A summary on **dB**

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Decibels　　　　Nominal units

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- Attenuation (dB)

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- Voltage
- Electric/magnetic field
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$$\boxed{\frac{P_r}{P_e} = g_e\, g_r \left(\frac{\lambda}{4\pi D}\right)^e}$$

Nominal units (*)

$$\boxed{10\log_{10}\frac{P_r}{P_e} = G_e + G_r + 10\log_{10}\left(\frac{\lambda}{4\pi D}\right)^e}$$

Decibels (+)

S10E01

- Gain: $G=28.5$ dBi
- System temperature (antenna + amplifier): $T_e=100$ K
- Ambient temperature: $T_0=293$ K
- Change of loss: $\Delta l=0.1$ dB => Change of G/T ?

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- Cable loss temperature:

$$T_{\Delta l} = (\Delta l - 1)T_0 \qquad T_{\Delta l} = \left(10^{0.1/10} - 1\right)293 = 6.82\ \mathrm{K}$$

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$$\boxed{\Delta\frac{G}{T} = \frac{G}{T}^{new}_{dB} - \frac{G}{T}^{old}_{dB} = 0.3\ \mathrm{dB/K}}$$

S10E02: part 1

- Path loss exponent: e=3
- Data rate: Rb=2 Mb/s
- Frequency: 5 GHz => $\lambda = \frac{c_0}{f} = 0.06\ \mathrm{m}, \qquad c_0 = 3 \times 10^8\ \frac{\mathrm{m}}{\mathrm{s}}$
- Transmitted power: Pe=2 W
- Transmission antenna effective surface: Ae=0.0028 m^2
- Distance: D=500 m
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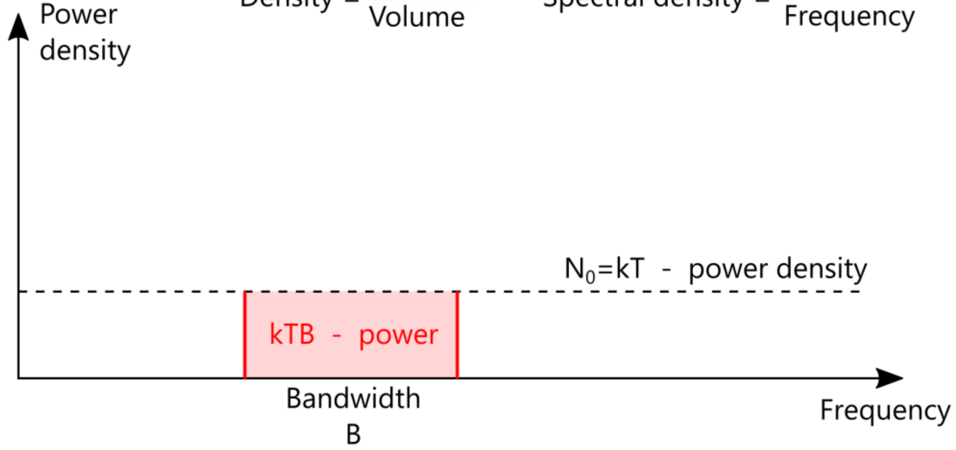

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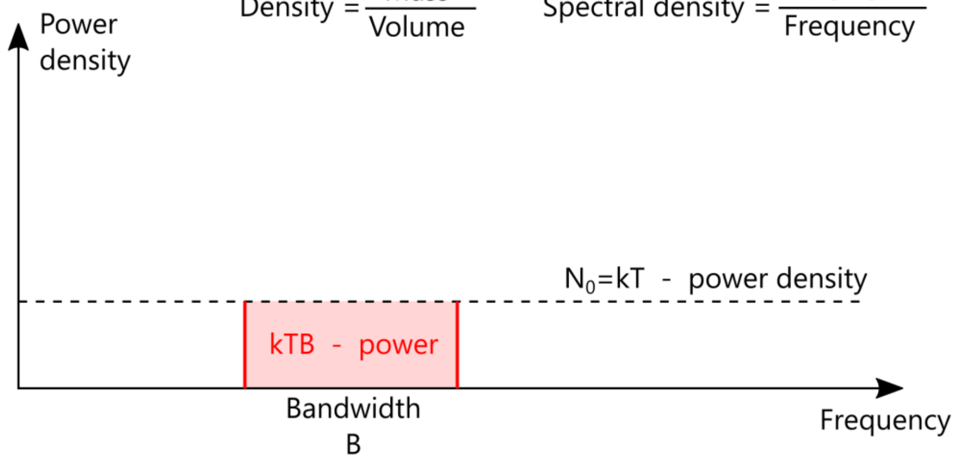

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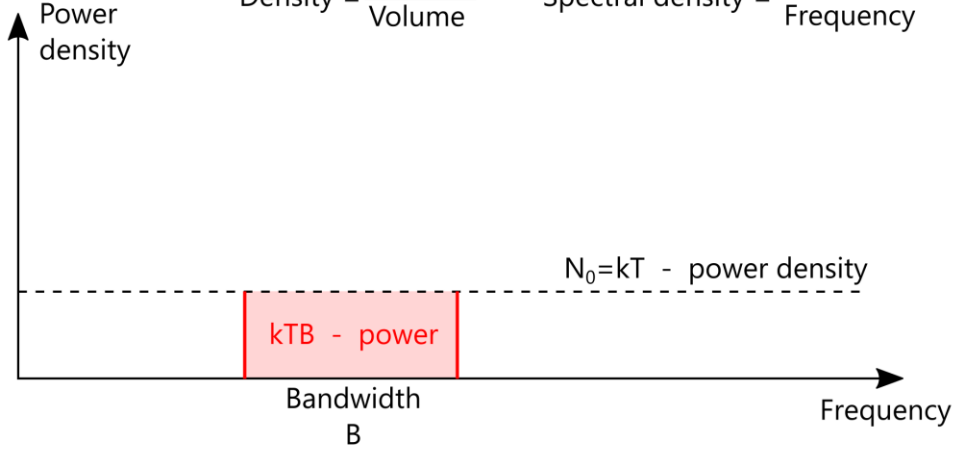

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$$\mathrm{EIRP_{dBW}} = P_{t\,dBW} + G_{t\,dBi}$$

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