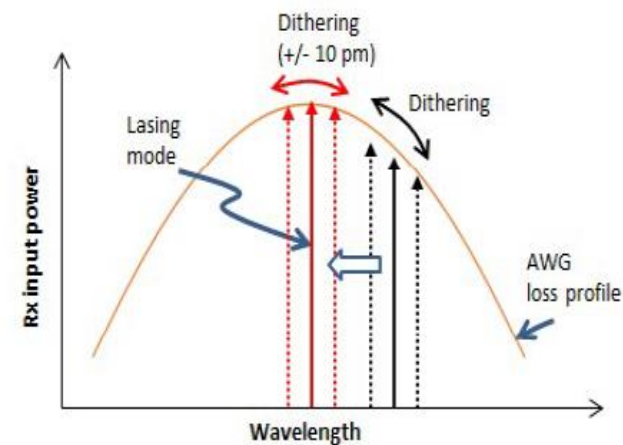
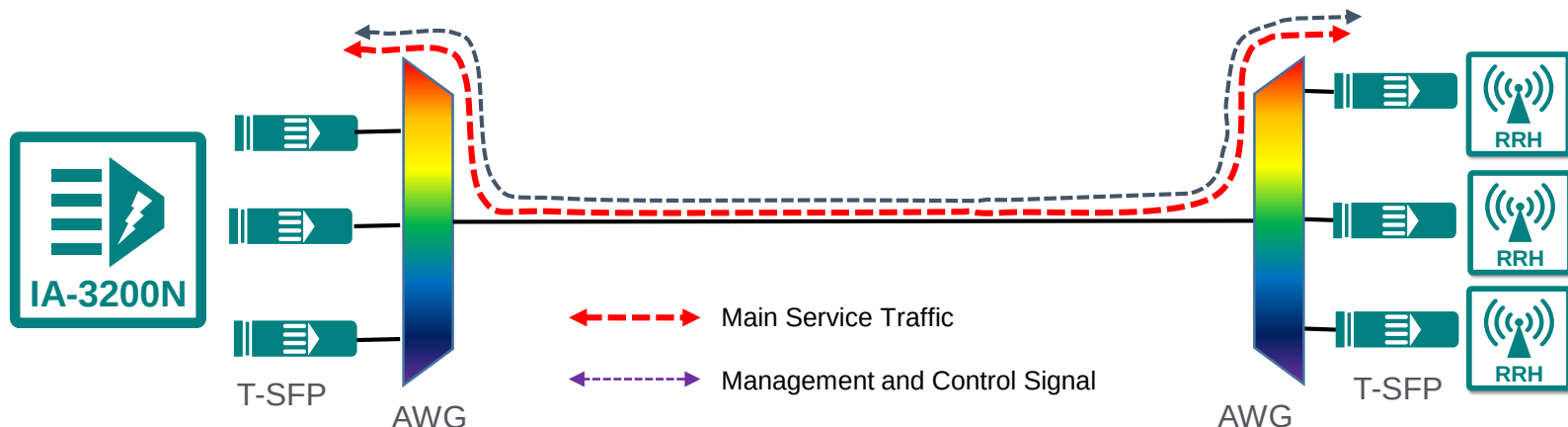
- Demarcation

- ✓ Performance Monitoring from DU to IA-3200N section by verifying either CV or FCS
- ✓ Performance Monitoring from RU to IA-3200N section by verifying either CV or FCS

- Diagnostic function

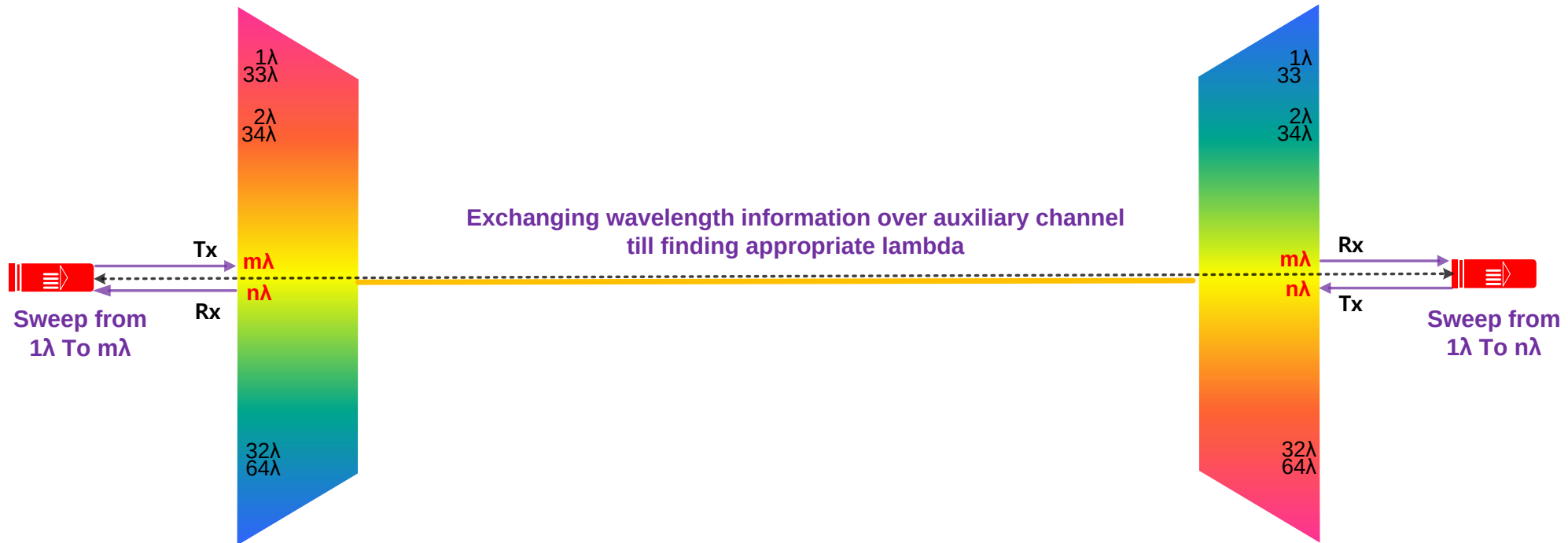
- ✓ Support diagnosis from IA-3200N to tunable SFP in RU by remote loop-back function
 - BER performance measurement in channel card in IA-3200A
- ✓ Performance monitoring of remote tunable SFP thru separately management and control channel
 - Alarm status : TX fail , LOS, self-tuning failure
 - Operation status : Tuned Wavelength, optical power, bias current, temperature

Self tuning and auto locking wavelength



- Auxiliary Management and Control Channel(AMCC)
 - Electrically multiplexed with service traffic, but no influence on service traffic
 - Utilized for self-tuning, wavelength locking and provisioning
- Self tuning in two mode
 - MUX port Aware : Either optics in IA-3200N and RU or OTS searches wavelength and the earlier searched one transmits its information to the other
 - MUX port agnostic : Each optics independently searches wavelength till finding appropriate lambda
- Patented wavelength locking by software
 - Fine tuning wavelength by tracking the peak power in Gaussian shape of AWG
 - Improve the link budget

Self tuning Benefits

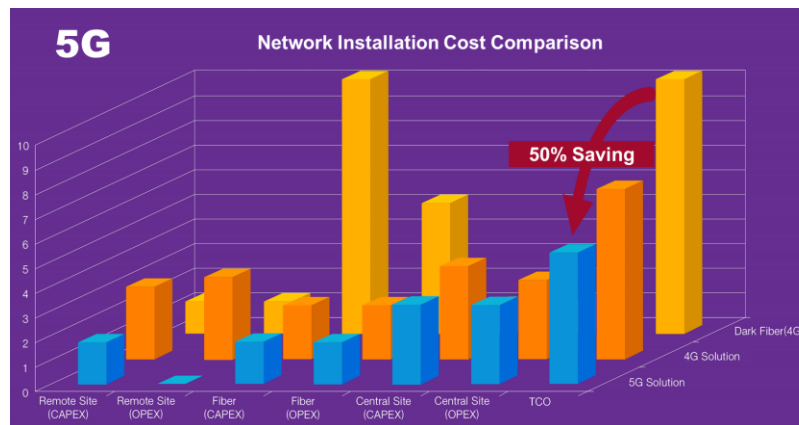
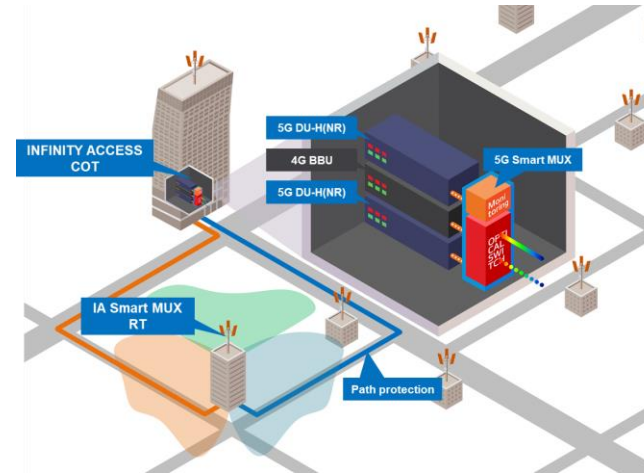
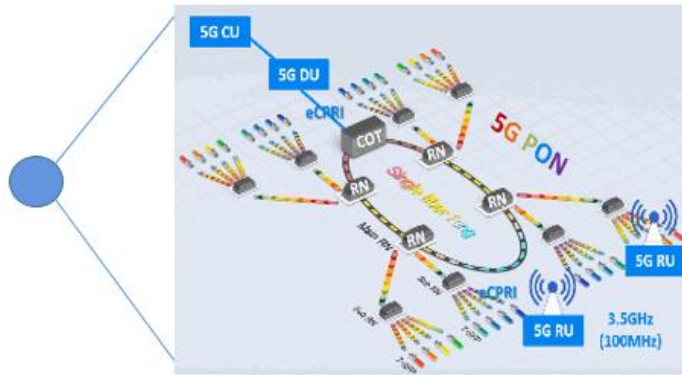
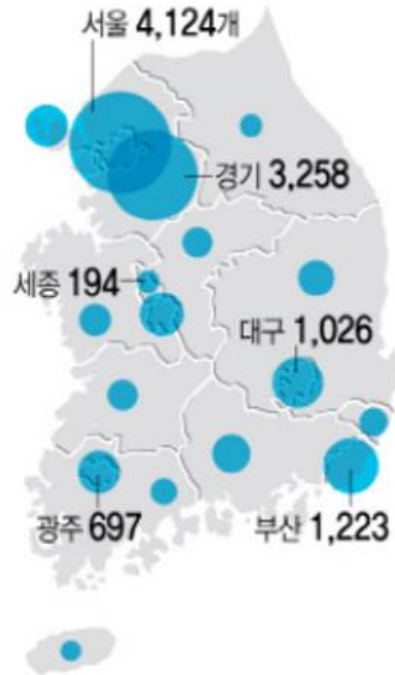


- Simply “Plug-and-Play”
- No need to bring external box for writing wavelength
- No intervene from host equipment for setting wavelength
- No need to trace out the transceivers and MUX ports
- Reduce substantial installation time
- Allow installation by non-trained persons

Proven track record in Korean 4G & 5G Mobile Network

SKT 5G

SKT



- [SKT's Active CRAN Solution for Fronthaul Networks](https://youtube.com/watch?v=K_lhV2s5c1o)
✓ https://youtube.com/watch?v=K_lhV2s5c1o
- [SKT 5G-PON](https://youtube.com/watch?v=SKsECX-TLQQ)
✓ <https://youtube.com/watch?v=SKsECX-TLQQ>
- [SKT 5G Fronthaul solution](https://youtube.com/watch?v=JvkVe_7z9Ao)
✓ https://youtube.com/watch?v=JvkVe_7z9Ao

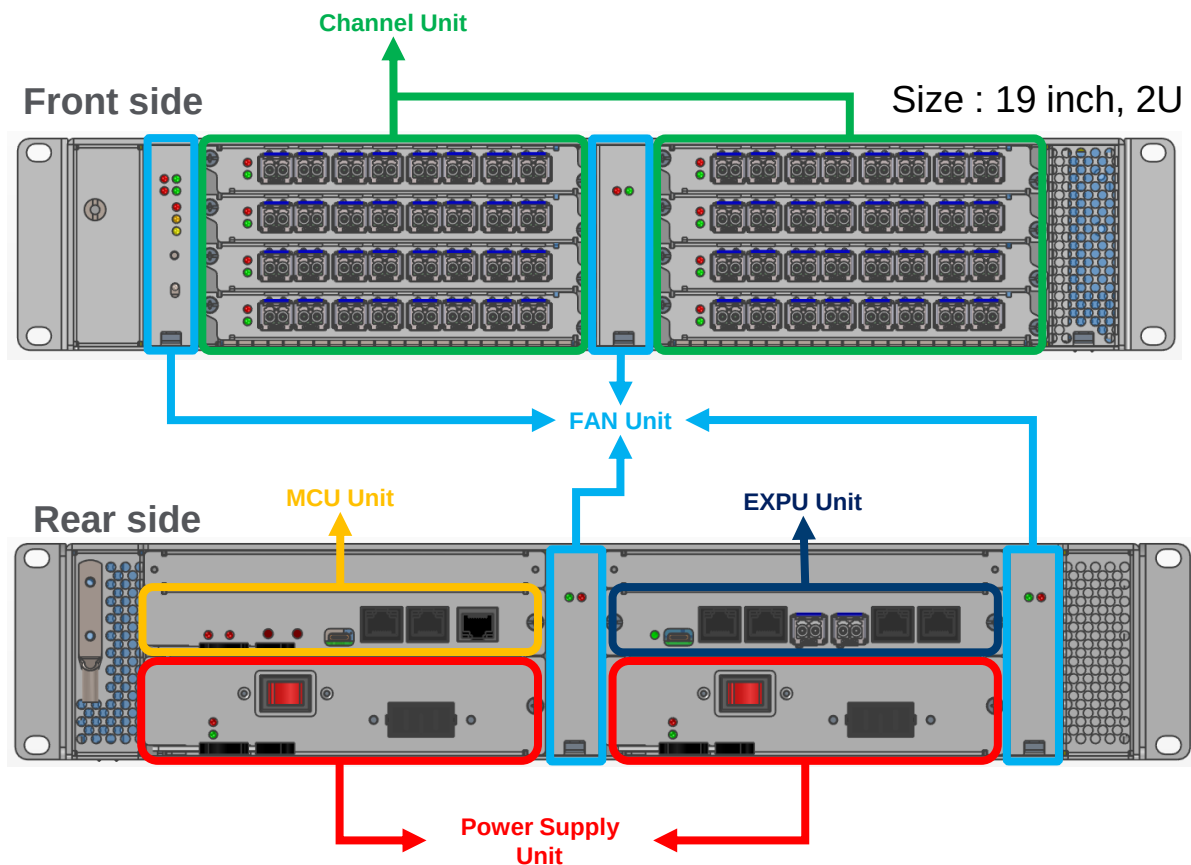
Part 3: System Overview

- **Active**
 - ✓ IA-3200N
 - ✓ IA-OTS
- **Self tunable optics**
 - ✓ Infinity
 - ✓ Optimum
- **Passive MUX/DeMUX**

IA-3200N Brief Summary

- Global market debut platform after successfully nationwide 5G deployment in Korea
- Well position in access network in both mobile and wireline
- Support WDM PON in principle but possible extend to full active architecture
- Provide DWDM transponder function and performance demarcation point
- Guarantee ultra low latency (0.4μsec)
- Support various protocol of CPRI option 3/5/7/8, 10G/25G eCPRI
- Compact design in accommodating 32 channels in 19 inch 2U height
- Design to comply NEBS and ETSI

IA-3200N (WDM-PON)



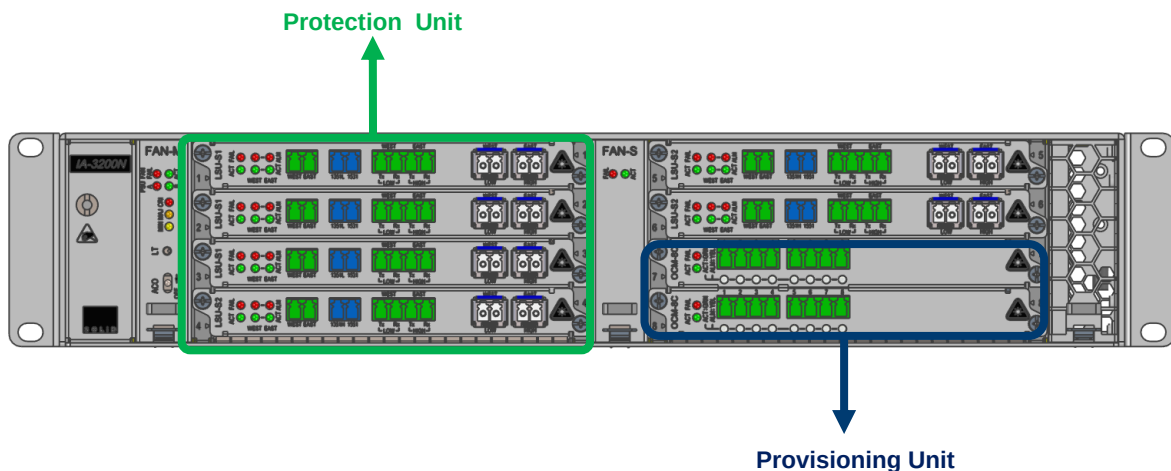
Front side : 8 Channel Unit Slots

- 10G Channel unit
 - ✓ Wavelength conversion from DU(Grey SFP) to RU(DWDM T-SFP)
 - ✓ 4 port of CPRI Option 3, 5, 7, 8 or 10G eCPRI
 - ✓ Performance monitoring
- 25G Channel unit
 - ✓ Wavelength conversion from DU(Grey SFP) to RU(DWDM T-SFP)
 - ✓ 4 port of CPRI Option 8 or 10G/25G eCPRI
 - ✓ Performance monitoring

Rear side : Common Unit Slots (MCU, EXPU, PSU)

- Main control Unit : MCU
 - ✓ System management and provisioning
 - ✓ Analyzing line condition with trace graph
- Management Port Expansion Unit : EXPU
 - ✓ DCN Port: Two 10/100 Base-T and Two SFP(GbE) Port
 - ✓ AUX Port: Two 10/100 Base-T
- FAN : Left(FAN-M/S) & Mid(FAN-C) & Rear(FAN-C)
- Power : DC -48V, Redundant Power Supply

IA-3200N (Semi-Passive)



• Provisioning Unit (Semi-passive)

- ✓ Monitoring total 32 channels' power level of upstream and downstream
- ✓ Supporting 8 WDM lines using MEMS switch
- ✓ Proactively notify the alert message to operator before transceiver gets dead
- ✓ Using a history diagram, an operator can conveniently check each channel status of WDM line

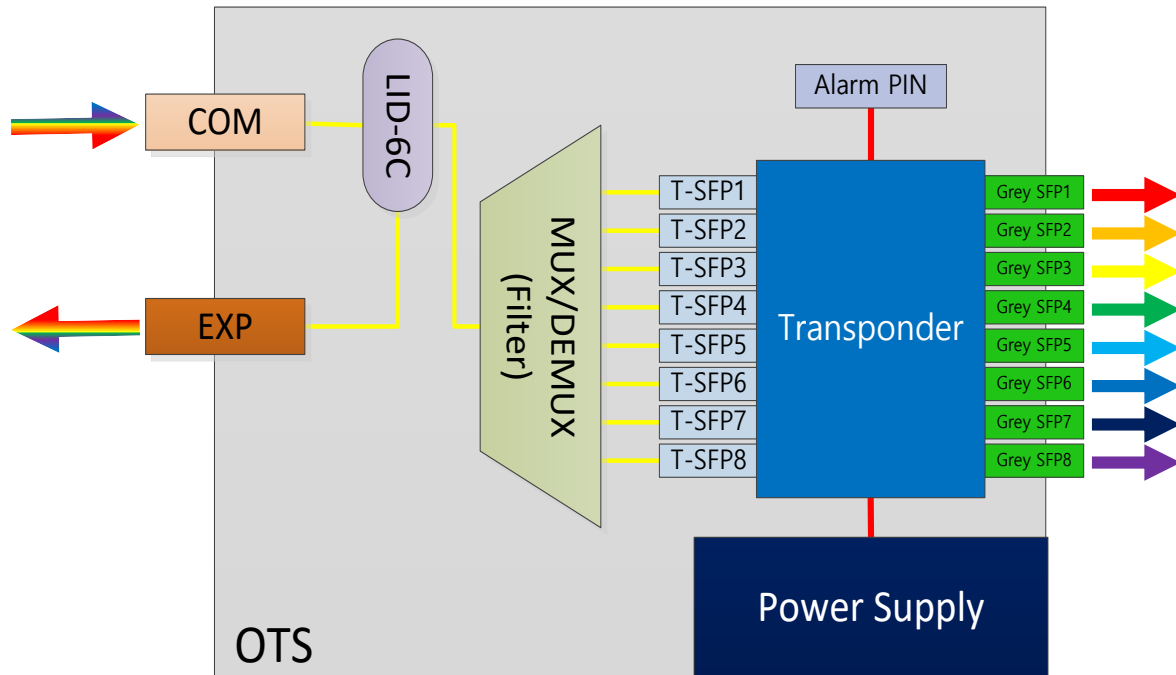
• 1+1 line protection (Semi-passive)

- ✓ Switch to standby line when working line is cut
- ✓ Monitoring optical power of returned signal on both working and standby line
- ✓ Support 3 protection modes

• Ring protection

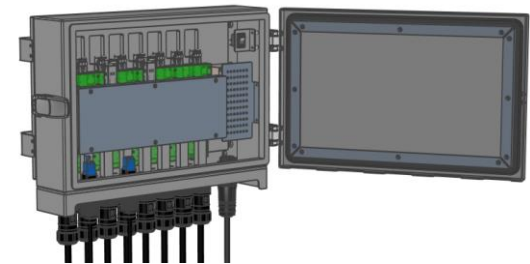
- ✓ Support two nodes Ring
- ✓ Require two units for East and West path
- ✓ Monitoring optical power of returned signal on East and West path
- ✓ Compensate the time difference when rerouted into longer path by delay equalizer function in channel card
- ✓ Supports 3 protection modes
 - Auto mode : switching per input power level
 - Manual mode : manual switching
 - Lock mode : prohibit Auto mode
- ✓ Priority Lock > Auto > Manual

IA-OTS (Outdoor Transponder System)

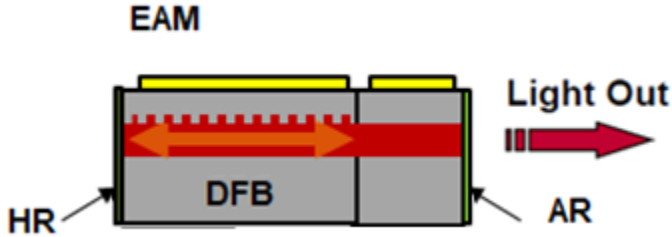
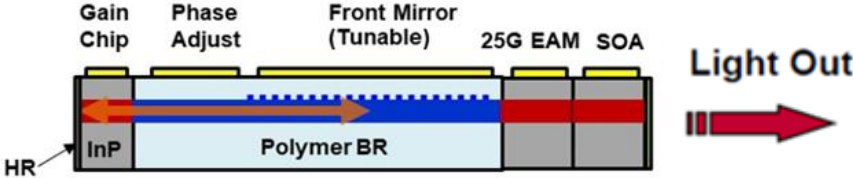


- Houses multiple transponders to support gray optic interface to client side
- Management by AMCC of tunable optics
- Environmentally hardened outdoor enclosure
- Compact size and light weight
- OFD for fiber optic cable management
- Features
 - Supports up to 8 service channels' wavelength conversion
 - Includes one MUX/DeMUX module
 - -48VDC or 110/220VAC power input
 - Dimension: 310.7 (W) X 377.0(H) X 136.3(D) (mm)

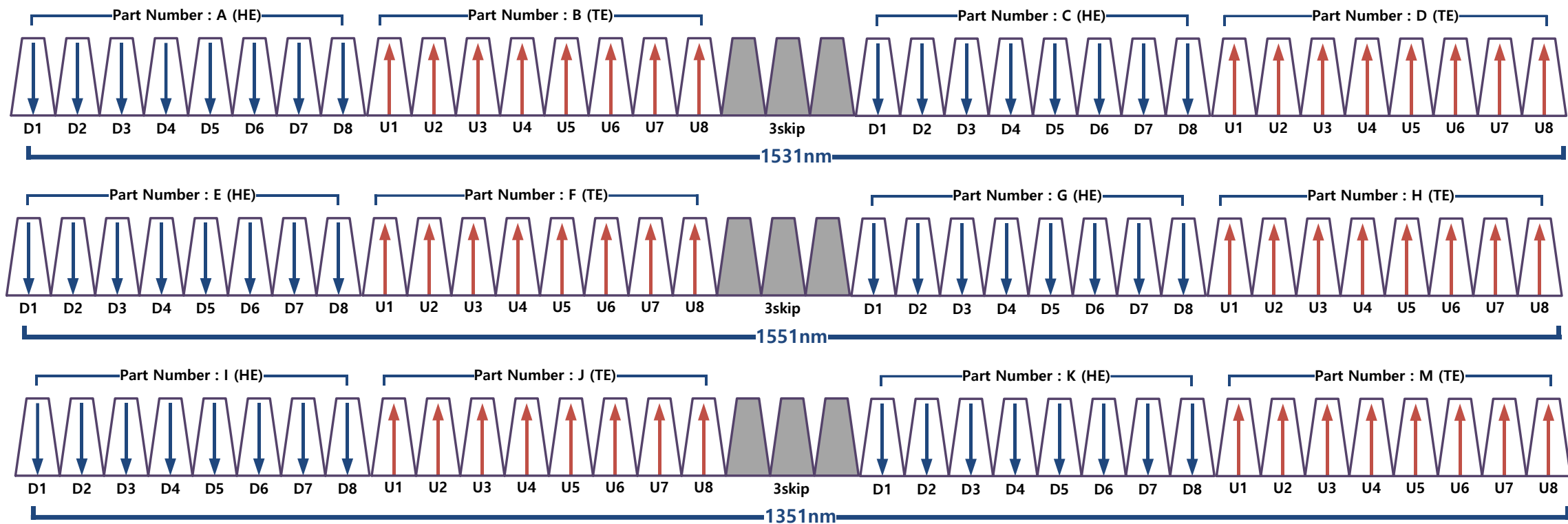
**IT TURNS IA-3200N SYSTEM
INTO FULLY ACTIVE**



SOLiD tunable optic : Optimum vs Infinity

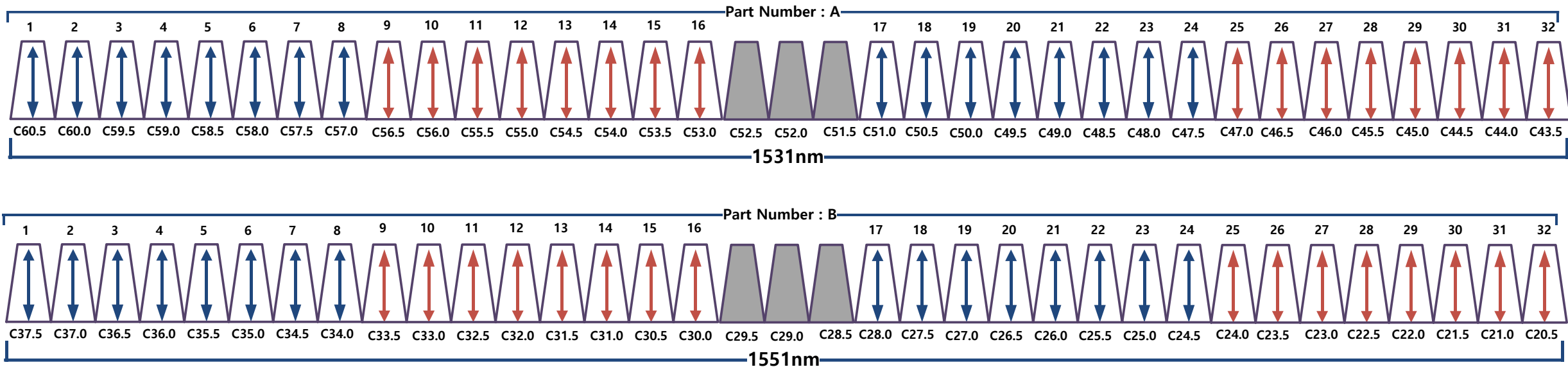
Type	Structure	Remark
Optimum		• Data rate: 10/25Gbps • Integrated DFB/EAM structure • Narrow Tunable Range (~3 nm) • 8 lambdas per 1 part number • 50GHz spacing + S/W locking • Available Now
Infinity		• Data rate: 10G/25Gbs • Discrete Polymer BR+EAM+SOA structure • Wide Tunable Range(~15 nm) ✓ 15nm range of EAM ✓ 15nm range of polymer BR • 32 lambdas per 1 part number • 50GHz spacing + S/W locking • Sample in Sep and GA in Dec

SOLiD OPTIMUM T-SFP Wavelength Plan



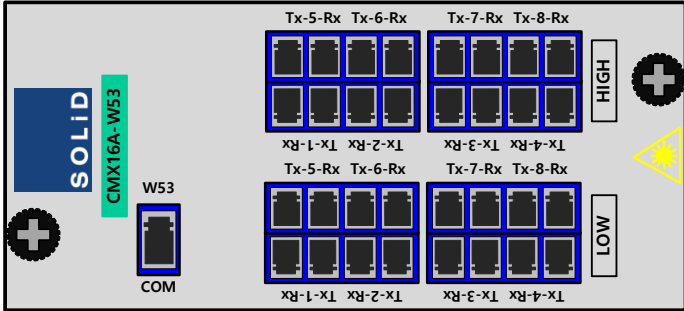
- 50GHz spacing grid complaint to ITU-T G.694.1
- Link budget : 10G 21.5dB @ 20Km SMF, 25G 16dB @10Km SMF
- 8 wavelengths tunable optic in O band and C band (total 12 SKUs)
- No conflict with GPON service

SOLiD INFINITY T-SFP Wavelength Plan

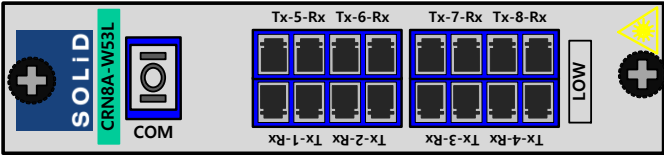
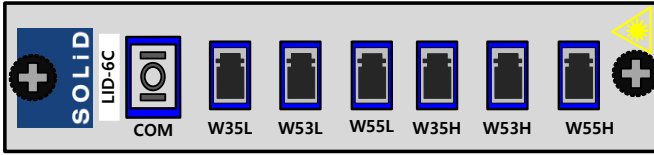
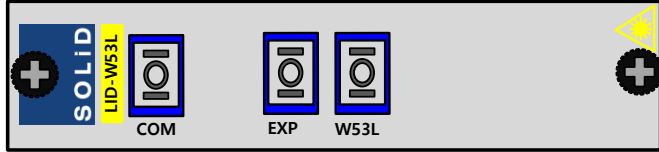


- 50GHz spacing grid complaint to ITU-T G.694.1
- Link budget : 10G 21.5dB @ 20Km SMF, 25G 16dB @10Km SMF
- 32 wavelengths tunable optic in C band per SKU (total 2 SKUs)
- Same frequency to OPTIMUM

CO Passive Components

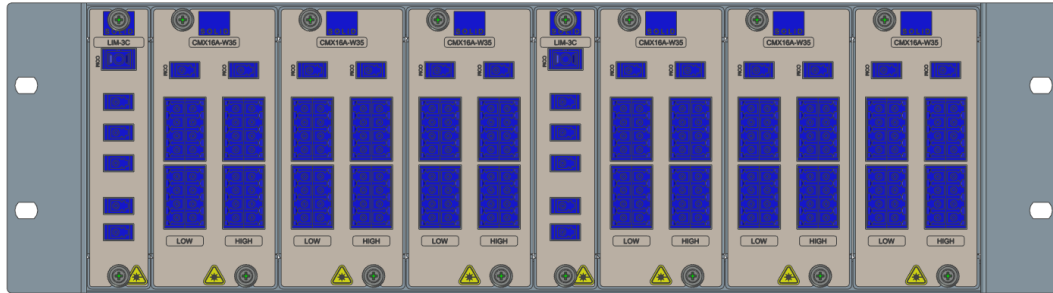
	Central Office (CO)	
	CMX16A-W35 CMX16A-W53 CMX16A-W53	LIM-3C
Unit Shape		
Unit Function	✓ 3 models : 1351nm, 1531nm, 1551nm ✓ 32 wavelengths Gaussian AWG(Arrayed Waveguide Grating) Module ✓ 50GHz channel spacing ✓ LGX modular type ✓ Connector type - COM(W35/53/55) : LC/PC - 16TRX/RX : LC/PC	✓ 35/53/55 3 band combining filter ✓ Providing the monitoring Port ✓ LGX modular type ✓ Connector type - COM : SC/PC - 35/53/55 : LC/PC - MON: LC/APC

RN Passive Components

	Remote Node (RN)		
	CRN8A-W35L/H CRN8A-W53L/H CRN8A-W55L/H	LID-6C	LID-W35L/H LID-W53L/H LID-W55L/H
Unit Shape			
Unit Function	✓ 6 models : 1351nm Low & High, 1531nm Low & High, 1551nm Low & High ✓ 16 wavelengths AWG Module ✓ 50GHz channel spacing ✓ LGX modular type ✓ 1 COM port for MUX/DeMUX ✓ Connector type - COM : SC/PC - 8 TX/RX Ports : LC/PC	✓ 35L/H, 53L/H, 55L/H 6 band combining filter ✓ LGX modular type ✓ Connector type - COM : SC/APC - 35L/H, 53L/H, 55L/H : LC/PC	✓ 6 models : 1351nm Low & High, 1531nm Low & High, 1551nm Low & High ✓ Passband filter ✓ LGX modular type ✓ Connector type - COM, EXP WxxL/H : SC/PC

Passive : Shelf & Enclosure

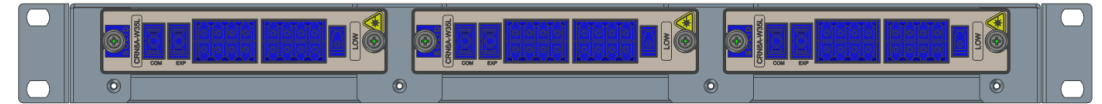
CO Shelf: LGX-RCK-14S-3U



LIM-3C 35nm 53nm 55nm 35nm 53nm 55nm

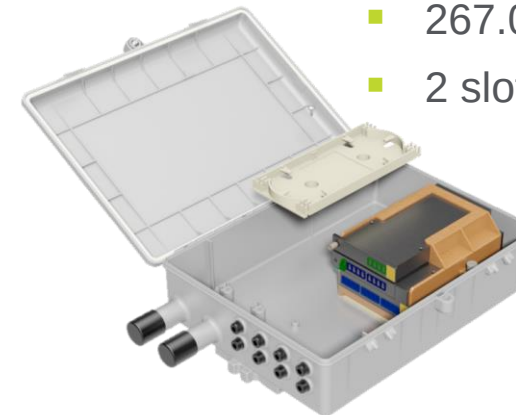
- 482.6(W) x 132.5mm(H) x 188.1(D) (mm)
- 3U 14 slots LGX chassis
- 3 AWG Modules (2 slots) of 1351nm, 1531nm and 1551nm
 - Each AWG mux/demux of 32 wavelengths
- 1 thin film filter Module (1 slot) for combining 3 DWDM (35/53/55)

RN Indoor Shelf : LGX-RCK-3S-1U



- 482.6(W) x 44.0(H) x 188.1(D) (mm)
- 1U 3 slots LGX chassis

RN Outdoor Enclosure : LGX-ENC-2S

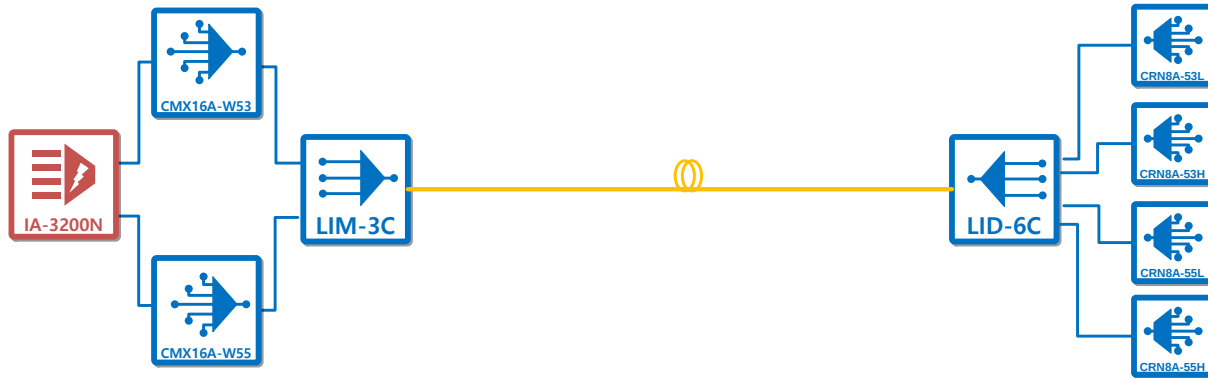


- IP53 rating
- 267.0(W) x 364.7(H) x 128.9(D) (mm)
- 2 slots for RN MUX/DeMUX

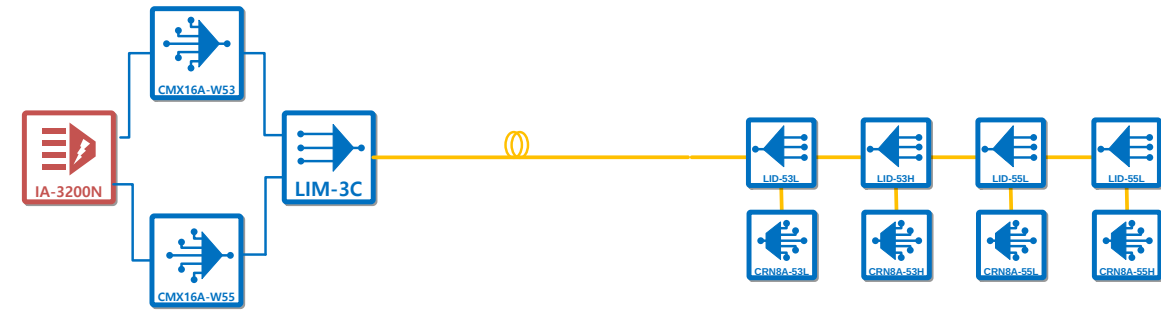
Part 4: Network Topology

Infinity Network Topology

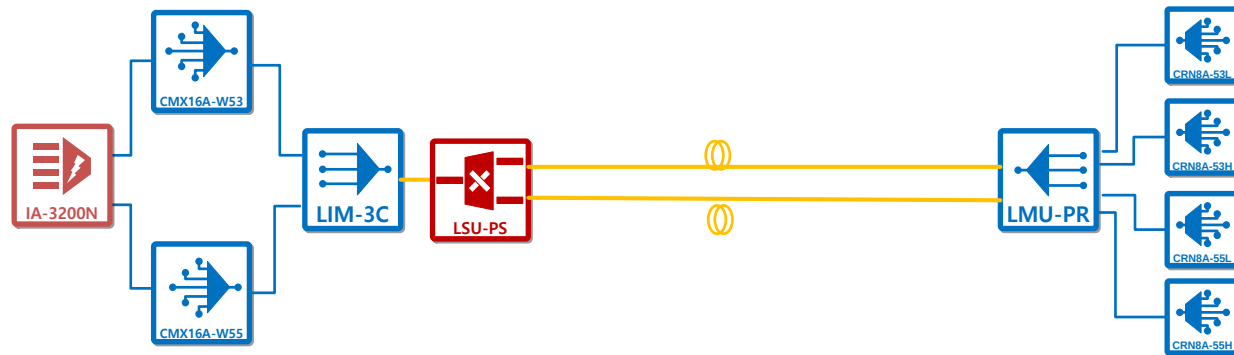
■ Point to Point



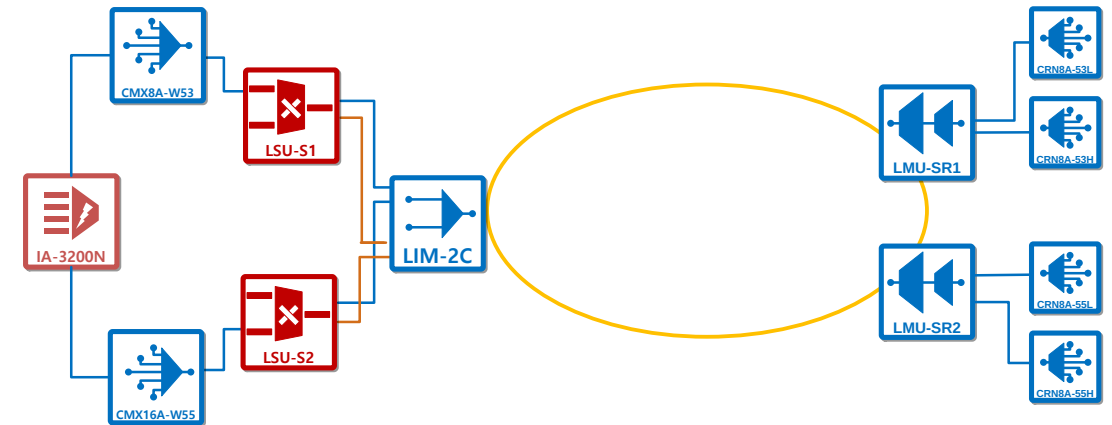
■ Cascade



■ Point to Point Protection

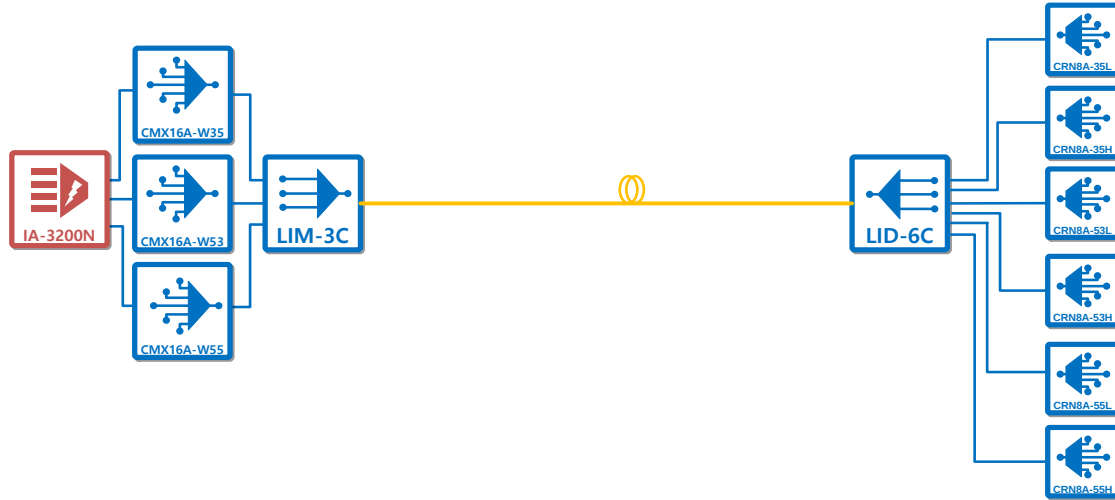


■ Ring Protection

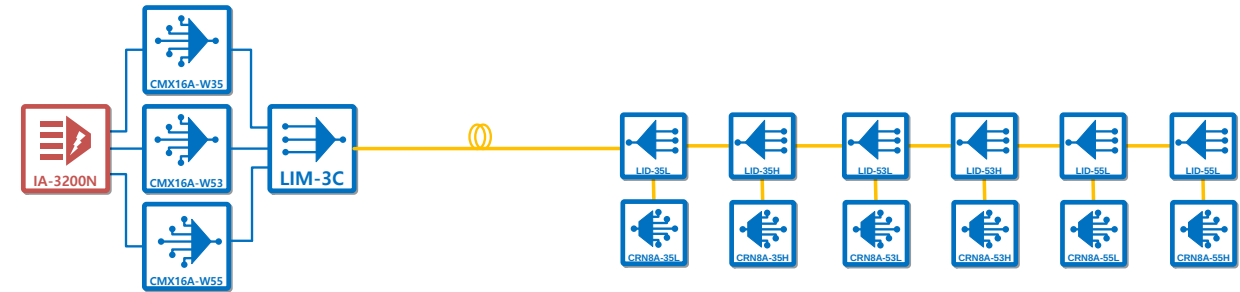


Optimum Network Topology

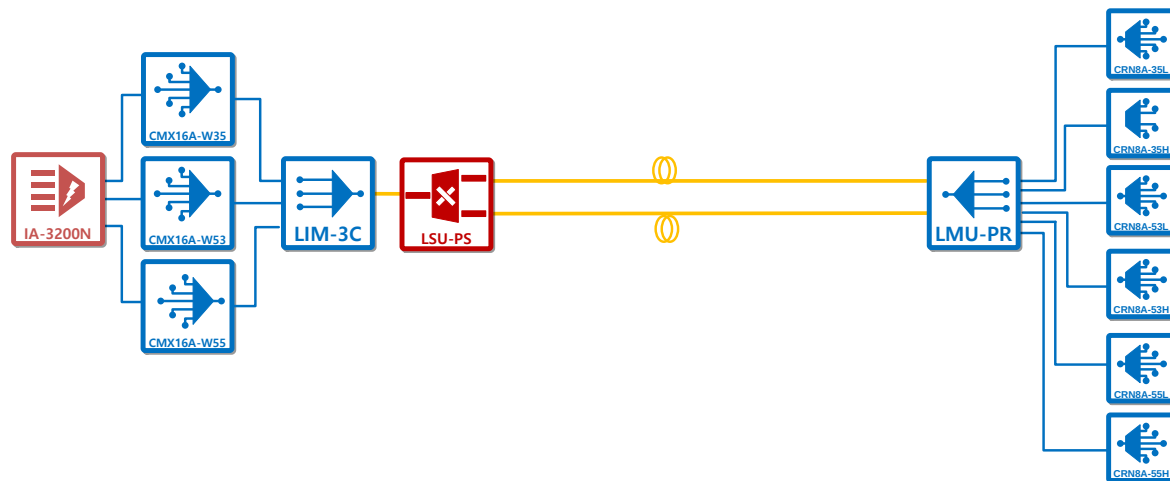
■ Point to Point



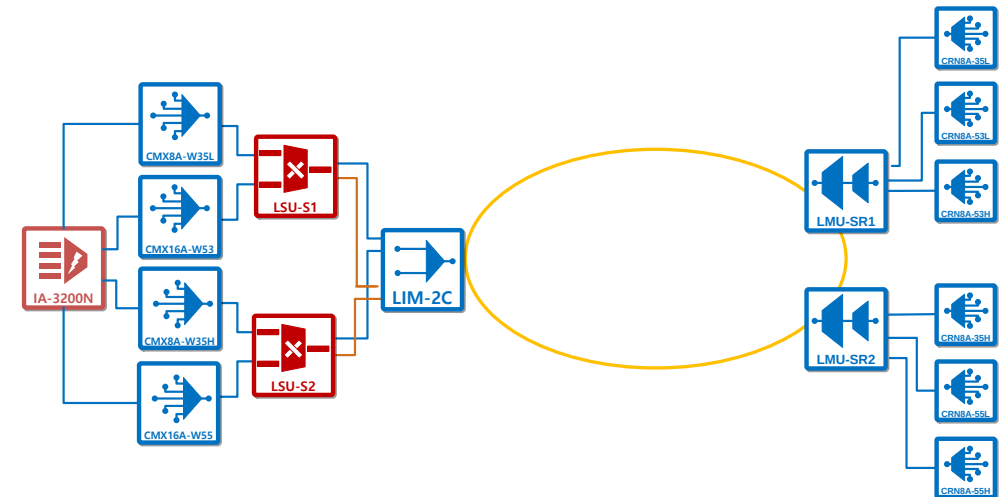
■ Cascade



■ Point to Point Protection



■ Ring Protection



Summary

➤ WDM PON: Infini Access

- Reduce OPEX by operating passively in remote sites
- Reduce SKU number of SFPs by using Tunable SFPs
- Support point to point, linear and ring topology
- Field proven technology by nationwide 5G deployment in Korea

➤ Semi Passive : iMUX+

- 1+1 fiber protection of the WDM
- Proactive provisioning by AI enabled monitoring channels

➤ All Passive: iMUX

- Cost effective Passive with tunable SFP+
- Enables 94 wavelengths (48 channels) over single fiber

Part 5: Appendix

IA-3200 Brochure

The background of the slide is a black and white photograph of several tall skyscrapers reaching towards the sky, viewed from a low angle looking up. In the top left corner, there is a blue square containing the word "SOLID" in white capital letters.

SOLID

Thank You

If you have further question or inquiry,
please contact at skchu@solid.co.kr