

Link Budget

GS Engineering - GPS Re-radiator - Vevor Model TZT-ZF330
Model Number - UNBSU0097215391

$A_{\text{cnom}} := 66.28$	Coax loss at 1800MHz, dB/100m
$l_{\text{coax}} := 30$	Installed Coax Length, receive antenna to amplifier unit, m
$A_{\text{csys}} := \frac{A_{\text{cnom}}}{100} \cdot l_{\text{coax}} = 19.884$	Feed line loss in installed system, dB
$\text{RSSI}_{\text{nom}} := -140$	Nominal RSSI at receive antenna, dBm
$G_{\text{LNA}} := 37$	Gain of receive antenna LNA, dB
$G_{\text{Amp}} := 75$	Gain of amplifier unit, dB
$A_{\text{att}} := 30$	Transmit attenuator loss, dB

$$P_t := \text{RSSI}_{\text{nom}} + G_{\text{LNA}} + G_{\text{Amp}} - A_{\text{csys}} - A_{\text{att}}$$

Free Space Path Loss at 30m

$P_t = -77.884$	Transmitter Power in dBmW
$D_t := 3$	Transmit Antenna Gain, in dBi
$D_r := 0$	Receive Antenna Gain. 0dBi = isotropic antenna per NTIA Redbook 8.3.28(6)
$f := 1575.42\text{MHz}$	GPS L1 C/A Carrier Frequency
$\lambda := \frac{c}{f}$	
$\lambda = 0.19\text{m}$	Wavelength of Carrier
$d := 30\text{m}$	Distance between transmitter and receiver for interference calculation per NTIA Redbook 8.3.28(6)

Friis transmission equation:

$$P_r := P_t + D_t + D_r + 20 \log \left(\frac{\lambda}{4\pi d} \right)$$

$P_r = -140.822$	Received power after free space path loss in dBmW.
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