Call for Proposal

For collaborative development of 16 Port Combo-PON mini-OLT solution

1) Introduction

Combo PON is combination of GPON (ITU-T G.984.x) and XGS-PON (ITU-T G.9807.1) technologies on a single PON port. This allows both GPON and XGS-PON services to be deployed on the same optical distribution network (ODN without requiring external coexistence element (CEx) modules.

Thus, an operator may deploy GPON to deliver highly cost competitive 100Mbp services leveraging ultra-low-cost GPON-based home gateways while XGS-PON is used to offer differentiated home and enterprise services at a price premium. The Combo PON technology provides improved economics for operators building new FTTH networks or modernizing existing GPON fibre networks. Quantifying the economic benefits, Combo PON save space, power and CAPEX when compared to operating, two discrete GPON and XGS-PON optical OLT systems.

C-DOT invites participation from the suitable Indian entities capable of partnering with C-DOT in collaborative development of project led by C-DOT for 16 Port Combo PON mini-OLT, supporting both GPON and XGS-PON on a single PON port.

The potential participants should have demonstrable expertise in the telecom domain including software development, supply chain management, assembly and hardware testing of the highly dense PCBs of telecom grade.

Keeping in mind the prospectus of the Combo-PON technology as natural succession of GPON technology and past development and deployment experience of GPON technology in Bharat Net project, C-DOT believes that Combo PON technology will have good market place in access networks and 5G mid-haul segment in near future.

The PCB CAD layout work of the design is already completed and for further development C-DOT invites collaborative project participation in the following areas.

- PCB manufacturing based on the gerbers provided by C-DOT.
- Component procurement as per the CL (Component List) provided by C-DOT.
- PCB assembly.
- Hardware testing of the assembled PCBs and integration of software modules with assembled PCBs.
- Software development for the product features as mentioned in “features” under section 2 (Project Description).
- Integration testing with C-DOT EMS.

- Enclosure/packaging unit manufacturing based on design files provided by C-DOT.

The developed solution needs to be integrated with C-DOT's EMS. The final outcome of the collaborative development project will be a commercially deployable 16 port Combo PON mini-OLT. The project outcomes can be further licensed to interested participants or third parties, capable of its mass production, marketing and deployments for end users, directly or in association with system integrators.

Through a process of rigorous technical evaluation, C-DOT shall select participants holding the most promise of delivering commercial grade outcomes as its development partners ("Partner") in the project.

In order to achieve a rugged, field deployable solution, C-DOT would prefer to select multiple Partners for the same work item wherever feasible.

2) Project Description

The 16 port Combo-PON mini-OLT is a compact 1U pizza box size unit, as shown in the figure 1 below. It has 16 PON ports, each port supports GPON and XGS-PON through single optical transceiver. This 19" rack mountable unit has multiple configurations for SNI with 1:1 protection towards the core network.

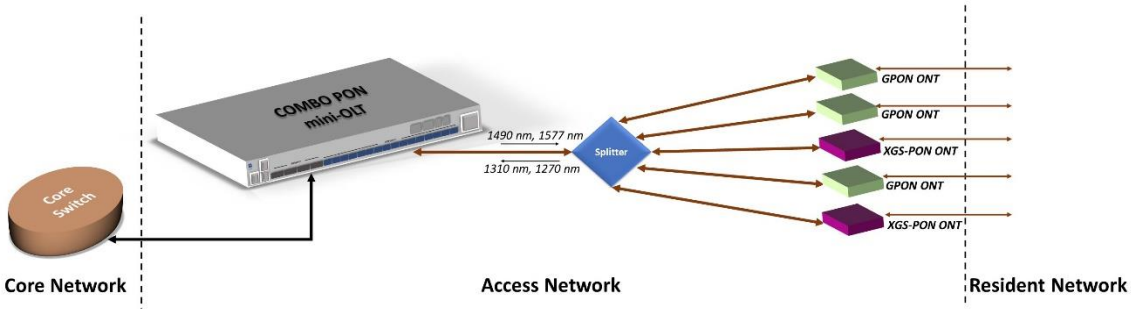

Figure 1 broadly illustrates the scope and expected final outcome of the collaborative project.

The main feature and specifications of the 16 PORT Combo PON OLT are as follows

Features:

- Compliant with ITU-T G.9807.1 and ITU-T G.984.x
- 1:1 protection towards the ODN as per ITU-T recommendations
- AES-128 encryption supported for both GPON (Enhanced security capabilities feature which is defined in amendment 3, ITU-T standard, G.984.3. (G.984.3 (2008)

Amd. 3 (04/2012)) and XGS-PON ITU-T G.9807.1 (Based on Secure Mutual Authentication)

- Compliant with IEEE1588v2 and ITU-T G.984.3 Amd2
- GUI based user-friendly LCT for local management of the equipment
- Standard interface for EMS for remote management

Specifications:

- Supports 16 Nos. unprotected or 8 Nos. protected Combo-PON ports
- SNI configurations (with 1:1 protection): 4x100GbE or
- 2x100GbE + 2x40 GbE + 12x10 GbE
- 1GbE management port.
- Switching Capacity: 300Gbps.
- Size: 446.5mm x 407mm x 1U.
- Dual –48VDC supply (Working Voltage Range: -36V to -72V DC)
- Hot-swappable 5 + 1 redundant fans.
- ToD (in/out) on UART
- 1PPS (in/out)
- Power Consumption: 210W typical
- Operating Environment: QM-333 B2 compliant

The Combo PON technology is useful in enabling network operators to upgrade their access networks with XGS-PON with continue to supporting to existing GPON customers.

The infrastructure and equipment required for testing, depending upon the availability, may be provided by C-DOT.

Collaborating partners in the project are required to develop the Combo PON mini-OLT as shown in the figure 1. During participation in the project, the Partners may use their respective pre-existing background facilities.

3) Roles & Responsibilities of C-DOT

C-DOT shall lead the integration of the final solution. It will provide technical development assistance and financial support to the project partners selected through a process of evaluation and due diligence conducted by a committee of subject experts.

Wherever deemed feasible, C-DOT may arrange equipment resources, testing infrastructure, mandatory clearances, statutory permissions, technical consultancy and provide gap funding to the partners in realizing their respective target deliverables.

C-DOT shall license the final solution for mass production and deployment. Royalty proceeds received from licensing shall be distributed amongst all Partners in ratio of

the assessed value of each partner's respective contribution determined through mutual discussions while finalizing the product architecture.

C-DOT shall engage with Partners on a non-exclusive basis and shall retain its right to develop similar products / through other developmental programs.

4) Roles & Responsibilities of Participant(s)

Role of the partners is broadly outlined in section 2.

The Partners may build the required module with pre-existing background facilities available with them.
All concerned Partners shall own the foreground technologies developed by them individually or collectively as the case may be.

The Partners may utilize the available test and infrastructure facilities offered by C-DOT with no financial implication for its usage.

Participation in the project shall be on non-exclusive basis. All partners shall be required to demonstrate commitment to the project by entering into a formal agreement with C-DOT as per the CCRP policy.

5) Ownership of Outcomes

Background technologies used in the project shall continue to remain with their respective owners.

New foreground technologies created during the project shall be owned by the respective development partners, individually or collectively as the case may be. Any agreement required for collective ownership shall be settled directly by the concerned partners.

The ownership of the final solution shall rest collectively with C-DOT and all its Partners.

ACRONYMS AND ABBREVIATIONS

CAD- Computer Aided Design
CCRP - C-DOT Collaborative Research Program
EMS – Element Management System
EOI - Expression of Interest

FTTH - Fibre To The Home
GPON – Gigabit Capable Passive Optical Network
ITU-T – International Telecommunication Union-Telecommunication
OLT – Optical Line Terminal
ONT – Optical Network Termination
PCBs – Printed Circuit Boards
PON – Passive Optical Network
SNI – Service Node Interface