émetteur 1 :

$P_e = 18$ dBm
$G_e = 15$ dB$_i$
$f = 41{,}5$ GHz

relais 2 :

$G_{max} = 51{,}6$ dB$_i$

réception 3 :

$G_{r\,max} = 31$ dB$_i$

$L_{1-2} = L_{2-3} = 400$ m

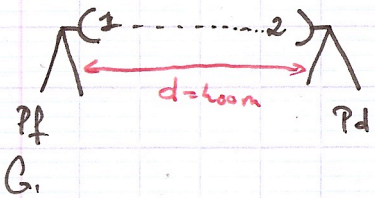
$P_r = -74{,}8$ dBm

1.1) Surface effective : $S(\theta,\varphi) = \dfrac{P_d}{\Delta P_s}$

$$S(\theta,\varphi) = \frac{\lambda^2}{4\pi} G_A(\theta,\varphi)$$

$$\frac{P_d}{P_f} = \frac{S_2 G_1}{4\pi d^2} \Rightarrow S_2 = \frac{4\pi d^2 . P_d}{P_f G_1}$$

S_2 → surface utile de la parabole



AN : $S_2 = \dfrac{4\pi . 400^2 \times 18}{P_f \times 15}$

$$Pf_{dB} = Pd_{dB} + Ge_{dB} + G_{2\,dB} - A_0 \qquad A_0 = 10 \log \left(\left(\frac{4\pi d}{\lambda} \right)^2 \right)$$

$$A_0 = 10 \log \left[\left(\frac{4\pi . 400}{\frac{3.10^8}{41,5.10^9}} \right)^2 \right] = 1,17.10^2$$

↳ Affaiblissement de propagation en espace parfait

donc $Pf_{dB} = 18 + 15 + 51,6 - 1,17.10^2 = -32,24\ dB$

et $S_2 = \frac{4\pi . 400^2}{15 \times (+32,24)} = 4157$

1.2.1

$$A = 10 \log \left[\left(\frac{4\pi . 900}{\frac{3.10^8}{41,5.10^9}} \right)^2 \right] = 122,86$$

$$P_E = P_e + G_e + G_2 + G_r - A$$

$$= 18 + 15 + 51,6 + 31 - 122,86$$
$$= -7,26$$