

LPWA Tutored Work

Requirements:

- LoRa Modem Calculator
- LoRa Alliance Bands Allocation

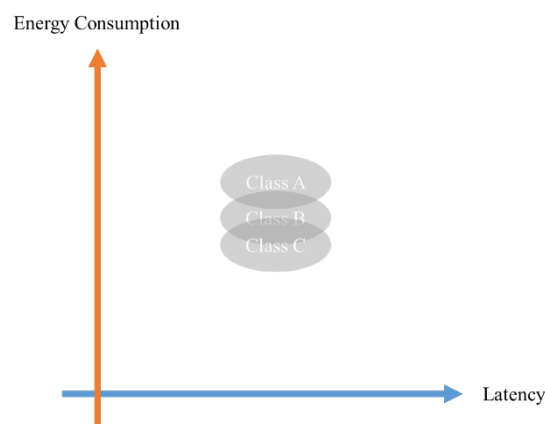
Exercise1:

Considering the spreading factors listed in the table, calculate the user data bits and the CRC dedicated ones according to the four coding rates.

SF	Bits	Coding Rate			
		1	2	3	4
7	User Data				
	CRC				
9	User Data				
	CRC				
11	User Data				
	CRC				

Exercise2 :

Make a graph plotting the energy consumption according to the reception latency of the LoRa compatible device classes.



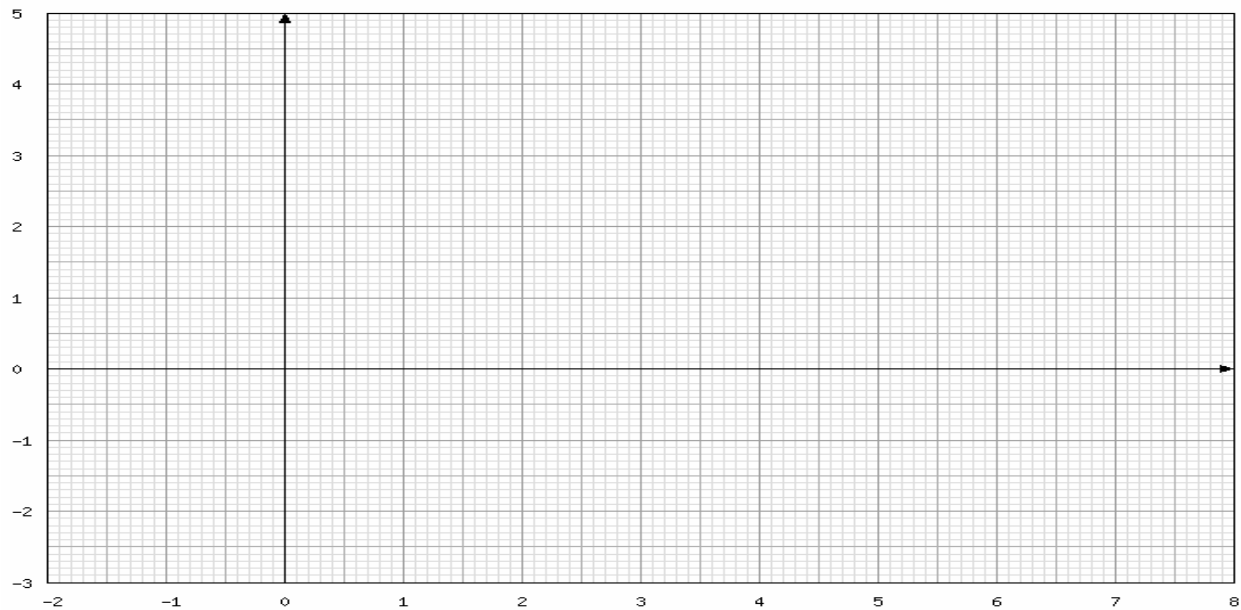
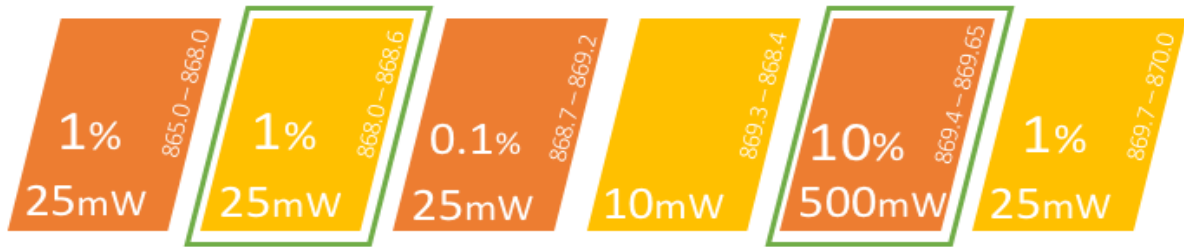
Exercise3 :

Considering a Class A device sends a payload of 8 bits “01000011” through the LoRaWAN technology. The device receives a payload of 4 bits “0011” from the gateway to acknowledge the reception. You are asked to draw the shape of the modulated RF signal to make the discussed communication. To simplify, you can use a spreading factor of 2 and 8 preambles with a bandwidth of 125 KHz.

You can choose one of the following LoRa bands:

UpLink

DownLink



Exercise4: (Based on LoRa Modem Calculator)

The objectif of this exercise is to study the EU433 and EU868 bands effect on the battery lifetime. We consider a device with lithium battery of 5000mAh and 3.7 operating voltage. The preamble for EU433 is 5 symbols and 8 for EU868. The bandwidth is 125 KHz and the SF is 8. The payload is 10 Bytes with a coding rate is 1. The header mode is set to default and the device is sending 4 msgs per day. The duty cycle for both bands is 1%, but the power of EU433 is 13dBm and 20dBm for EU868 one.

Make the simulations to calculate the timing performance indicators then the energy-based ones