Evaluative analysis of next generation mobile networks in future smart grid in developing countries.

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Smart grid (SG) promises an efficient system that provides effective monitoring, timely statuses and vital automation capabilities across generation, transmission and distribution spectrum of the power grid. SG applications have stringent and unique latency and bandwidth requirements. 4G LTE and the evolving 5G promises to support a wide range of applications in the SG. This research analyses the performance of 4G LTE and 5G networks in supporting big data analytics for SG in developing countries. In order to evaluate the technical practicality of using wireless cellular networks provided by local mobile operators, a comparative analysis of three 4G LTE networks operators on wide area network (WAN) application and an emulated future 5G networks is carried out in Nigeria. The latency (λ), throughput (τ) and packet loss rate (ψ) for the three local networks providers (denoted as OP1, OP2, OP3), and the emulated 5G networks (denoted as EFN1, EFN2, EFN3) were used for the experimentation using OMNET++ simulation tool. The obtained results indicate that OP2 is a better choice for WAN SG applications when the communication radius is below 1600m and OP3 is a preferable choice when communication radius grows up to 2400m and beyond. While on the other hand, the results obtained for the 5G networks show that, on average, EFN2 is a better choice for WAN SG applications when the communication radius is lesser than 1600m and EFN3 is a preferable choice when the communication radius extend beyond 2400m.