

ABSTRACT

The Hutuo, Dutulanaa and Bulota areas in Gorontalo Regency are suburban areas, in these areas there is an FTTH network with G-PON technology but Fixed Wireless Access services are not yet available, requiring fast internet access services to support the activities of its citizens at low prices. The author plans to design the construction of a Fiber To The Home (FTTH) XG-PON and Fixed Wireless Access (FWA) 5G network at a frequency of 1.4 GHz which will later provide an overview in terms of network performance, implementation period, and economic analysis.

This study calculates network feasibility, comparison from a business perspective for companies, implementation period on FTTH XG-PON and 5G FWA networks that will be implemented in the Hutuo, Dutulanaa, and Bulota areas in Gorontalo. The results of the FTTH Link Power Budget calculation show the nearest attenuation value of 23.08 dB (ODC 1) and 22.35 dB (ODC 2), with the farthest value of 23.99 dB (ODC 1) and 23.161 dB (ODC 2). For FWA 5G NR, the SS-RSRP values at 30 MHz, 50 MHz, and 80 MHz bandwidths are -66.62 dBm, -69.39 dBm, and -75.12 dBm. FTTH XG-PON has better network quality than 5G FWA, because it is more resistant to interference because FTTH XG-PON uses fiber optic cables in transmitting signals. However, FTTH technology is less efficient when used in hard-to-reach areas. Techno-economic results using a new pole scheme at a price of IDR 150.000, FTTH XG-PON has an IRR value of 50.4% superior to 5G FWA with a new site scheme which has an IRR value of 23%.

From the overall calculation results, it has met the ITU-T G.987.2 standardization with the provisions of LPB results with a total attenuation limit of 28 dB, Prx with a minimum received power limit of -28 for downstream dB. While for FWA, it has met the KPI radio standard with the provision of SS-RSRP value $\leq$ -115 dBm.

Key Word: FTTH, FWA, 5G, XG-PON, LPB, SS-RSRP, NVP, IR