Test setups and proceedings for LoRa evaluation

First test setup: Raw LoRa implementation

Data is collected as fast as possible and compared to prior set threshold limits. If the threshold limits are exceeded (positive or negative) the data is packed into a message, added to a queue and send via LoRa. The central receiver sends an acknowledgment if the CRC is correct, which leads to the message put into queue being deleted. If the queue contains ten elements and an eleventh one is added, the latest entry is popped. Every sensorboard has an initial *time.sleep()* function call before the execution of the infinite loop, which is increased by one for each sensorboard added to the setup (e. g. first sensorboard 11 s, second 12 s, …).

Second test setup: Raw LoRa implementation with re-transmission of packets

Same as the first test, with an additional re-transmission mechanism. After five seconds the queue is checked. If the queue has more than zero elements in it, the latest packet is retransmitted. After that is tried two consecutive times, the timer is deinitialized and restarted when another message is send.

Third test setup: Raw LoRa implementation with re-transmission of packets and random back-off

As in the second test, with an additional random back-off mechanism. In this test case there is no *time.sleep()* call before the infinite loop execution. After a message is sent a random value between 0 and 1 is generated. If the values is greater than or equal to 0.4, the message sending interval and the re-transmission interval are randomized (message sending interval between 20 s and 40 s, re-transmission interval between 2 s and 10 s).

Test proceedings

General setup: Set the central receiver one meter away from the four boards up. The boards shall also have a distance of one meter.
   (1) Let the four boards run for one hour.
   (2) Let the boards run for 30 minutes and unplug board #1 and #2. After two minutes plug board #1 in again. After another two minutes plug board #2 in again.
Timings, as well as distances are tbd.