Development for a Simplified MAC Layer Protocol for ZigBee IEEE802.15.4 Transceiver (CR2-05)

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ZigBee is a high-level communication protocol specification that was designed to use digital radios which are compatible with IEEE 802.15.4 standard. IEEE 802.15.4 is the standard for Low Rate Wireless Personal Area Network (LR-WPAN). IEEE 802.15.4 defines both Physical Layer (PHY) and Media Access Control Sub-layer (MAC) while ZigBee defines Network Layer (NWK) and Application Support Sub-layer (APS).

With the help of IEEE 802.15.4, application developers can benefit greatly from short development time, lower development cost, ultimate low power consumption on the RF modules and ease of development by concentrating on their application development and deployment rather than constructing RF modules by themselves. However, lots of embedded system applications do not require all the features of such powerful protocol but only the key features with which the application developers concern.

In the project, we developed our proprietary protocol that contains the most basic and key features of IEEE 802.15.4 protocol standard, with which most of embedded system applications would be sufficed.
The developed protocol stack contained 2 main abstract layers, Physical Layer (PHY) and Medium Access Control Sub-layer (MAC), and Hardware Abstraction Layer (HAL) was introduced to hide the hardware details at PHY layer such that the developed protocol stack was hardware independent and of high portability. C programming language was employed because it was required for a software development to be Microcontroller Unit (MCU) independent.
In the end of this project, we developed a protocol stack for IEEE802.15.4 compatible RF transceiver MC13191. With simple application software, the protocol can establish a WPAN and allow peer devices to transfer data.