Week 2 Progress Report

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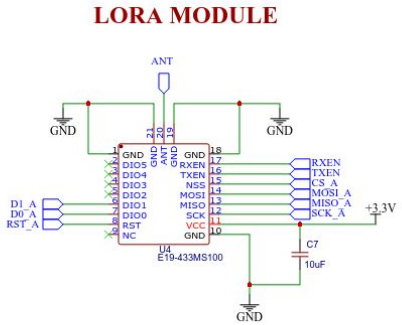
ENE221-0109/2017

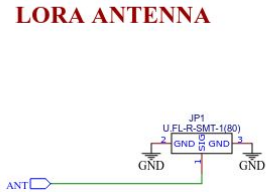
Tasks

- Issue #140 Review LoRa matching circuit
- Testing ESP32-LR mode

LoRa module Matching circuit

No matching is required since the antenna is already matched at 50 ohms





Testing LoRa LR mode

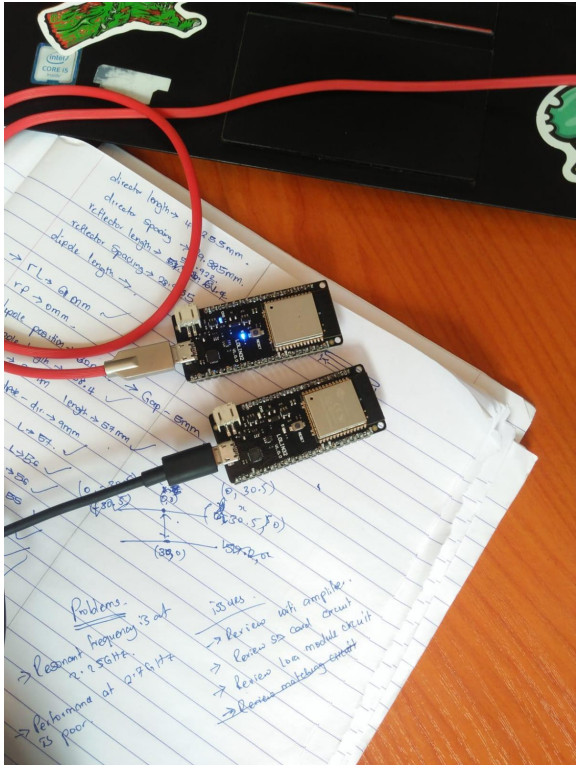
ESP32 LR(Low Rate hence Long Range) protocol promises 1km point-to-point range even without external antennas. This low data rate is 10X greater than LoRa data rates.

The best RSSI values at 70m (-64dBm). Beyond 70m the RSSI values worsened (-90 dBm)
From theory, performance below -70dBm is classified as poor

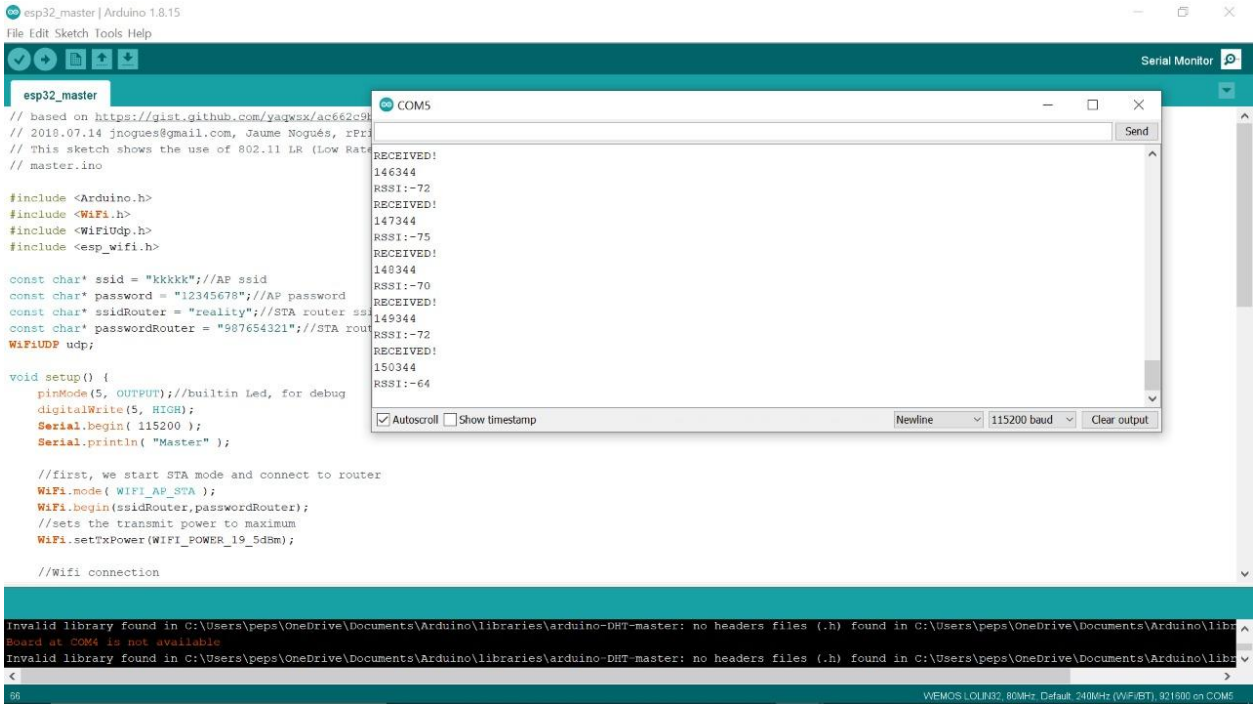
Since the ESP32 PCB antenna has only 2dBi gain, we will require an external antenna of 24dBi at the ground station to receive telemetry data reliably.

We will be re-using the ESP modules with hand-mounted ipex connectors. However, industry-calibrated ESP modules that come with already matched external connectors (ESP32 Wroom 32UE) are known to yield better results.

ESP LR Mode


director length
director spacing
reflector length
reflector spacing
driven length
Problems.
Issues

Best RSSI


esp32_master | Arduino 1.8.15
File Edit Sketch Tools Help
Serial Monitor
esp32_master
// based on https://gist.github.com/yaqwsx/ac662c9
// 2018.07.14 jnogues@gmail.com, Jaume Nogués, rPri
// This sketch shows the use of 802.11 LR (Low Rate
// master.ino
#include <Arduino.h>
#include <WiFi.h>
#include <WiFiUdp.h>
#include <esp_wifi.h>
const char* ssid = "kkkkk";//AP ssid
const char* password = "12345678";//AP password
const char* ssidRouter = "reality";//STA router ss
const char* passwordRouter = "987654321";//STA rout
WiFiUDP udp;
void setup() {
pinMode(5, OUTPUT);//builtin Led, for debug
digitalWrite(5, HIGH);
Serial.begin(115200);
Serial.println("Master");
//first, we start STA mode and connect to router
WiFi.mode(WIFI_AP_STA);
WiFi.begin(ssidRouter,passwordRouter);
//sets the transmit power to maximum
WiFi.setTxPower(WIFI_POWER_19_5dBm);
//Wifi connection
COM5
Send
RECEIVED!
146344
RSSI:-72
RECEIVED!
147344
RSSI:-75
RECEIVED!
148344
RSSI:-70
RECEIVED!
149344
RSSI:-72
RECEIVED!
150344
RSSI:-64
Autoscroll
Show timestamp
Newline
115200 baud
Clear output
Invalid library found in C:\Users\peps\OneDrive\Documents\Arduino\libraries\arduino-DHT-master: no headers files (.h) found in C:\Users\peps\OneDrive\Documents\Arduino\libr
Board at COM4 is not available
Invalid library found in C:\Users\peps\OneDrive\Documents\Arduino\libraries\arduino-DHT-master: no headers files (.h) found in C:\Users\peps\OneDrive\Documents\Arduino\libr
66
WEMOS LOLIN32, 80MHz, Default, 240MHz (WiFi/BT), 921600 on COM5