OpenEdge
Sled Switch for
Nokia AirFrame Team

Delta Product Marketing

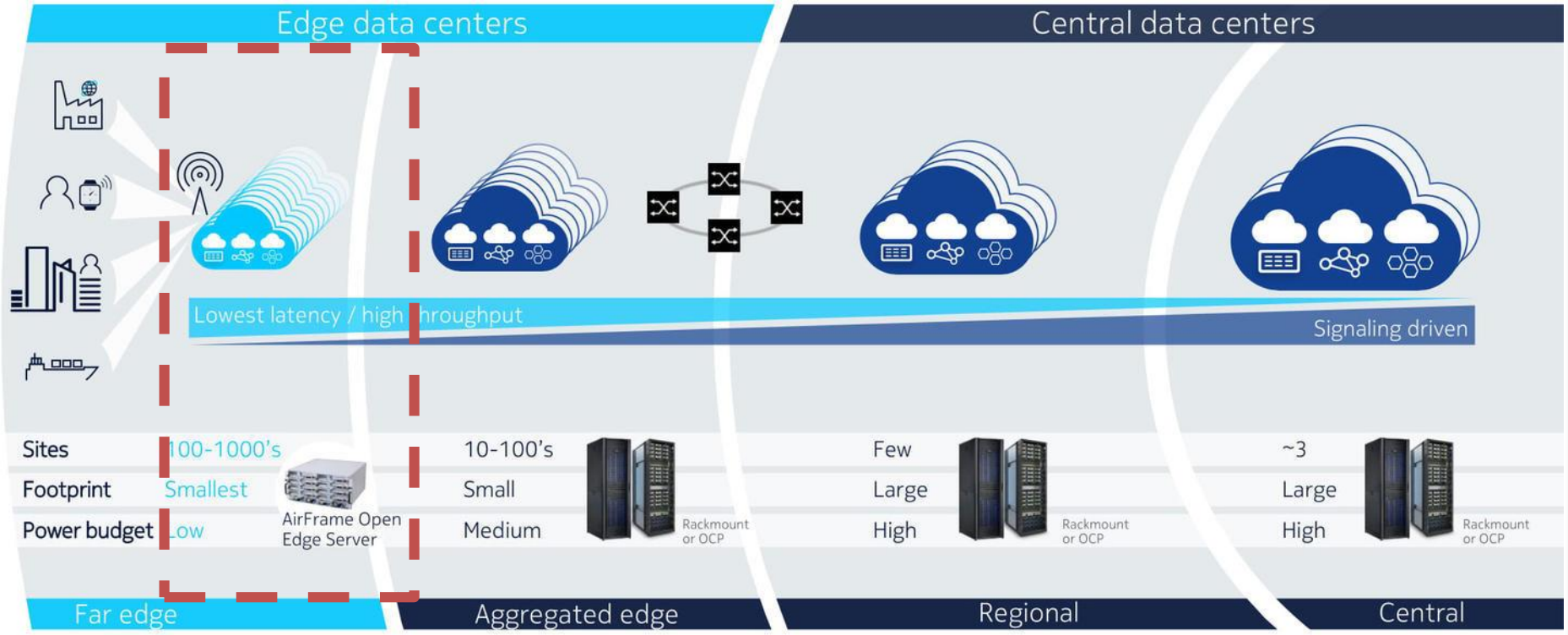
Well Lee & Samuel Fu

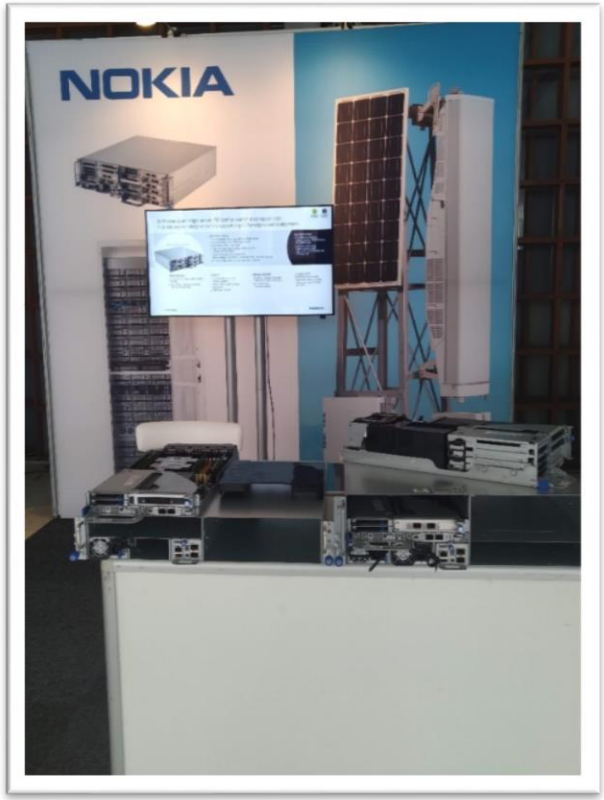
May. 11th, 2020

Agenda

- **Background of openEDGE Sled Switch Proposal**
- **Switch Product Proposal**
- **Time Synchronization**

Nokia Airframe openEDGE structure

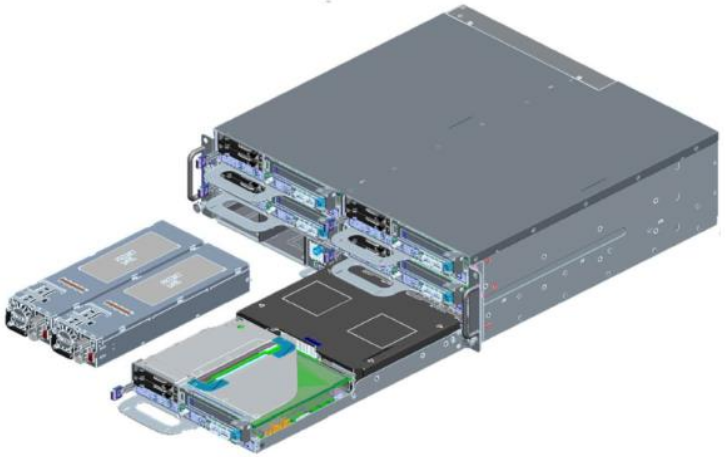




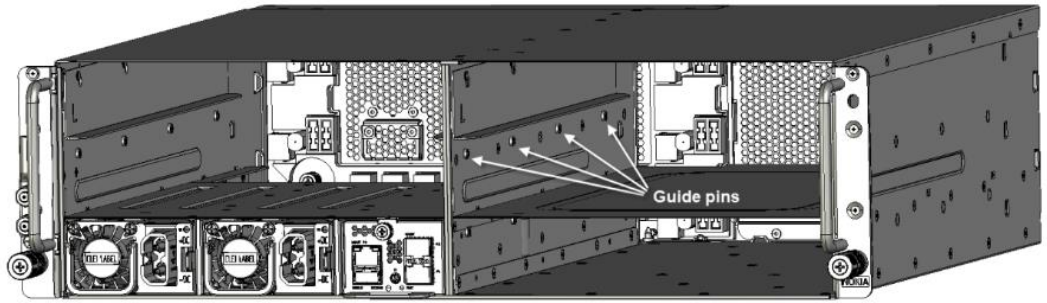
Agenda

- Background of openEDGE Sled Switch Proposal
- **Switch Product Proposal**
- Time Synchronization

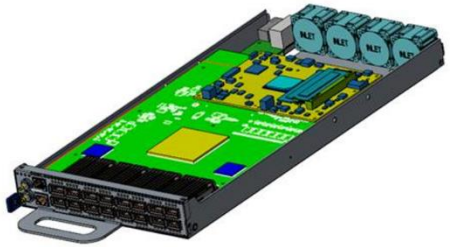
Delta Hardware Proposal-DSS



- Half width module support for both 1U and 2U sleds
- OpenEdge 1U open slot: 16-port 100GbE QSFP28 in sled 41.85 x 215 x 421mm (H x W x D)
- OpenEdge 2U open slot: 32-port 100Gbe QSFP28 in sled 83.55 x 215 x 421mm (H x W x D)
- 12V-DC power feed, the estimated power consumption are 400Watts or 700Watts.
- Fans are installed into the sled and air flow direction configurable from front to rear of rear to front.
- Provides sled switch management (RMC) are performed via RMC or front console I/O.



Airframe openEDGE Chassis



Delta Sled Switch

DSS-1U

Delta Sled Switch

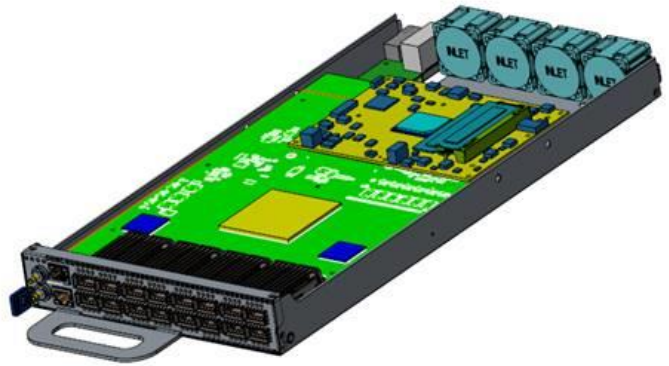
DSS-2U

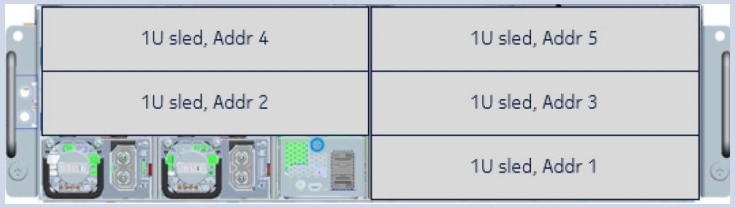
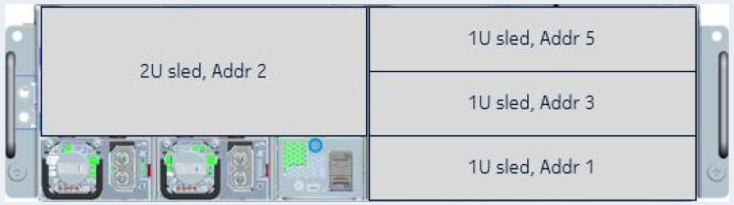
Delta Sled Switch

1U and 2U Sled

Delta Sled Switch Solutions

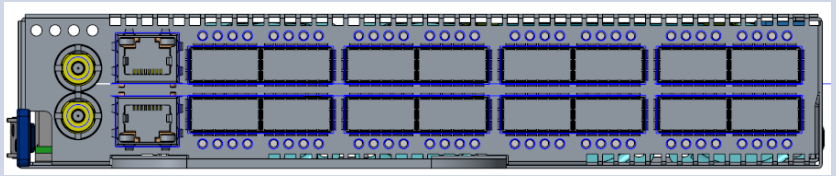
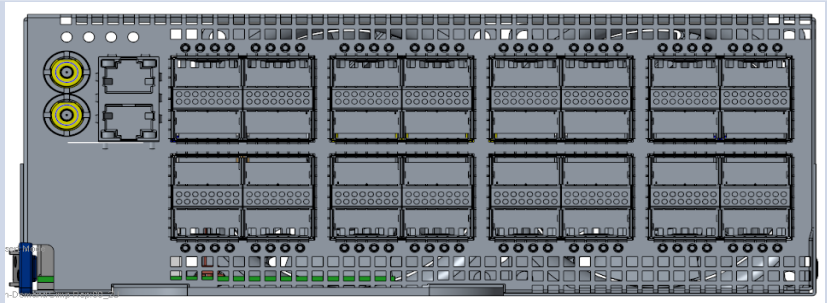
- Solution 1: 1U x 5
- Solution 2: 1U x3 & 2U x1
- Solution 3: 1U x1 & 2U x2
- Solution 4: 1U x3 & 2U x1



Supported combinations of 1U and 2U sleds	
Solution #1	
Solution #2	
Solution #3	
Solution #4	

Delta Sled Switch

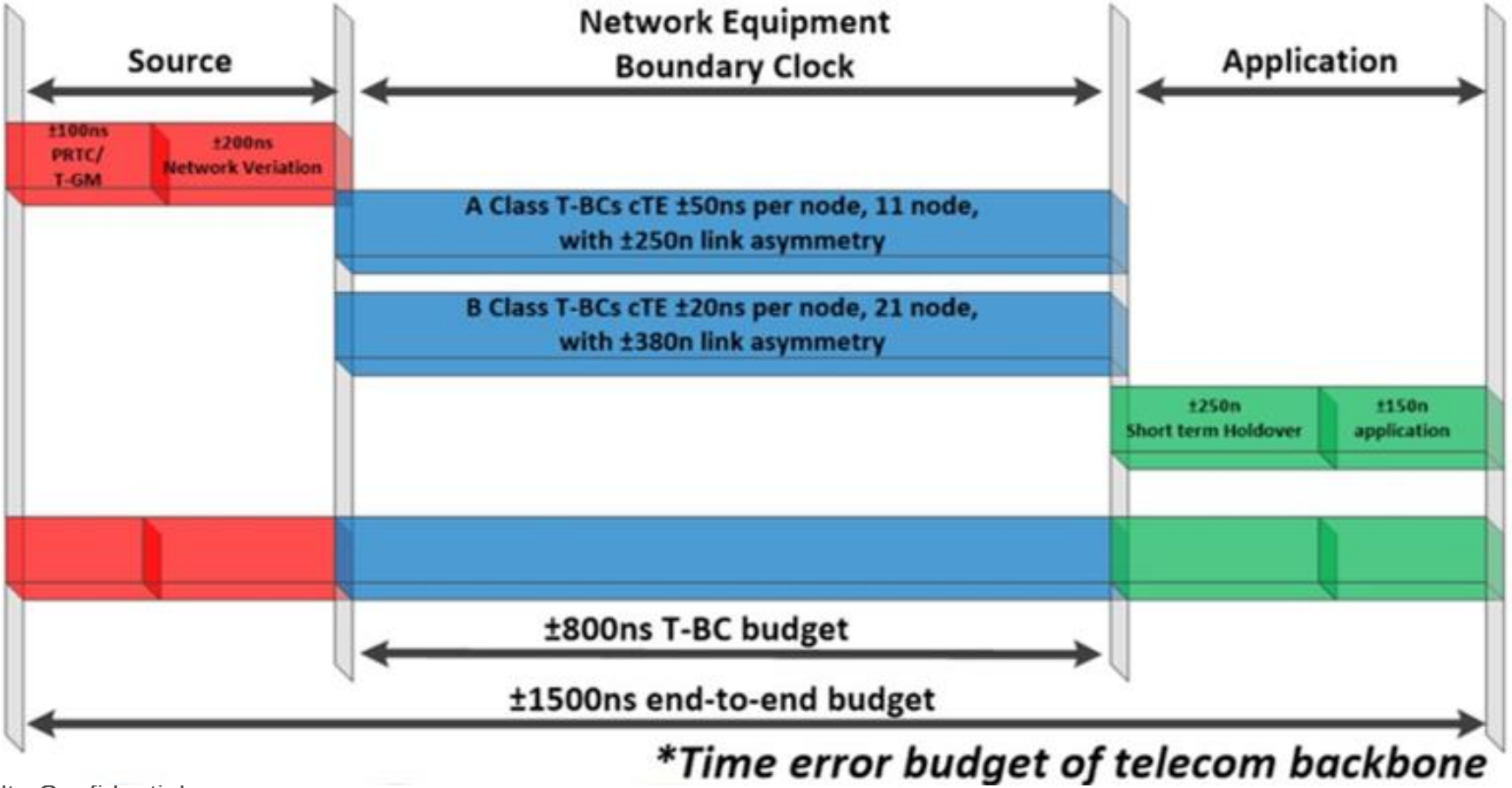
Product Brief

Feature	1U Sled Switch	2U sled Switch
Delta Sled Switch		
I/O configuration	16 x100GE QSFP28	32 x100GE QSFP28
Timing I/O Connector	SMA connector x 2 (for 1PPS and 10MHz)	
Management Port	RJ-45 (for IP-based OOB)	
Console Port	RJ-45 (for RS-232 Console)	
OpenEdge Chassis compatible 1U and 2U slots	41.85 x215 x421mm (H/W/D)	83.55 x215 x421mm (H/W/D)
OpenEdge Chassis compatible Power feed	+12 VDC	
Sled power budget (maximum)	400Watts	700Watts

Agenda

- Background of openEDGE Sled Switch Proposal
- Switch Product Proposal
- **Time Synchronization**

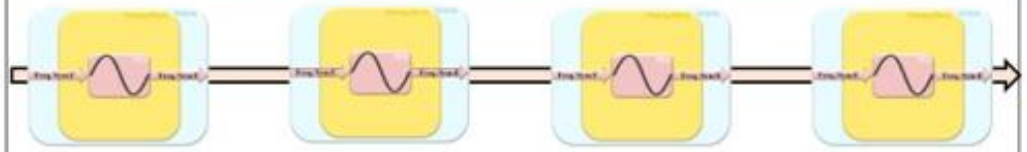
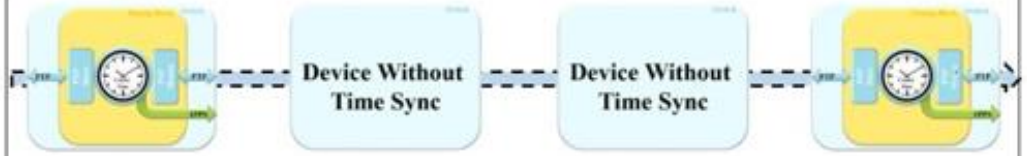
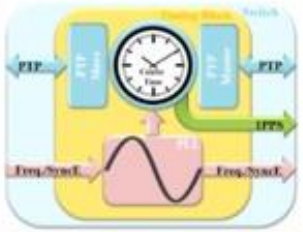
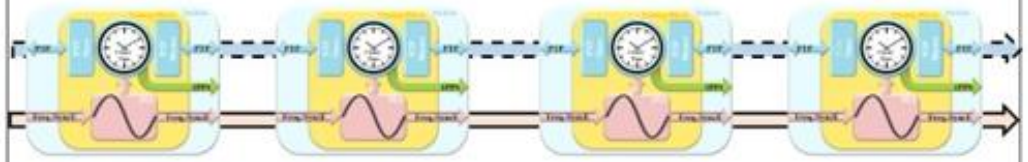
Timing budget in Telecom Backbone



T-BC Class	Permissible range of constant time error
A Class	±50 ns
B Class	±20 ns
C Class	±10 ns

*Reference ITU-T G.8273.2

Target Product Type

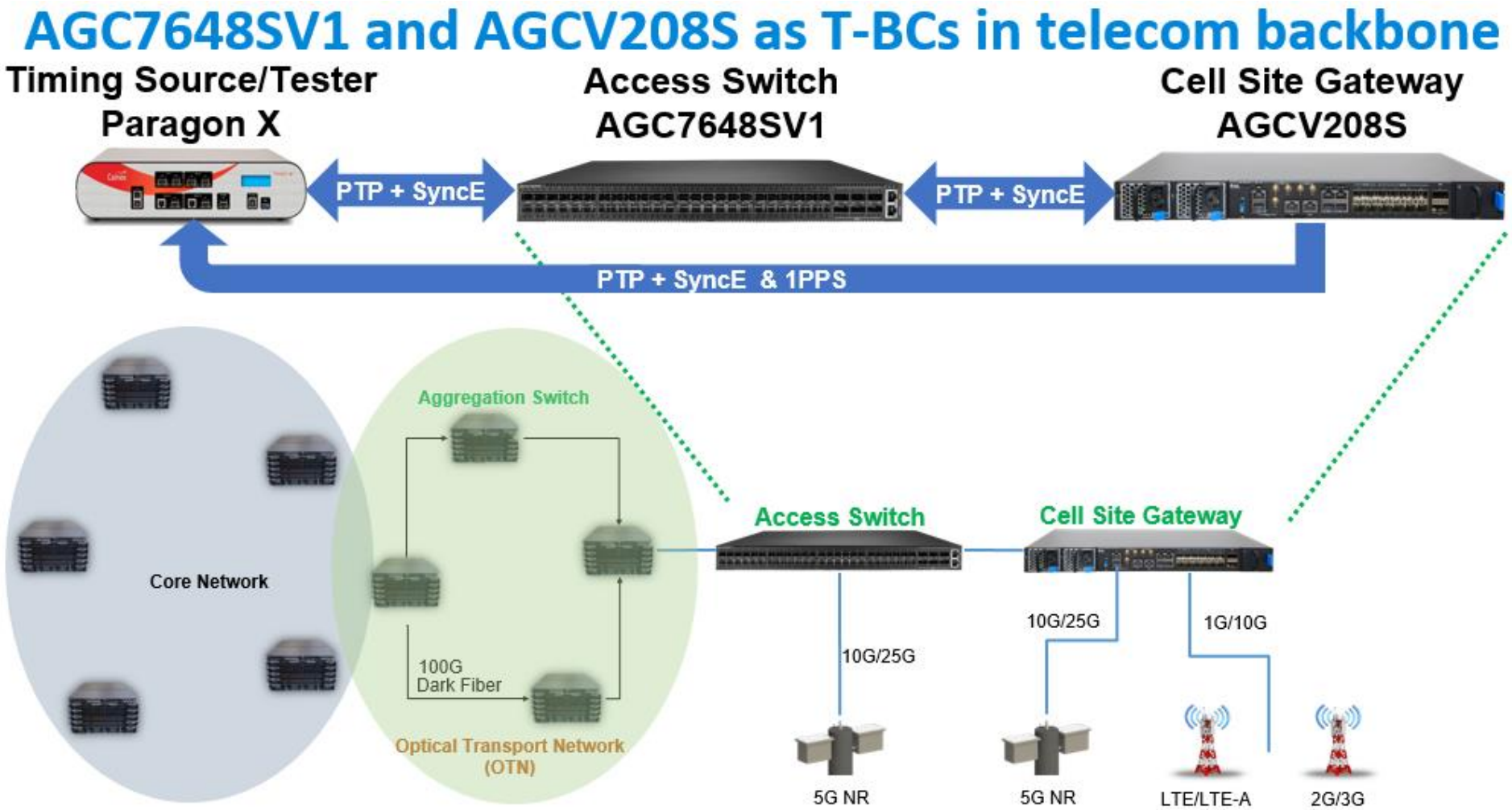
Type*	Standard	Symbol	Function	Application / Note
EEC	G.8262	 PLL	Frequency	 Synchronous Ethernet. Physical connection, need sync entire path.
BC (PTS) G.8275.2	G.8273.2	 Center Timer	Phase Time	 1588(PTP) without frequency support. Data link, support End-to-End sync.
BC (FTS)	G.8273.2 G.8275.1	 PLL + Center Timer	Frequency Phase Time	 1588(PTP) with frequency support. Combine Physical and Data link, most precise and reliable.

***EEC: Ethernet Equipment Clock**
BC: Boundary Clock
PTS/FTS: Partial/Fully Timing Support

Combinations of Timing Key Blocks

	SyncE+1588(G.8275.1)	SyncE(G.8262)
MAC External 1588 solution (Broad Sync I/F)	CPU: System Host, 1588 Servo PLL: Frequency, Phase MAC: Packet SW, Time Stamper FPGA: Broad Sync	CPU: System Host PLL: Frequency MAC: Packet SW
MAC Internal 1588 solution (Broad PTP)	CPU: System Host PLL: Frequency MAC: Packet SW, Broad PTP, Time Stamper	NA

Boundary Clock cascade test



AGC7648SV1 + AGCV208S Noise Gen – Boundary Clock Test Result

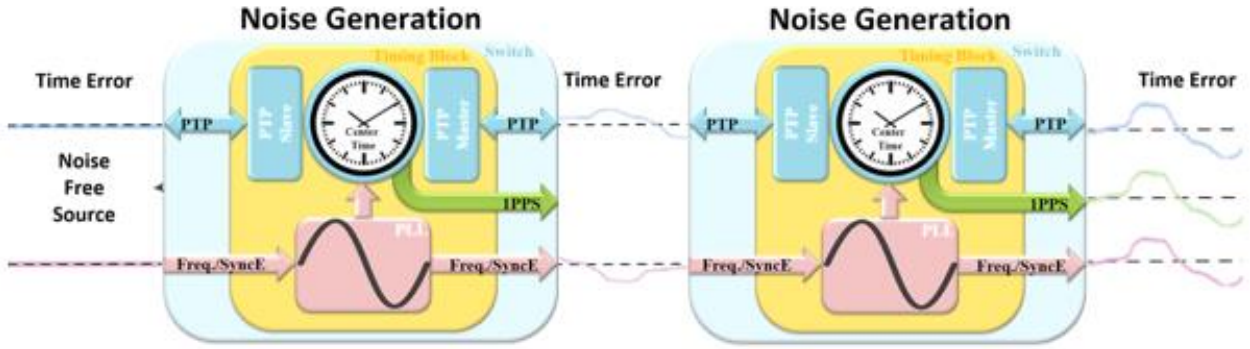
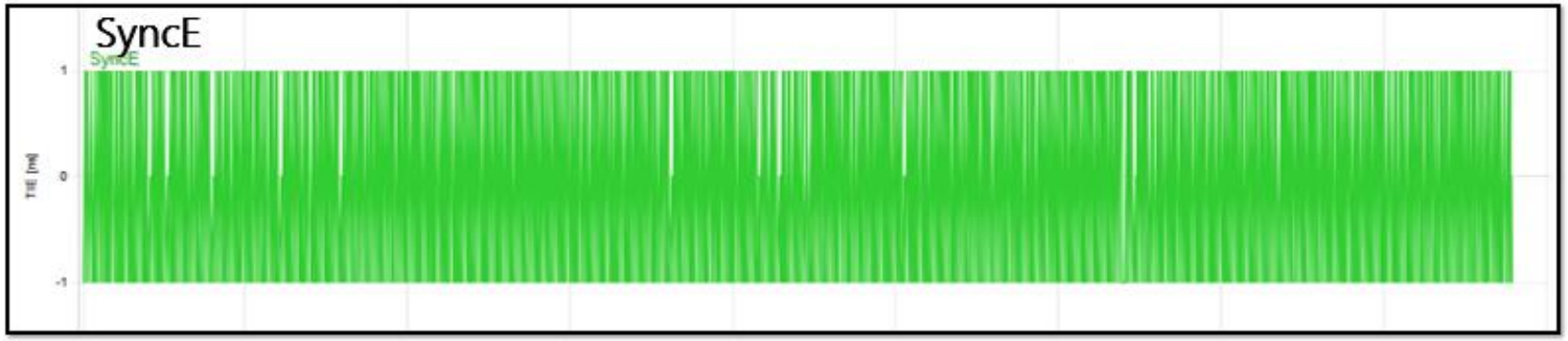
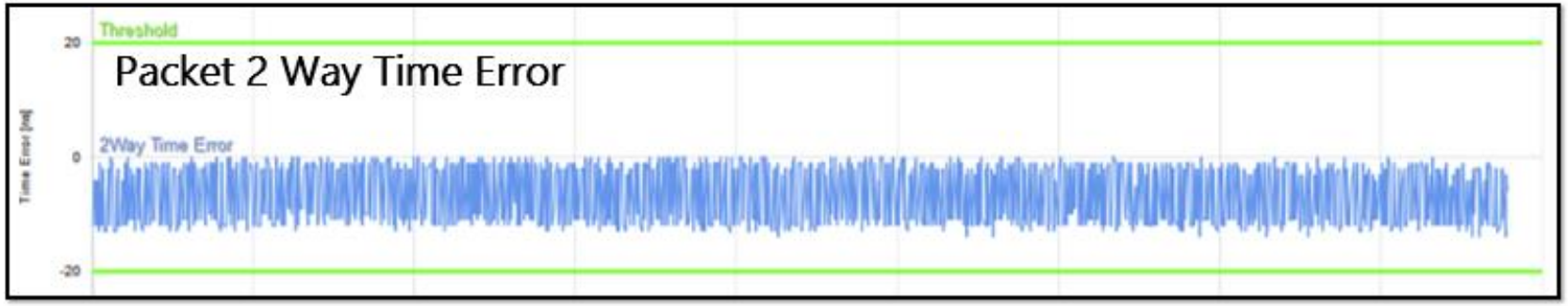


Table 7-3 – T-BC/T-TSC permissible range of constant time error

T-BC/T-TSC Class	Permissible range of constant time error – cTE(ns)
A	±50
B	±20
C	±10

***Reference ITU-T G.8273.2**





Smarter. Greener. Together.

To learn more about Delta, please visit www.deltaww.com