

## ABSTRACT

Development of cellular communication is growing rapidly, Indonesia is country 4<sup>th</sup> who has biggest population in the world. The telecommunication needs is increasing. Mobile Network Operator (MNO) in Indonesia was deployed 4G LTE infrastructure with almost covered 36 city in Indonesia including the most outside island in Indonesia or called as Non-3T. The traffic data density is become higher, to solve the bottle neck of telecommunication cellular in Indonesia is build the 5G deployment. 5G technologies can facilitated traffic in Indonesia with data transfer speed reach 20 Gbps. 5G Spectrum frequency auction winner released based on KOMINFO in 2021 is two big MNO which are Telkomsel and Smartfren by utilize frequency 2,3 Ghz with bandwidth up to 50 Mhz. Based on 2021 annual strategic report on 5G deployment in Indonesia bandung city is priority city in first phase deployment, due to bandung city is dense urban categorized by geoptype segmentation

To support the development of 5G, pricing model and data charging is considered, 4G pricing model is not compatible anymore due to network characteristic and scenario technology. 5G NSA is choosen in the first stage phase deployment in Indonesia to reach market and coverage by utilize the 4G LTE EPC as core network.

In this study, a techno-economic study was conducted on 5G NR network planning by use case eMBB , for 5G NR -NSA in the Bandung area within a period of 10 years. The results of research that have been carried out based on simulations obtained the capacity planning study with three conditions optimistic , moderate, pessimistic , 50 gNodeB, 47 gNodeB, 31 gNodeB. 5G NR was obtained for the eMBB scenario until the period 2030, it is obtained that the number of gNodeB for the Uplink network site is 53 sites, and for the Downlink site, 21 sites are needed, with the coverage of 3 wireless cells in the uplink and downlink sectors is 3.1839  $km^2$ .

The results of the study based on economic analysis were obtained for B2C 5G NR eMBB , eMBB in Optmitstic condition early stage 2021 have ROI 24% use M1 model with CAGR TCO 55.59% & CAGR revenue for 48% . of total use M2 model, B2B FWA optimistic in early stage 2021 have ROI 28% with CAGR TCO 66.49% and CAGR revenue growth in 30,85% with end up in 2030 ROI hit 45%. 2C business, which largely depends on the country's macroeconomic development and the

operator's strategy. while 2B income is relatively low in the first three years and will gradually grow to over 20% after the fifth year.

**Keywords-** 5G-Non Stand Alone, eMBB, FWA, TCO, ROI.