Experimental Assessment of Battery Lifetime for Commercial Off-The-Shelf NB-IoT Module

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***Abstract*— Low Power Wide Area (LPWA) connectivity, a wireless wide area technology that is characterized for interconnecting devices with low bandwidth connectivity and focusing on range and power efficiency, is seen as one of the fastest-growing components of Internet-of-Things (IoT). The LPWA connectivity is used to serve a diverse range of vertical applications, including agriculture, consumer, industrial, logistic, smart building, smart city and utilities. 3GPP has defined the maiden Narrowband IoT (NB-IoT) specification in Release 13 (Rel-13) to accommodate the LPWA demand. Several major cellular operators, such as China Mobile, Deutsch Telekom and Vodafone, have announced their NB-IoT trials or commercial network in year 2017. In Telekom Malaysia, we have setup a NB-IoT trial network for End-to-End (E2E) integration study. Our experimental assessment showed that the battery lifetime target for NB-IoT devices as stated by 3GPP utilizing latest-to-date Commercial Off-The-Shelf (COTS) NB-IoT modules is yet to be realized. Finally, several recommendations on how to optimize the battery lifetime while designing firmware for NB-IoT device are also provided.**

***Keyword*— Low Power Wide Area Network; NB-IoT; Energy Consumption Evaluation; Data over Non-Access Stratum (NAS)**

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