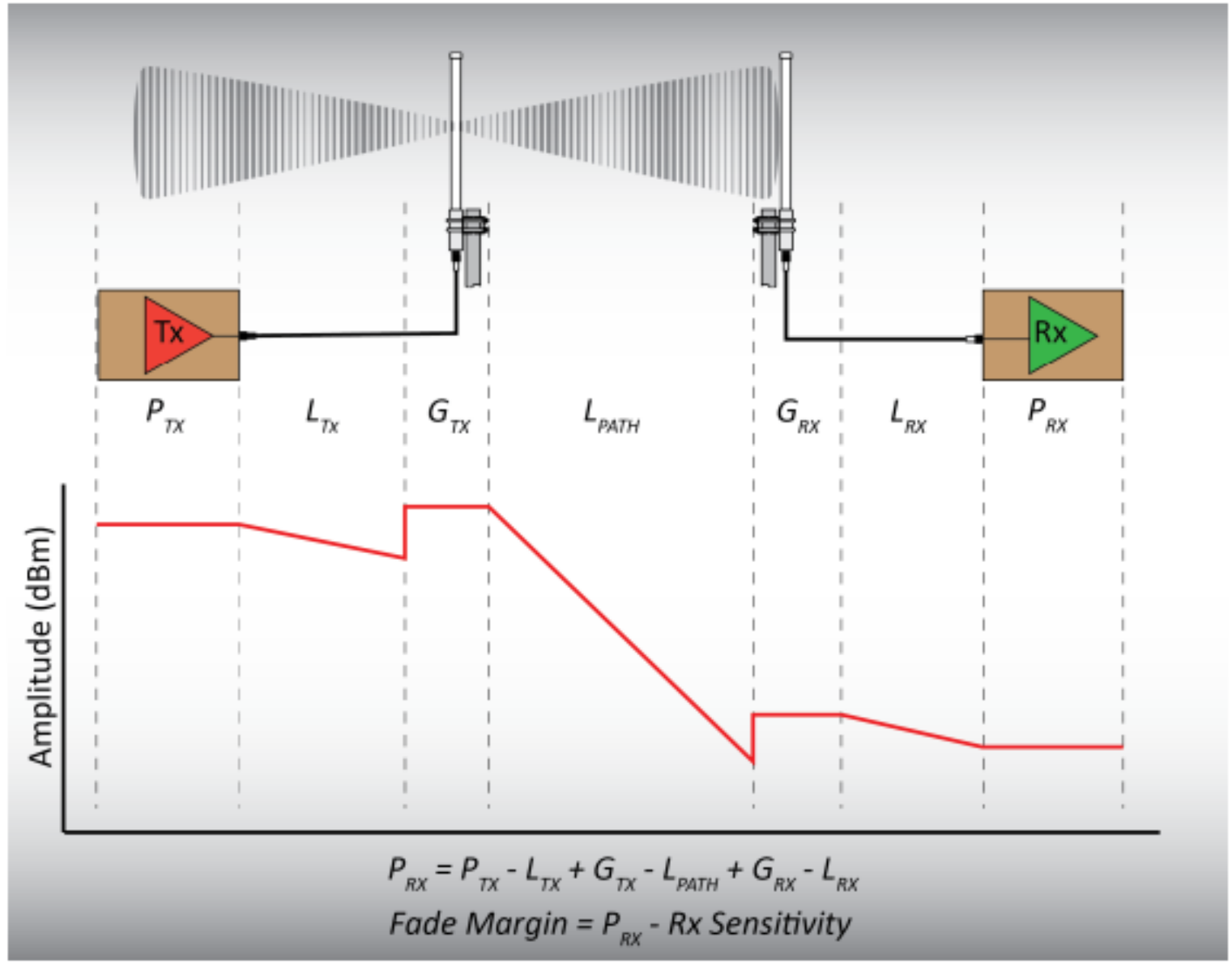
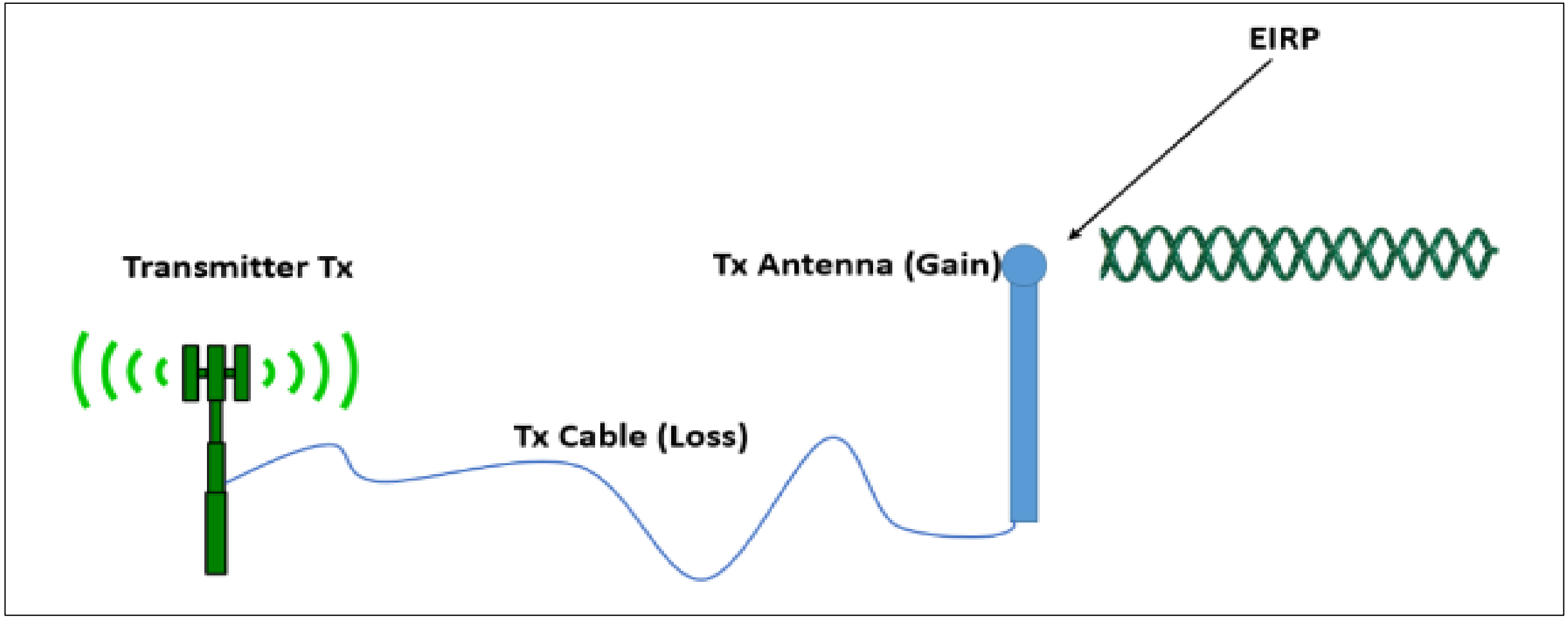


FIGURE 1-1. System Gain-Loss Profile for a Link Budget



EIRP = Tx power + Tx Antenna – Tx cable

3. Transmitter Antenna Gain

Antenna Gain

$$G = \eta \left(\frac{\pi D}{\lambda} \right)^2$$

where:
- η = Aperture Efficiency(between 0.5 and 0.8)
- D = Antenna Diameter in meters
- λ = Wavelength

$$G = \eta (10.472\, fD)^2$$

where:
- η = Aperture Efficiency(between 0.5 and 0.8)
- D = Antenna Diameter in meters
- f = frequency in GHz

$$[G] = 17.8 + 20 \log (D \times f)$$

Satellite System Parameters

1. Effective Isotropic Radiated Power (EIRP)

- For Parabolic Antennas with efficiency η=0.55-0.73 , the gain can be approximated by:

$$G=\eta(10.472\ fD)^2$$

Where f – the operating frequency in GHz

D – Ant. Diameter in m

- Fade allowance : extra margin added to compensate for fading introduced by atmospheric and/or rain attenuation.

- Other losses could include polarization loss, and propagation – related losses not modelled by free-space loss calculations.

- Edge of coverage loss refers to the losses seen user at the edge of the coverage pattern, where the gain of the antenna is lower and the signal also has a larger range to cover.

- Implementation loss refers to implementation loses in the receiver.
  - Ex) detector efficiency