

$$\text{Implant Output Power [mW]} = \text{Input Power [dBm]} + G_T [\text{dB}] \leftarrow \text{Not including antenna}$$

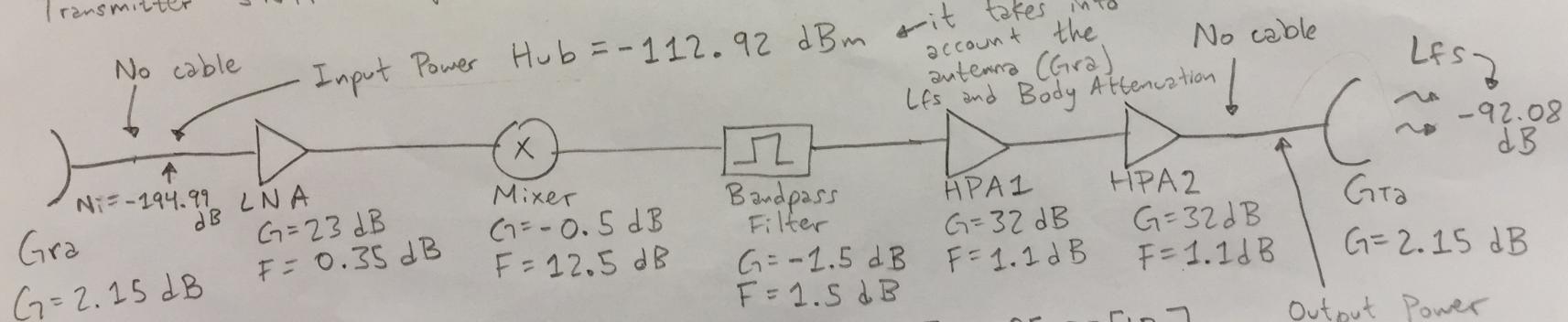
-8 dB
Total Implant Transmitter

$$\text{Implant EIRP [dBm]} = \text{Input Power [dBm]} + G_T (\text{Total Implant Transmitter}) [\text{dB}] + G_{T2} [\text{dB}]$$

$$\text{Output Transmitter Noise [mW]} = G_T N_i F_T$$

\uparrow
Previous cell

$$\text{Transmitter SNR} = \text{Implant Output Power [dB]} - \text{Output Transmitter Noise [dB]}$$



$$\text{Hub EIRP [dBm]} = \text{Output Power [dBm]} + G_{T2} [\text{dB}] = -25.77 [\text{dBm}]$$

Output Power
 $= -27.92 \text{ dBm}$
 $No = -48.28 \text{ dB}$

$$\overset{\sim}{\sim} \left. \right\} \begin{array}{l} \text{GPA} \\ G = -1.4 \text{ dB} \end{array}$$

$$\begin{array}{l} \text{Noise} \\ \text{Received} = -139.622 \text{ dB} \\ \\ \text{Power} \\ \text{Received} = -119.25 \text{ dBm} \end{array}$$

$$\begin{aligned} \text{SNR}_{\text{iPhone}} &= \text{Power Received [dBm]} - \text{Noise Received [dB]} \\ &= -119.25 \text{ dBm} - (-139.622 \text{ dB}) \\ &= -119.25 \text{ dBm} + 139.622 \text{ dB} = 20.372 \end{aligned}$$

$$\text{Previous output power} + G_{T2} - L_{fs} + G_{PA} =$$

$$-27.92 \text{ dBm} + 2.25 \text{ dB} - 92.08 - 1.4 = -119.25 \text{ dBm}$$

$$\text{Channel Capacity} = \text{Shannon's Law} = \underset{C}{(3.322)(10^4)} \underset{\text{Bandwidth}}{\log_{10}(1 + \underset{\text{SNR}}{108.684})} = 67773.6 \text{ bits/sec}$$

$$= 6.78 \times 10^4 \text{ bits/sec}$$

