

## ABSTRACT

### **Design and Realization of Node MCU Module based on NB-IoT (Narrow Band-Internet of Things)**

Scientists have predicted that there will be more than 10 billion Internet devices (IoT) in the world by 2021, where 10% of them will be based on cellular networks [1]. Among LPWA technologies, NarrowBand IoT (NB-IoT) proposed by the standard organization 3rd Generation Partnership Project (3GPP), has been widely recognized as one of the most promising LPWA technologies [2], [3]. Huawei Hisilicon Technologies Co. Ltd or Qualcomm Inc. and several vendors such as Quectel have designed and developed communication modules for NB-IoT [3]. But in Indonesia NB-IoT is still under development because most people and a practitioner at the same time do not know/do research on NB-IoT.

For this final project, the NB-IoT-based module has been designed with practical use like the NodeMCU module which is a universal used. The author has also designed a program/software to send data to an existing IoT platform. The author has also conducted various trials on this NodeMCU NB-IoT, so that the results of the design of this NodeMCU NB-IoT can be analyzed.

The results of NodeMCU NB-IoT testing show that with a battery of 10,000mAh can last for 5 days, with a duty cycle of 0.0575%, the amount of Tx power with an average of -15,804dBm, with an average bandwidth of 103.07 kHz at a measured frequency of 905.1 MHz, the test results are in accordance with the standard.

**Keywords:** LPWA, NB-IoT, bandwidth, platform, NodeMCU.