

ABSTRACT

The 4G LTE network has now been launched in various countries including Indonesia, and all telecommunications operators are competing to expand their service coverage. However, due to various limitations for various reasons, there are still quite a lot of areas that are not covered by the 4G LTE network. With the increase in cellular traffic, operators must continue to maintain the continuity of their service coverage. One of the scenarios of traffic offload and expansion of service coverage is by building a more cost-effective 802.11ah network because one access point can service thousands of mobile devices and support the Machine-to-Machine (M2M) / Internet of Things (IoT) communication concept.

The methodology study comprehensive about technical, economic, and regulatory analysis in this research is first to simulate the Modulation and Coding Scheme (MCS) performance evaluation on the 802.11ah protocol on the effect of the number of nodes. 802.11ah performance evaluation is done using NS3 software with parameters: throughput, delay, and energy consumption. The second stage is to simulate the implementation of coverage analysis using the Atoll planning tool for coverage analysis of LTE network extensions using 802.11ah technology and third calculated economic assetment using Cost and Benefit Analysis by using NPV calculations as investment feasibility and calculations, sensitivity of several parameters and finally regulation analysis contains explaining existing regulation about 802.11ah in Indonesia, listing some benchmarks of 1 GHz usage over the world, and determining the recommendation related to the 802.11ah regulation.

The results show that the performance obtained by varying the number of nodes / users from 100 to 1000 nodes is technically acceptable. Likewise in service coverage, 802.11ah network implementations can fill blank areas that were previously owned and NPV value of implementasion 802.11ah in several area is $NPV > 1$ in second year.

Keywords: 802.11ah (Wifi halow), restricted Access Window (RAW), cellular coverage, Network Simulator 3, Cost benefit Analysis