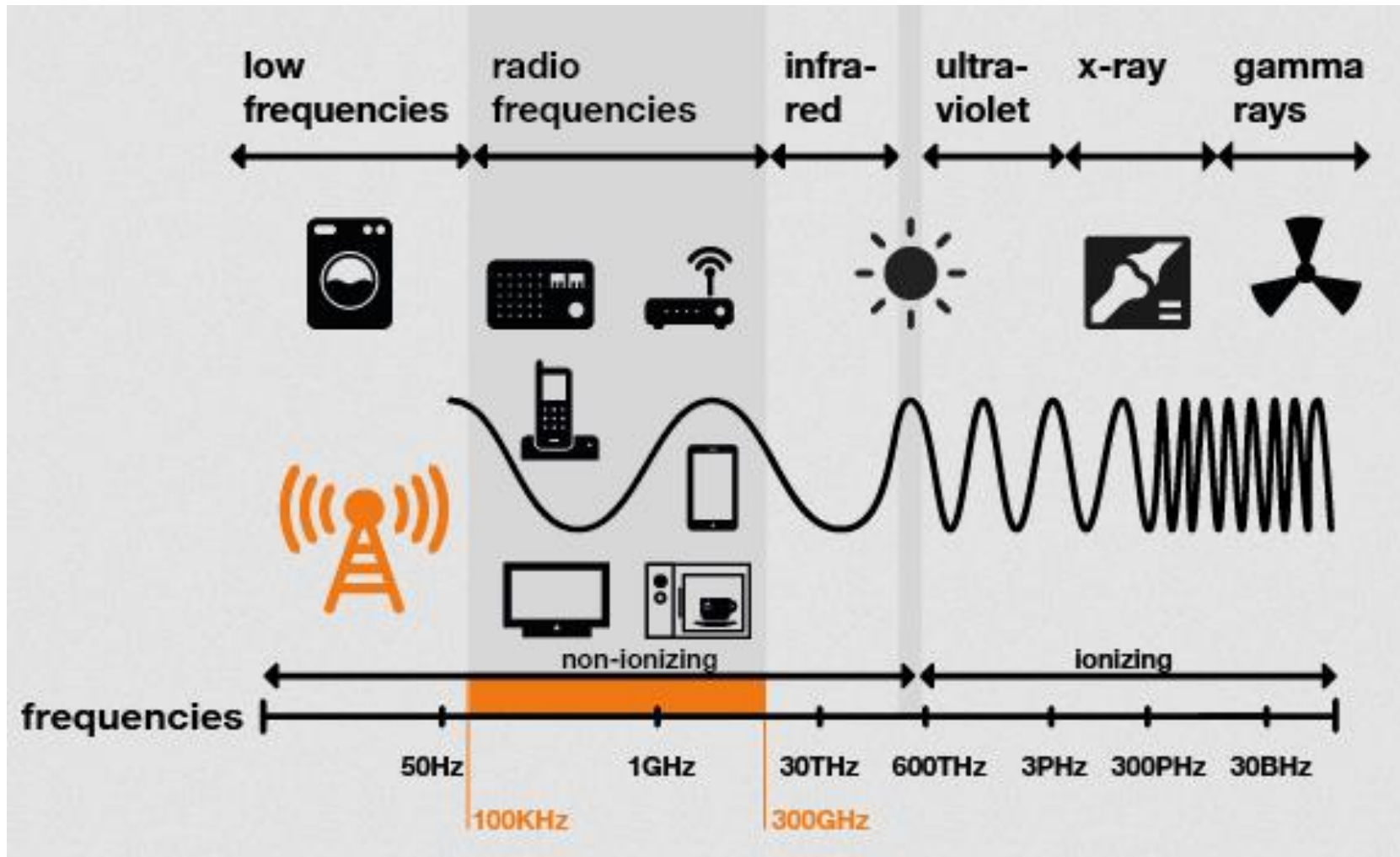




IoT OG EMBEDDEDE SYSTEMER 1

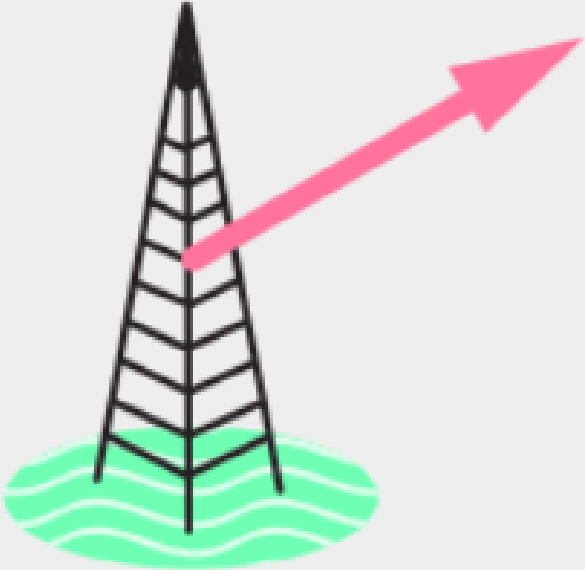
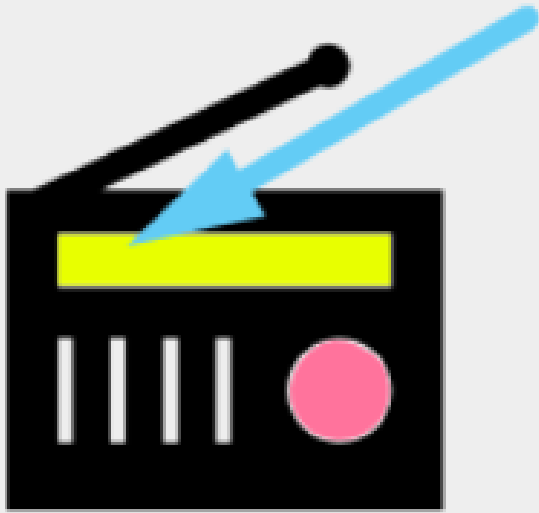
- Med Lærke Brandhøj Kristensen
- lkri@techcollege.dk

Signaler / stråler



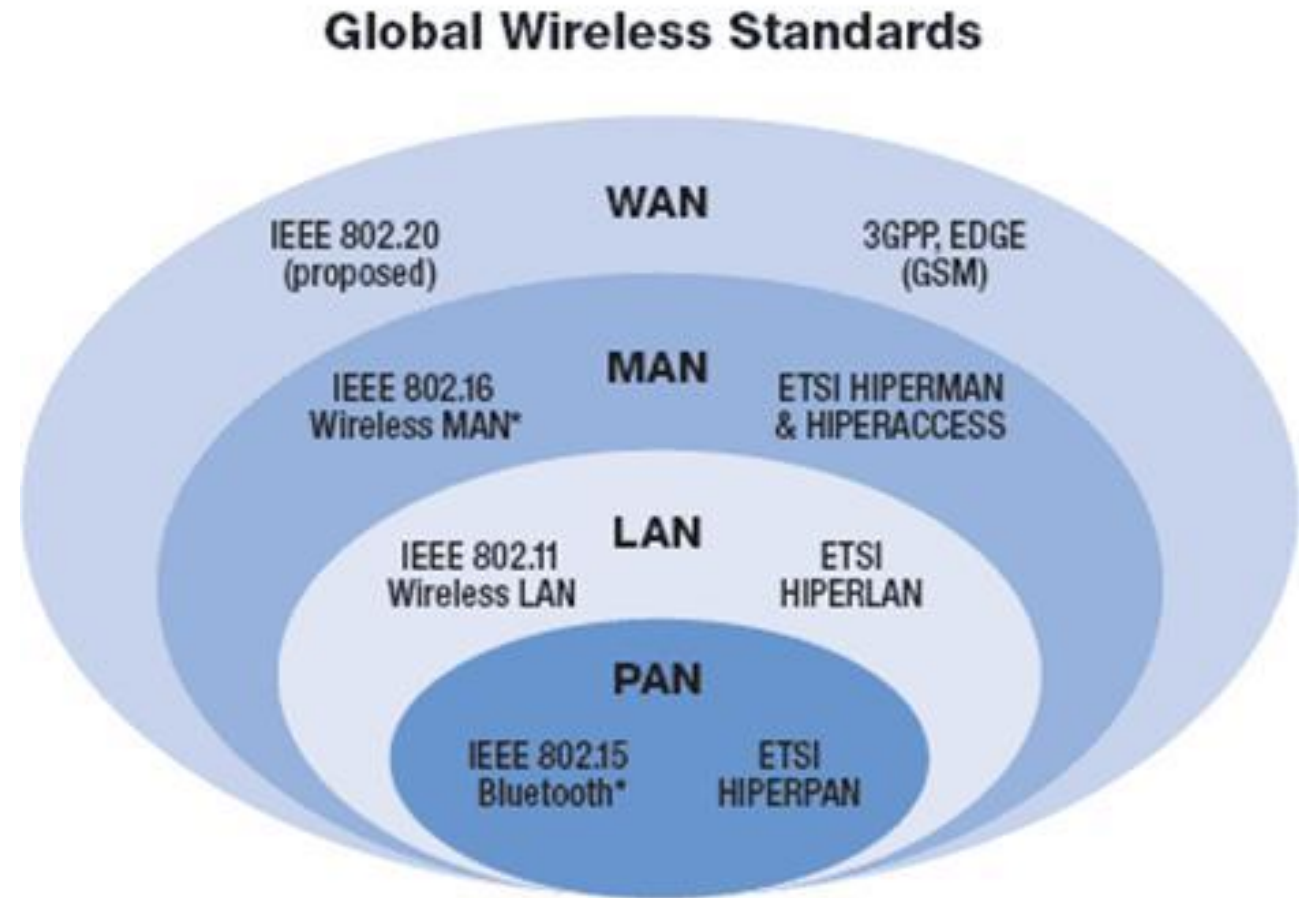
Begraber

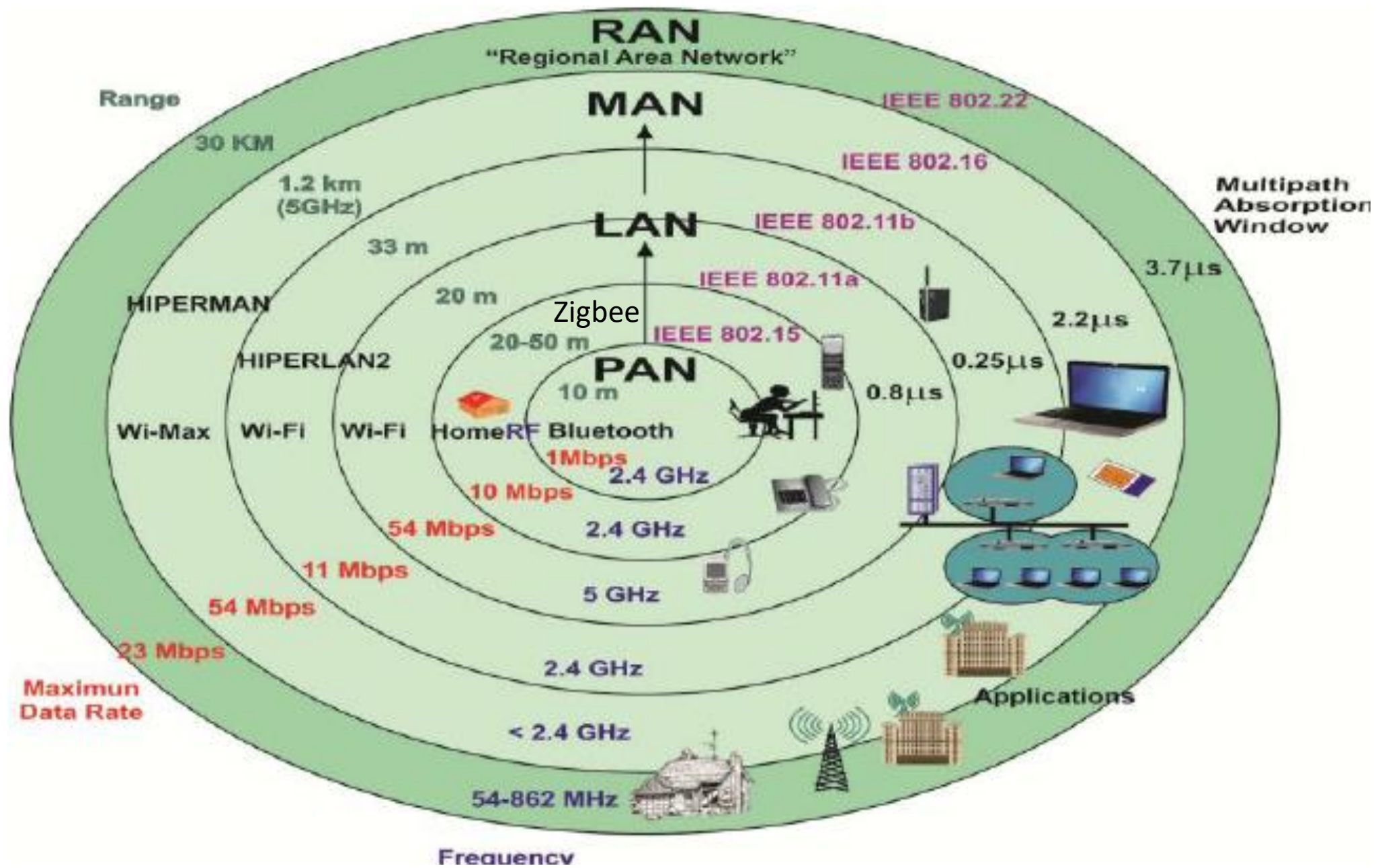
- Eksempler?

Transmitter	Receiver	Transceiver
		

Trådløs teknologier

- IEEE standarder/protocoler
- Stadarilisering
- Sikkerhed

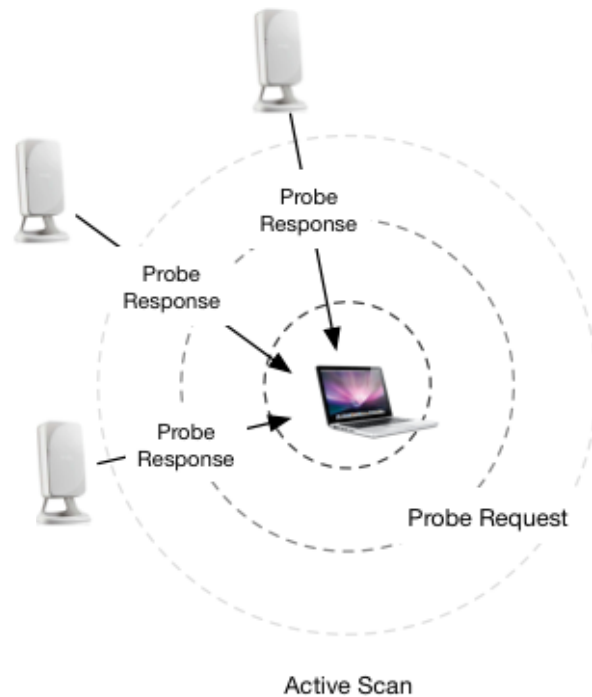




Attribute	Bluetooth® Low Energy Technology	Wi-Fi	Z-Wave	IEEE 802.15.4 (Zigbee, Thread)	LTE-M	NB-IoT	Sigfox	LoRaWAN
Range	10 m – 1.5 km	15 m – 100 m	30 m - 50 m	30 m – 100 m	1 km – 10 km	1 km – 10 km	3 km – 50 km	2 km – 20 km
Throughput	125 kbps – 2 Mbps	54 Mbps – 1.3 Gbps	10 kbps – 100 kbps	20 kbps – 250 kbps	Up to 1 Mbps	Up to 200 kbps	Up to 100 bps	10 kbps – 50 kbps
Power Consumption	Low	Medium	Low	Low	Medium	Low	Low	Low
Ongoing Cost	One-time	One-time	One-time	One-time	Recurring	Recurring	Recurring	One-time
Module Cost	Under \$5	Under \$10	Under \$10	\$8-\$15	\$8-\$20	\$8-\$20	Under \$5	\$8-\$15
Topology	P2P, Star, Mesh, Broadcast	Star, Mesh	Mesh	Mesh	Star	Star	Star	Star
Shipments in 2019 (millions)	~3,500	~3,200	~120	~420	~7	~16	~10	~45

Active / passive scanning

- Strøm forbrug
- Stabilitet / Reliability
- Hastighed / mængde af information



Zigbee

- Protocol lag
- Mesh network
- Mest brugt som wireless sensor networks

