

A Framework for the Design of Green Giga Passive Optical Fiber Access Network in Kuwait

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Abstract : In this work, a practical study on a commissioned Giga Passive Optical Network (GPON) fiber to the home access network in Kuwait is presented. The work covers the framework of the conceptual design of the deployed Passive Optical Networks (PONs), access network, optical fiber cable network distribution, technologies, and standards. The work also describes methodologies applied by system engineers for design of Optical Network Terminals (ONTs) and Optical Line Terminals (OLTs) transceivers with respect to the distance, operating wavelengths, splitting ratios. The results have demonstrated and justified the limitation of transmission distance of a PON link in Fiber to The Premises (FTTP) to not exceed 20 km. Optical Time Domain Reflector (OTDR) test has been carried for this project to confirm compliance with International Telecommunication Union (ITU) specifications regarding the total length of the deployed optical cable, total loss in dB, and loss per km in dB/km with respect to the operating wavelengths. OTDR test results with traces for segments of implemented fiber network will be provided and discussed.

Keywords : passive optical networks (PONs), fiber to the premises (FTTx), access network, OTDR

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