

TEK 5110

LN - Del 7

Wireless Communication

- Coverage

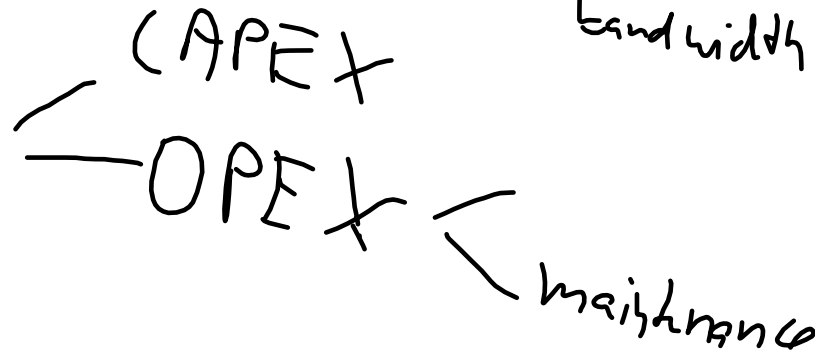
$$\text{Power} \sim \frac{1}{R^2}$$

- Capacity

$$C \sim \overset{\text{MIMO}}{\downarrow} W \log_2(1 + \text{SNR})$$

bandwidth

- Costs



Goals

"AI for Wireless network management"

anomaly detection in IoT with machine learning in 5G network

TEK 5110 L1 part 2

$P = -30 \text{ dB}$

$1 \text{ mW} = 10^{-3} \text{ W}$

14:40 h onwards

$P_{\text{dB}} = 10 \log P_{\text{W}}$

$30 \text{ dB} \quad P_{\text{dB}_m} = 10 \log P_{\text{mW}}$

$100 \text{ mW} = 10 \text{ E2}$

$\Rightarrow P = 20 \text{ dB}_m \text{ mW}$

$1 \text{ mW} = 10 \text{ E0 mW} \Rightarrow$

$P = 0 \text{ dB}_m$

Antenna

$$g = 0 \text{ dB}$$

$$g = 30 \text{ dB}$$

$$10 \text{ E } 3 = \underline{\underline{1000}}$$

double power $\rightarrow + 3 \text{ dB}$
 half $\rightarrow - 3 \text{ dB}$

Loss: 100 dB
 $P_{dB} = 10 \log P_w$

$$P_{dB} = 10 \log 10 \text{ E } 10$$

$$\Rightarrow P_{\text{power}} = 10.000.000.000$$

$$P_{dBm} = 30 \quad (36) \text{ dBm} \quad f \approx 5.4 - 5.7 \text{ GHz}$$

$$30 \text{ dBm} \quad 10 \log 10^3 \Rightarrow 1000 \text{ mW} = \text{handset } 3G \quad 7W - 2W$$

$$36 \text{ dBm} \quad (+3, +3 \text{ dB}) \Rightarrow 4000 \text{ mW} \quad \uparrow 2 \times 2$$

$$f = 2.46 \text{ Hz}$$

$$20 \text{ dBm} = 100 \text{ mW} \quad \sim 42 \text{ dBm}$$

$$23 \text{ dBm} = 200 \text{ mW} \quad \log 2.5 \times 10^4$$

Mobile network: $P_i = 25 \text{ W} = 25000 \text{ mW}$