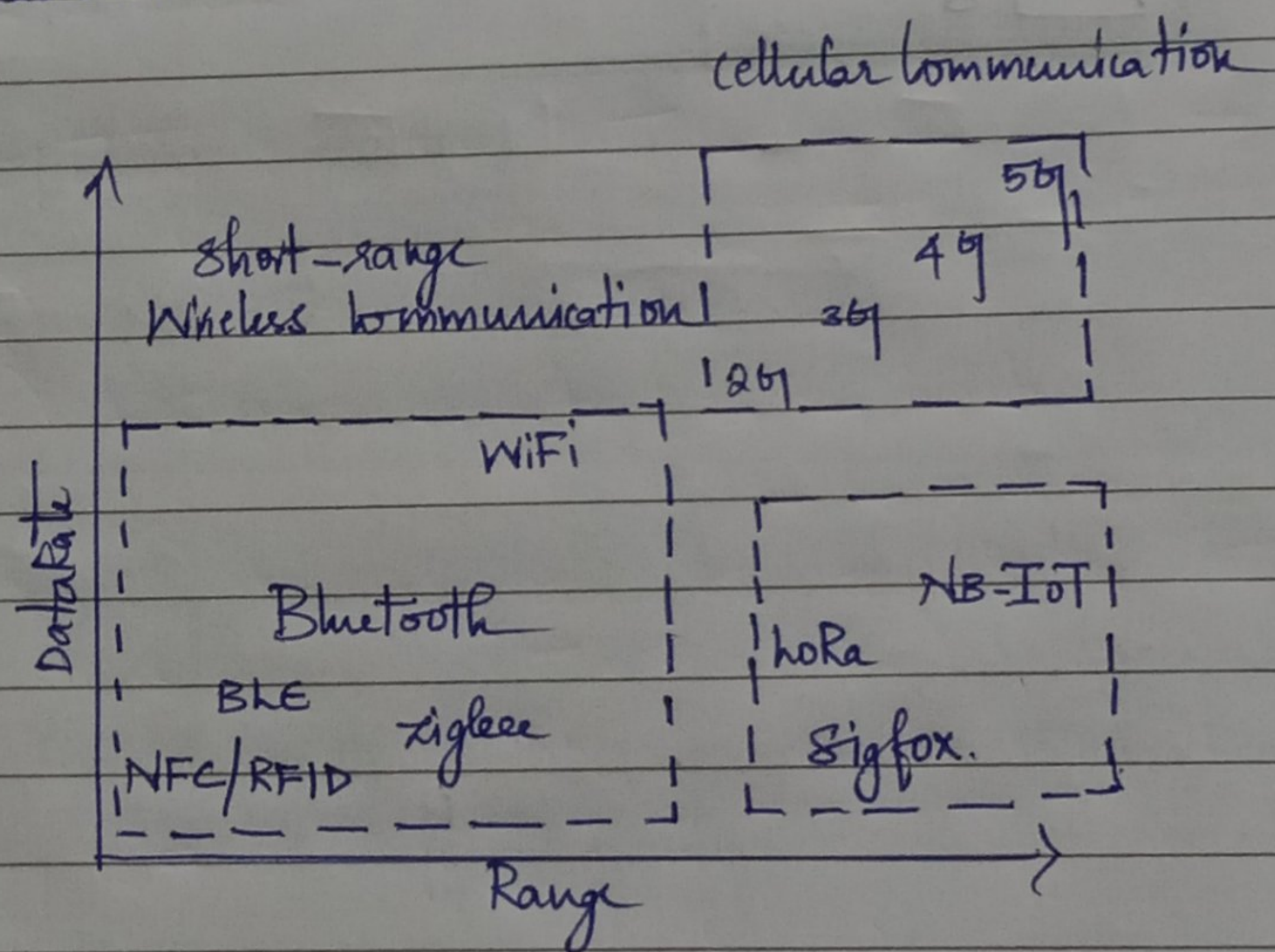


Tutorial-1 IoT, LPWAN, Semtech / LoRa

LPWAN: (Low power wide area Network)

* designed for sending small data packets over a long distance, operating over battery.

- 1) NB-IoT
- 2) Sigfox
- 3) LoRa
- 4) LoRaWAN



Comparison chart

Wireless Technology	Wireless communication	Range (m)	Tx Power (mW)
Bluetooth	short Range	~10	~2-5
WiFi	short Range	~50	~80
2G/4G	Cellular	~5000	~500
LoRa *	LPWAN	2000-5000 (urban) 5000-15000 (rural) >15000 (direct line)	~20

* The Audio & Video can't be send, only sensor data can be transmitted.

* LoRa Wireless Technology was developed by Cycleo.

* In 2012, the semtech acquired cycleo.

* LoRa Radio and modulation part is patented.

* Semtech has licensed its LoRa Intellectual Property (IP) with other chip manufacturers.

- 1) HiperRF
- 2) Microchip
- 3) Digi

LoRa Range in (km)

Environment	Range (km)
Urban Areas (towns & cities)	2-5
Rural Areas (countryside)	5-15
Direct Line of Sight	>15

Notable records

Ground to Ground : (212 km) (131.73 miles)

Weather balloon to Ground connection (702.67) (436.61 miles)