Celtic Kelten — Askrix & Obelix

Genozid

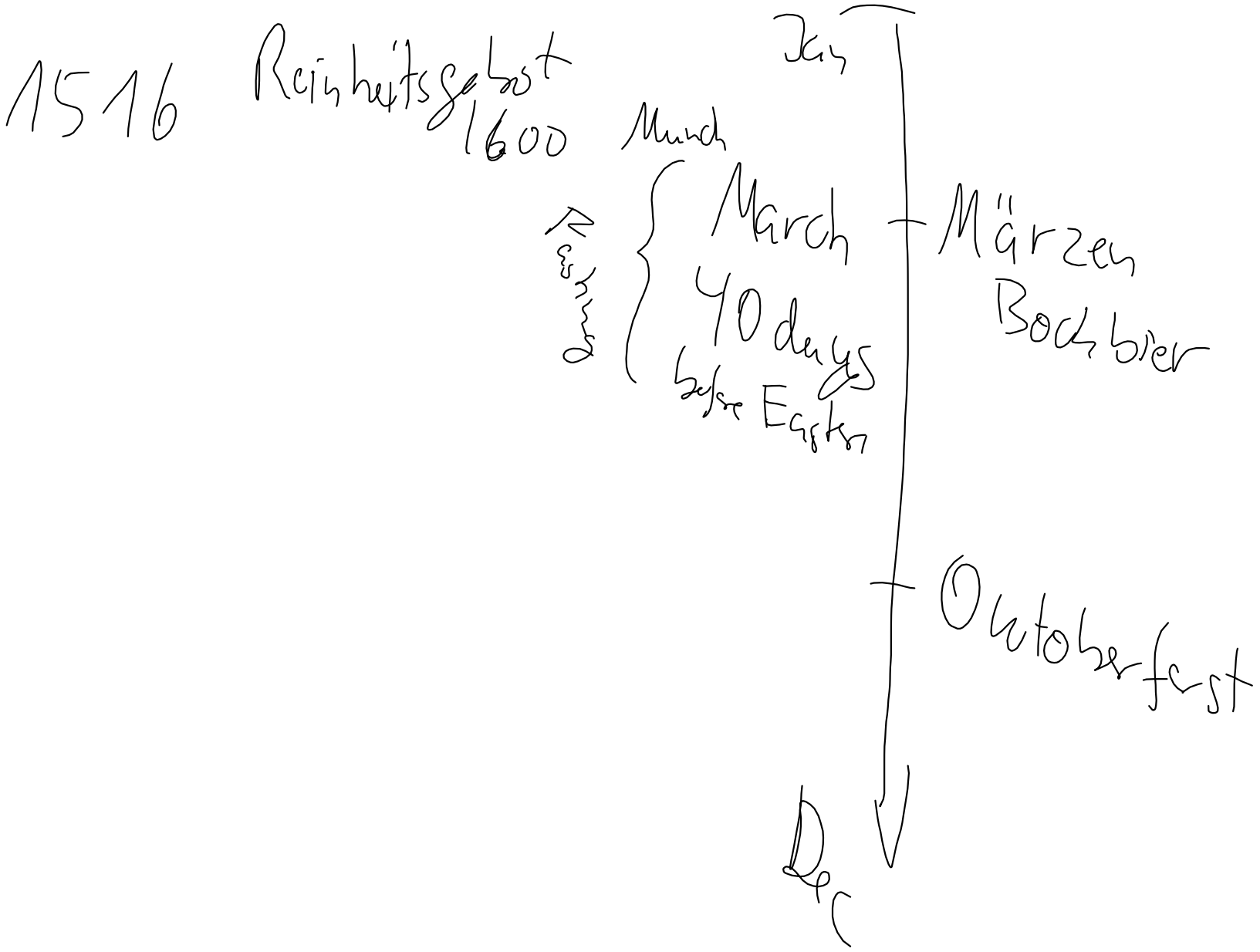
Caesar → Helvetier
250.000

Irish & Galicia NW Spain

mjøt, met

- Cole mining

Budweiser
Pilsen


1516
Reinheitsgebot
1600
Munich
March
40 days
before Easter
Jan
Dec
Märzen
Bockbier
Oktoberfest

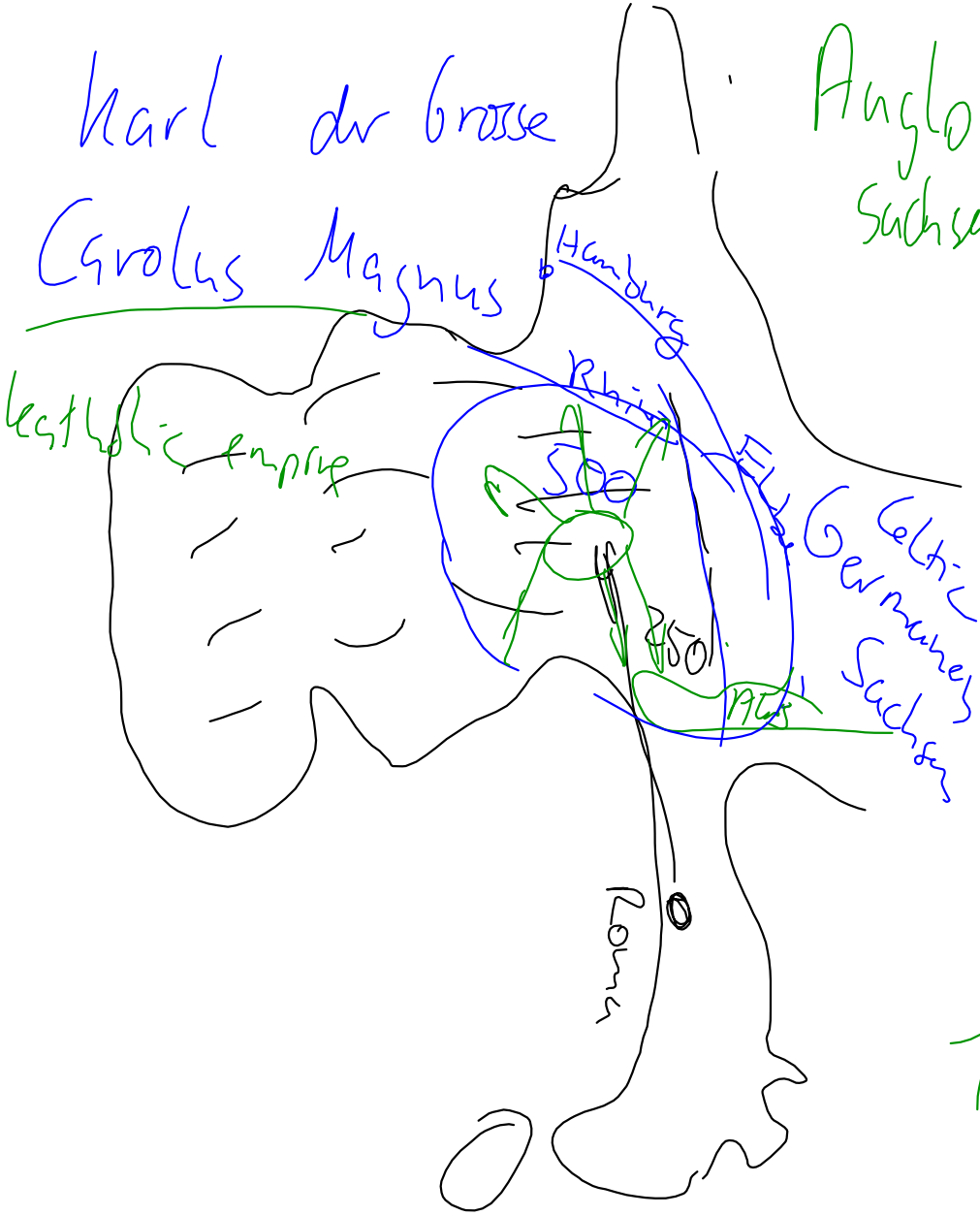
Karl der Grosse

Carolus Magnus

Anglo Sachsen

Sachsen

Niedersachsen



katholic empire

785 Sachsen-Anhalt

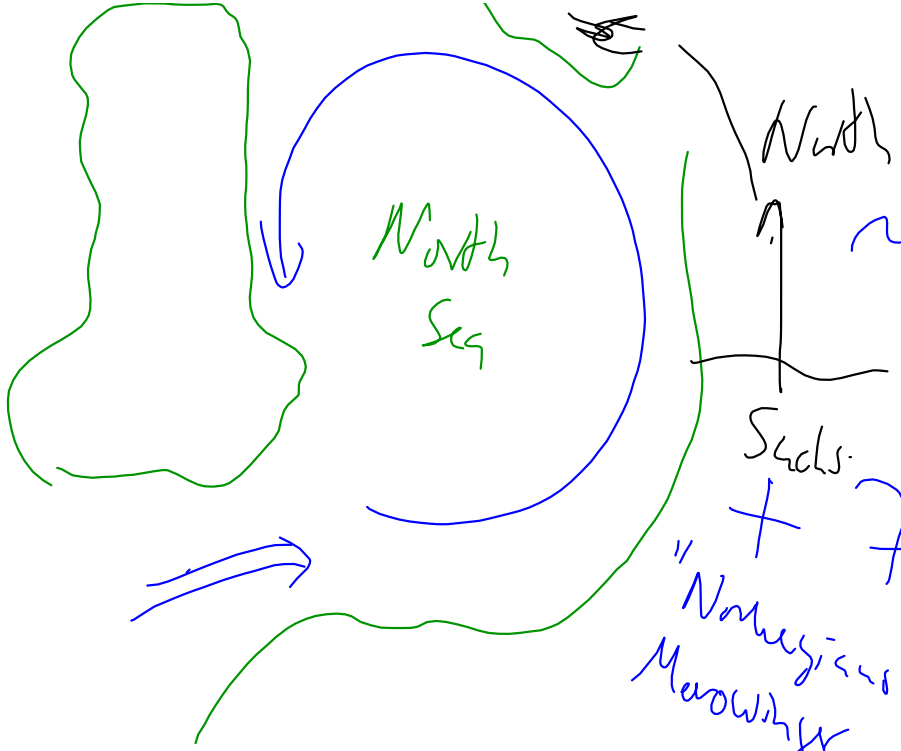
Saxony

SE Germany

793 Vikings

Lindisfarn

1814



~730 Oseberg Ship

Sail

+ 785 North Germany

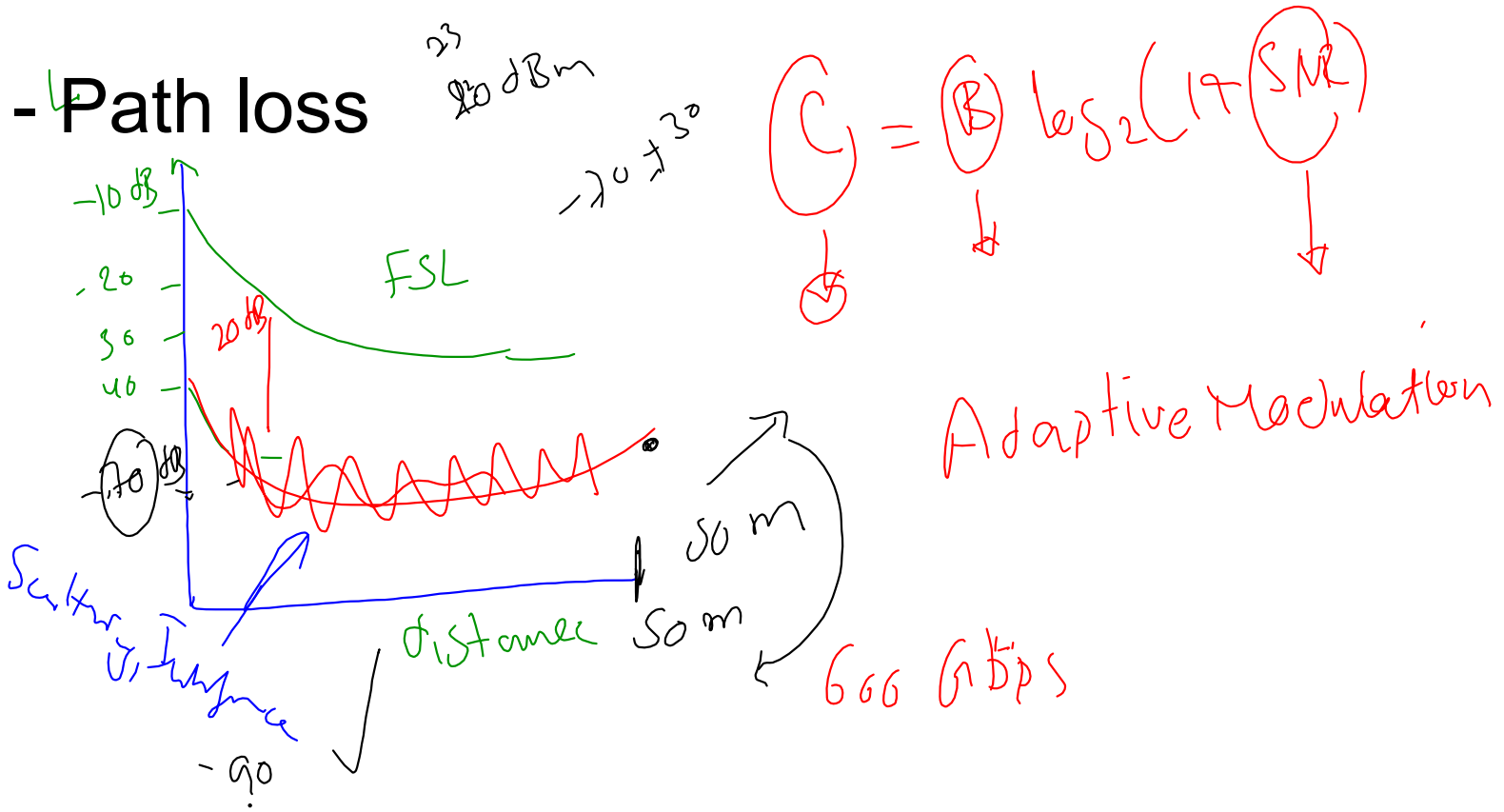
"Norwegians" Merowinger

~~Widukind~~ Surrendered ⟷

Carolus Magnus

793 Viking

A - Path loss



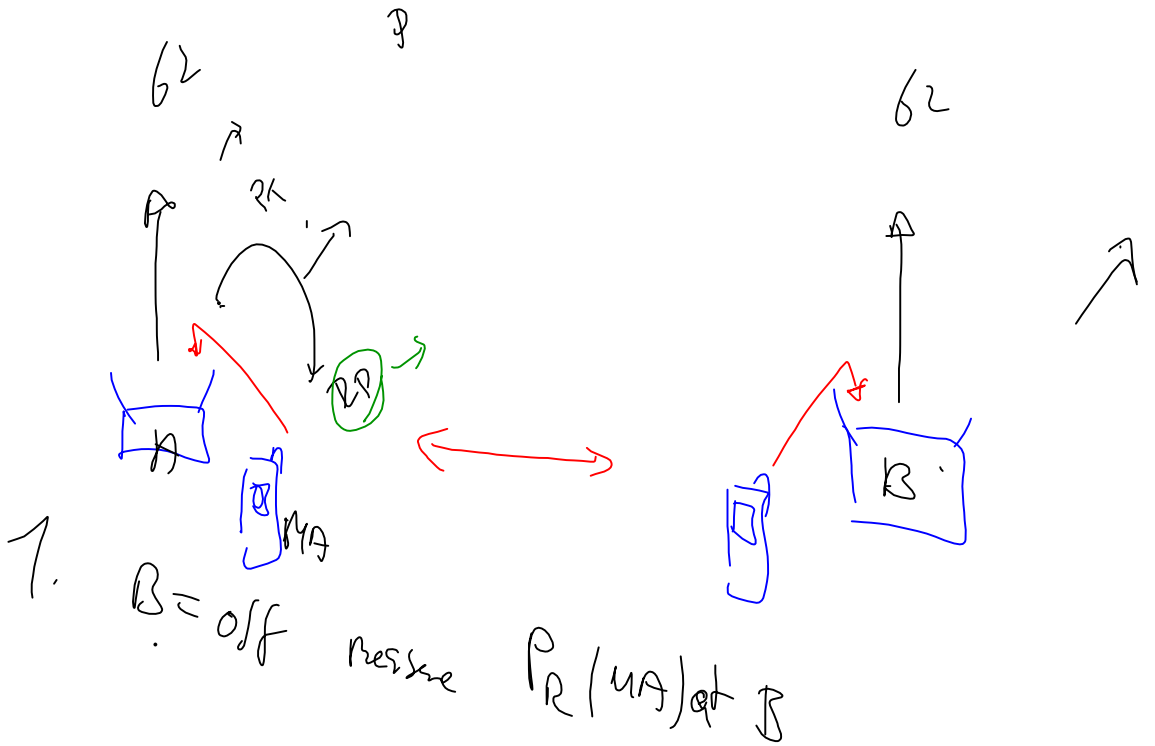
1) 5.x GHz communication

ETSI urban pedestrian

$$L_{pedest} = 40 \log r + 30 \log f + 49$$

2. Fading margin

(20 dB)



Path loss, use "relative model"

P_r (xm) = P_r(2m) - 40 log(r-2 m)

in addition: up-time of Wifi in the mobile phone (see: https://www.cisco.com/c/en/us/td/docs/wireless/controller/technotes/8-0/iPhone_roam/b_iPhone-roaming.html)

Search:

less capacity than theoretically calculated

loss due to antenna connection

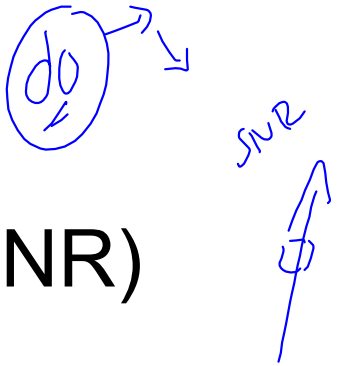
Drawing

loss much higher

due to ground

3. Tx efficiency (P_t, G_t) - Antenna matching

B - Capacity



$C = B \log_2(1+SNR)$

Sensitivity:

SNR= 0...40 dB

B = 20 MHz (10, 40 MHz)

Data vs Channel capacity

- TCP/IP has typically only 50-60% efficiency

data with SNR > 20 dB are not realistic