

# Chapter 1 figs ELEN4001

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Note that the source code for the figs can be seen by clicking the pic. You will need to use your Browser's BACK button to return to this page.

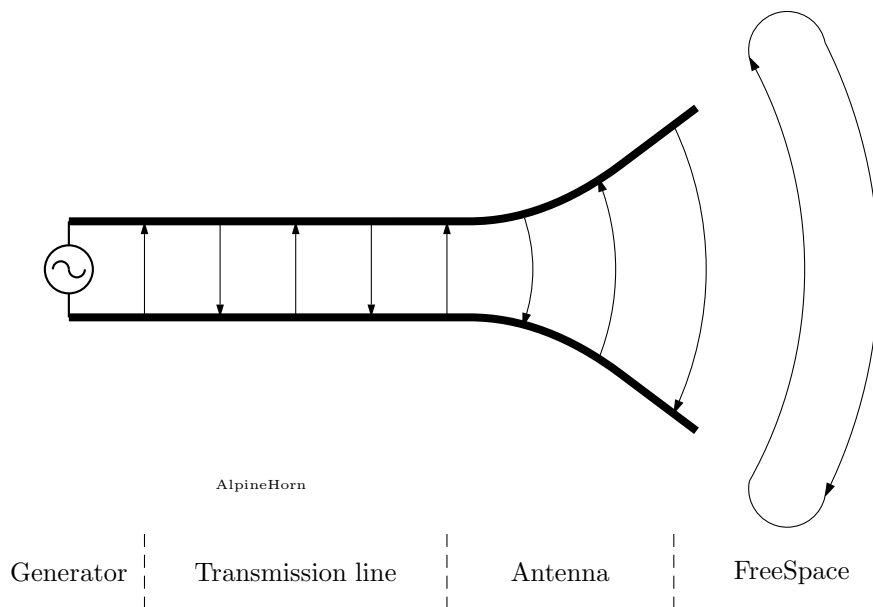


Figure 1: Alpine Horn antenna

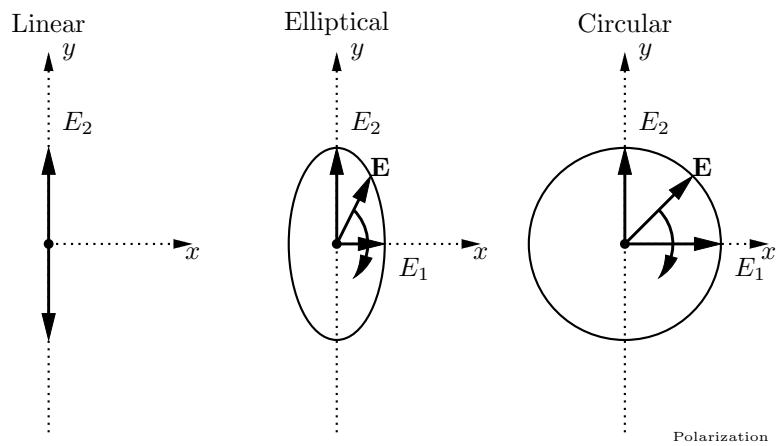


Figure 2: Polarization possibilities. Wave out of page

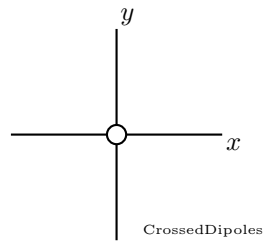


Figure 3: A pair of Crossed Dipoles.

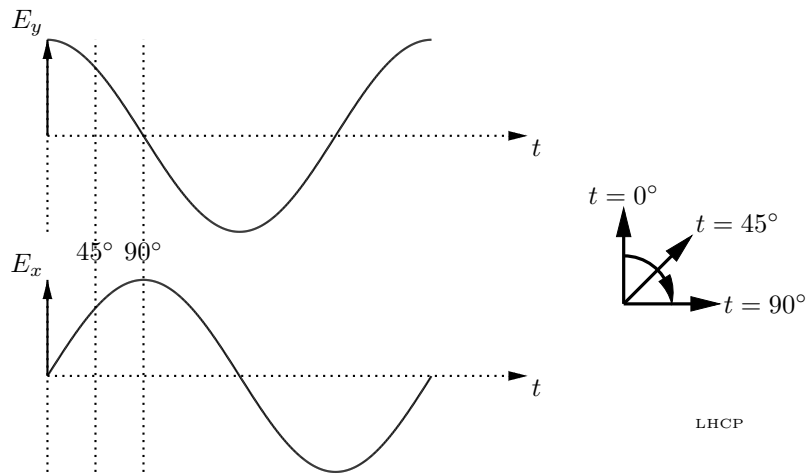


Figure 4: Obtaining Left-Hand Circular Polarization with a phase and spatial  $\pi/2$  shift.

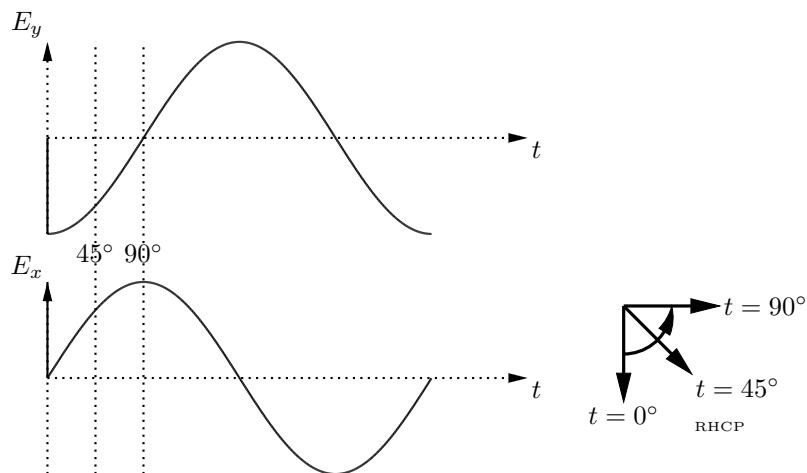


Figure 5: Obtaining Right-Hand Circular Polarization with a phase and spatial  $\pi/2$  shift.

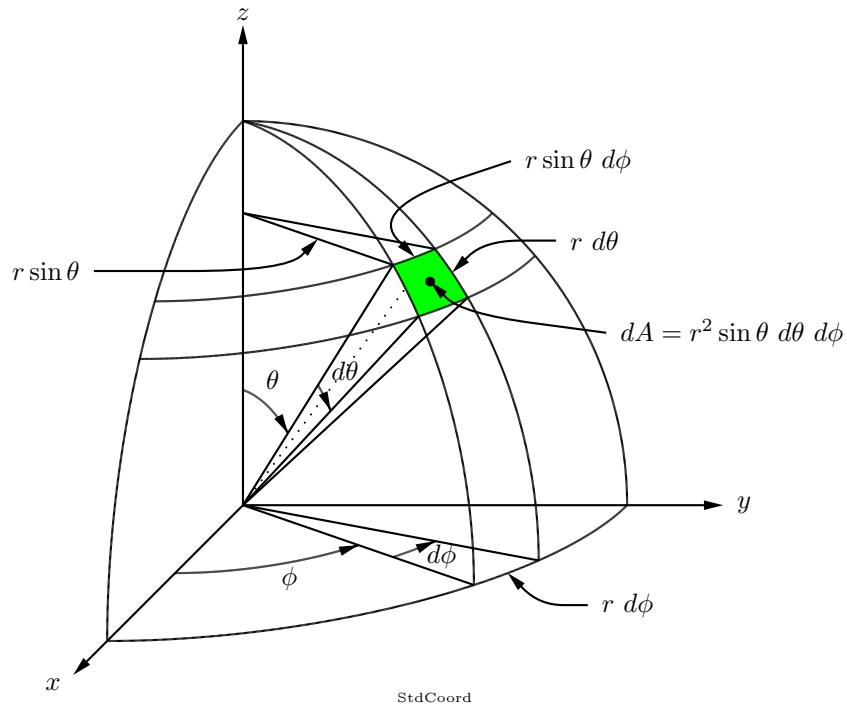


Figure 6: Standard coordinate system and integrating area

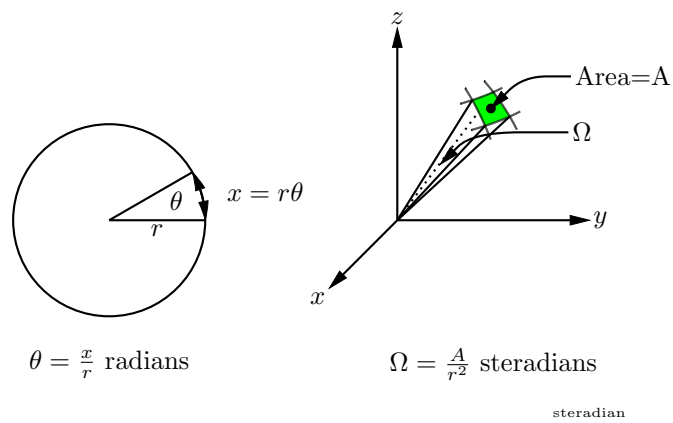
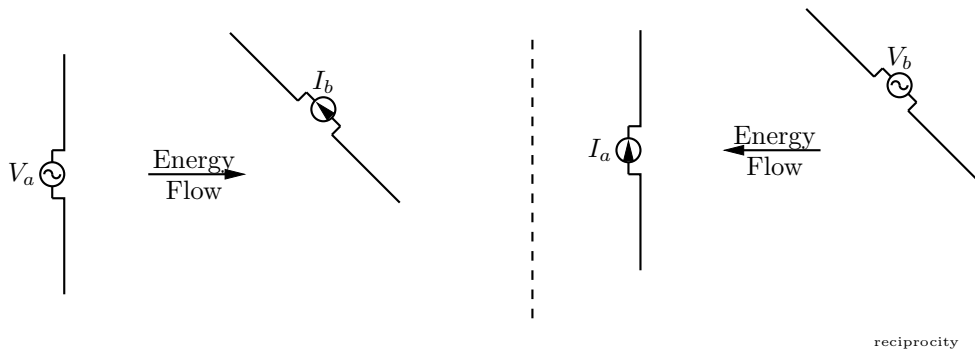


Figure 7: Concept of a solid angle



$V_a$  causes  $I_b$  ;  $V_b$  causes  $I_a$   
 If  $V_b$  is made =  $V_a$ , then  $I_a$  will be =  $I_b$

Figure 11: Reciprocity concepts

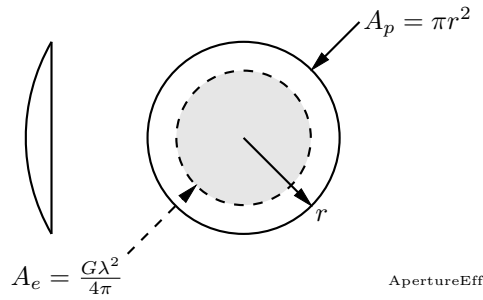


Figure 12: Aperture Efficiency of a Parabolic Dish

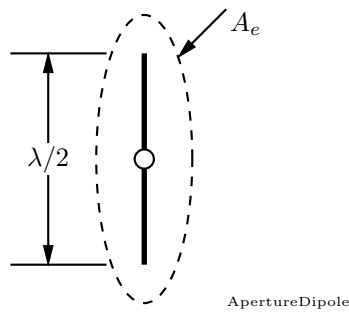


Figure 13: Effective Aperture of Dipole  $\gg$  Physical Aperture

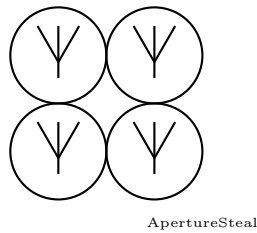


Figure 14: Apertures *MUST NOT* overlap!

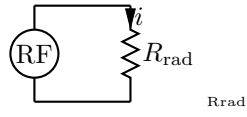


Figure 15: Radiation Resistance concept.

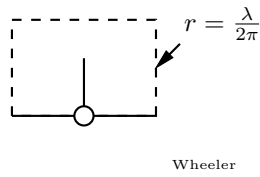


Figure 16: Wheeler cap method of determining  $R_{\text{loss}}$

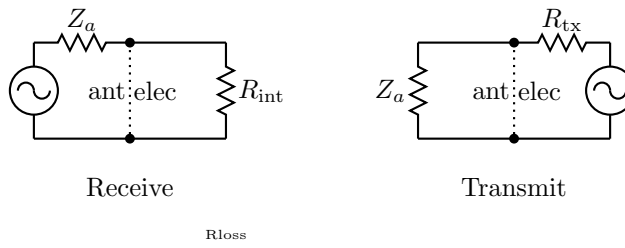


Figure 17: Terminal impedance as a Tx and Rx

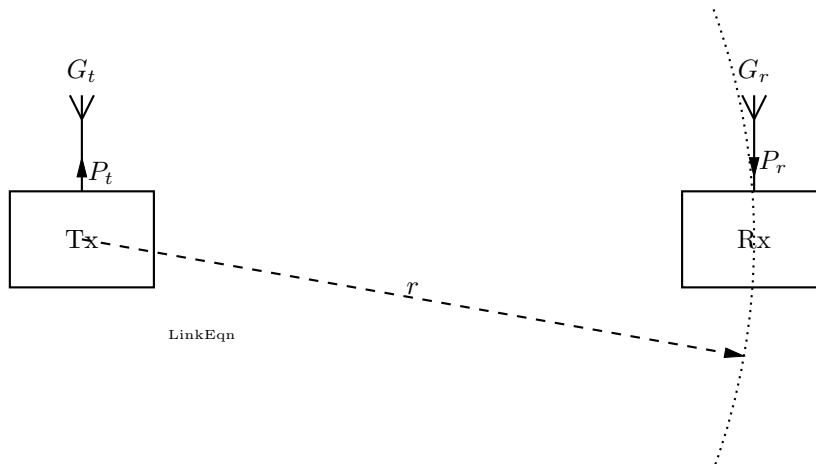


Figure 18: Point-to-point Link parameters

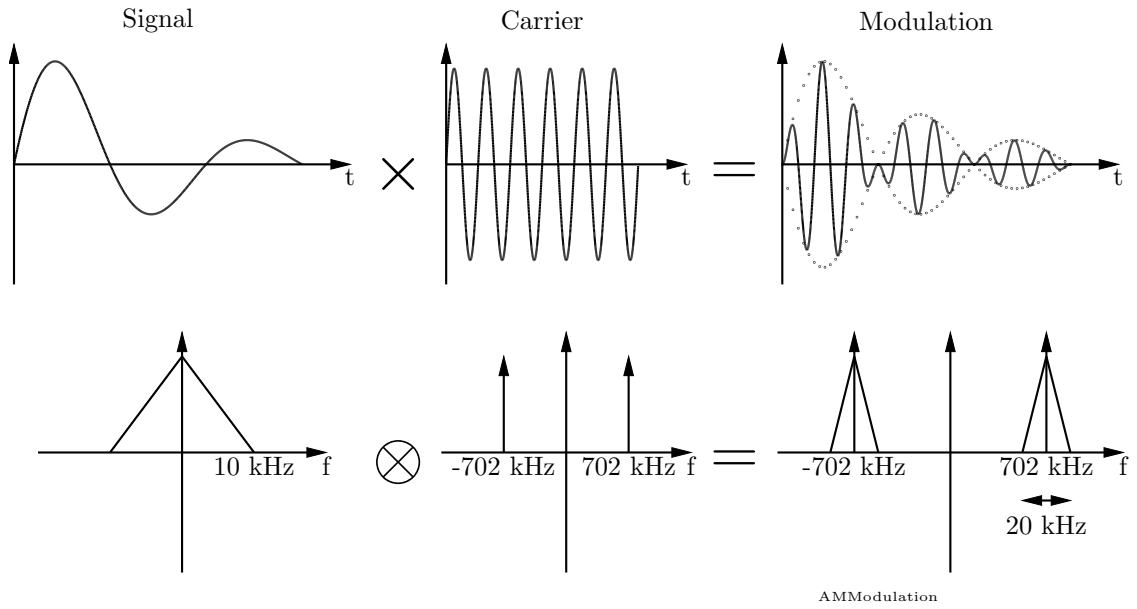


Figure 19: Amplitude Modulation

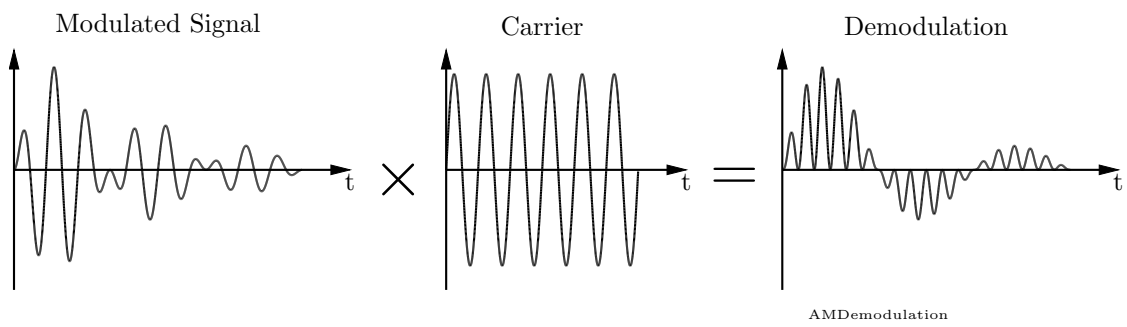


Figure 20: AM Demodulation

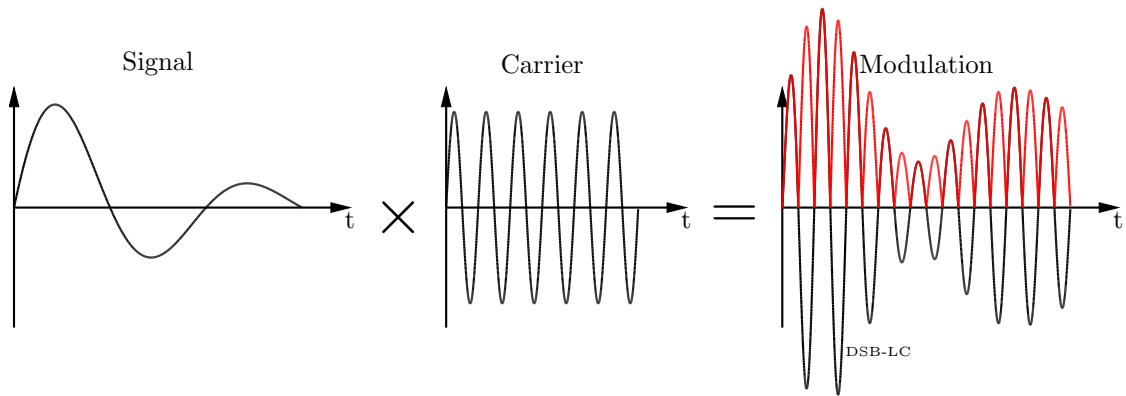


Figure 21: Double Side-band Large Carrier

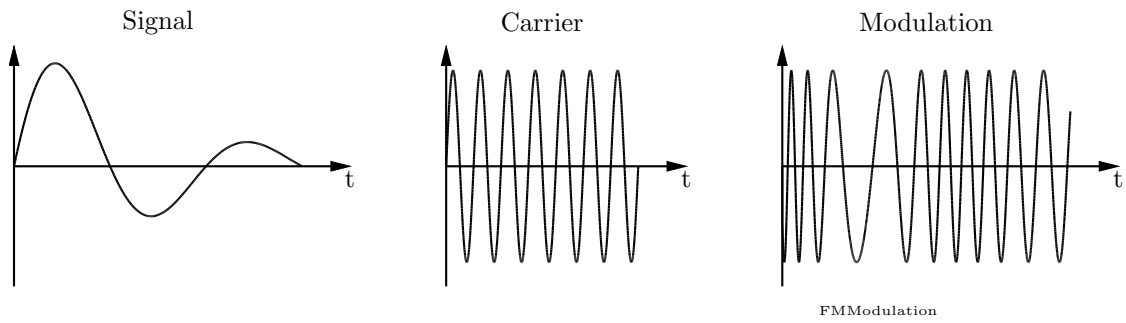


Figure 22: Frequency Modulation

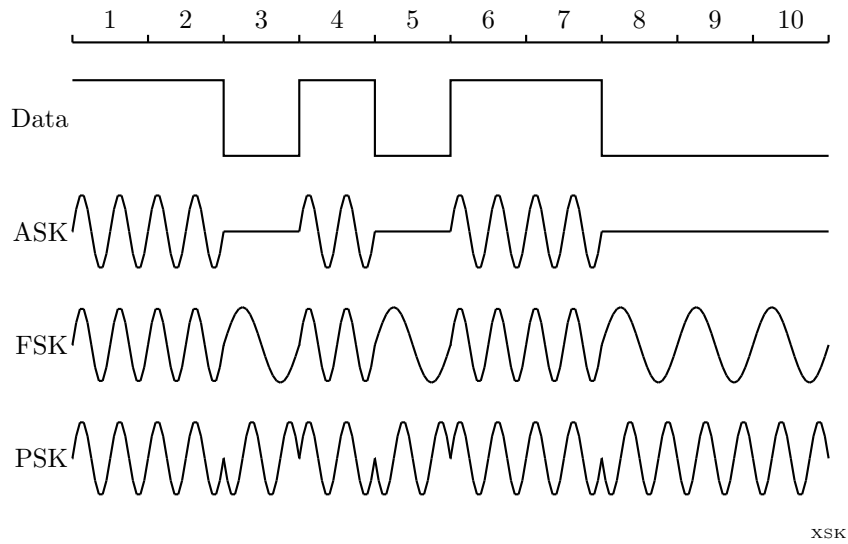


Figure 23: Amplitude, Frequency and Phase Shift Keying

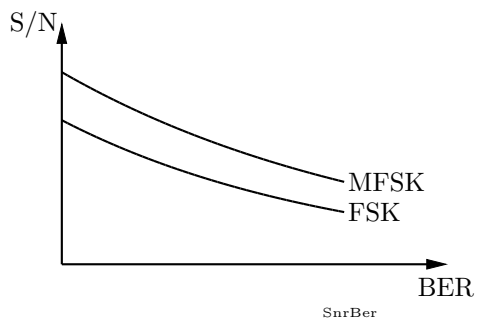


Figure 24: Bit error rates at Signal to Noise Levels.

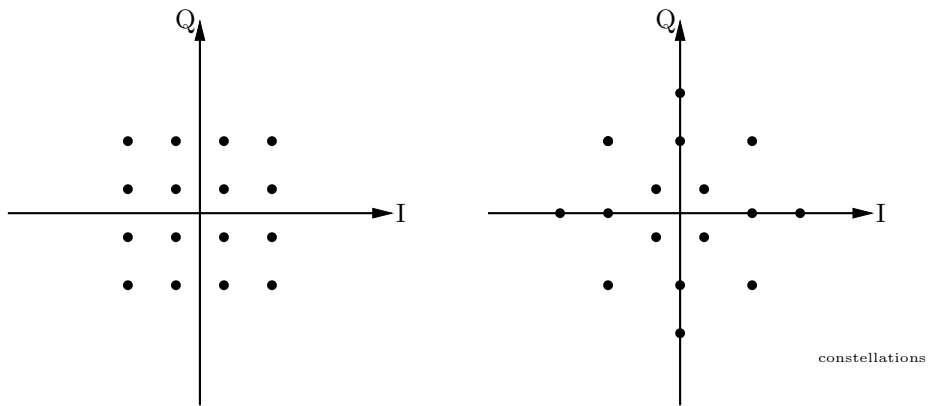


Figure 25: Two types of 16-ary Phase and Level shifted constellations.

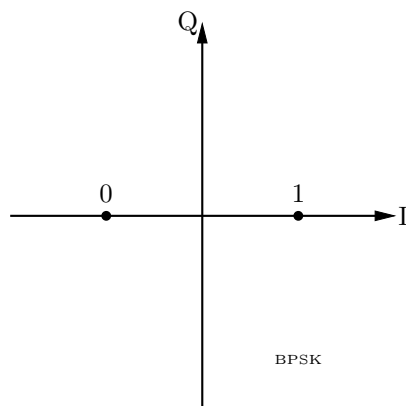


Figure 26: Binary Phase Shift Keying



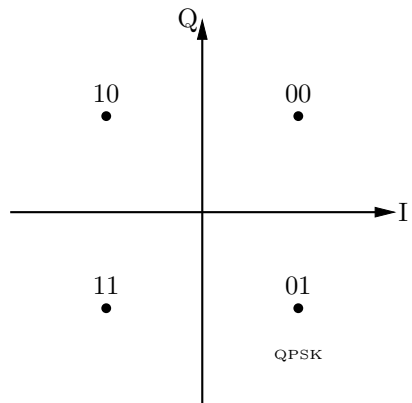


Figure 27: Quadrature Phase shift Keying

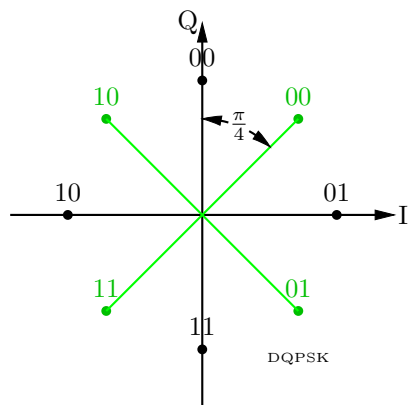


Figure 28:  $\pi/4$  Differential Quadrature Phase Shift Keying

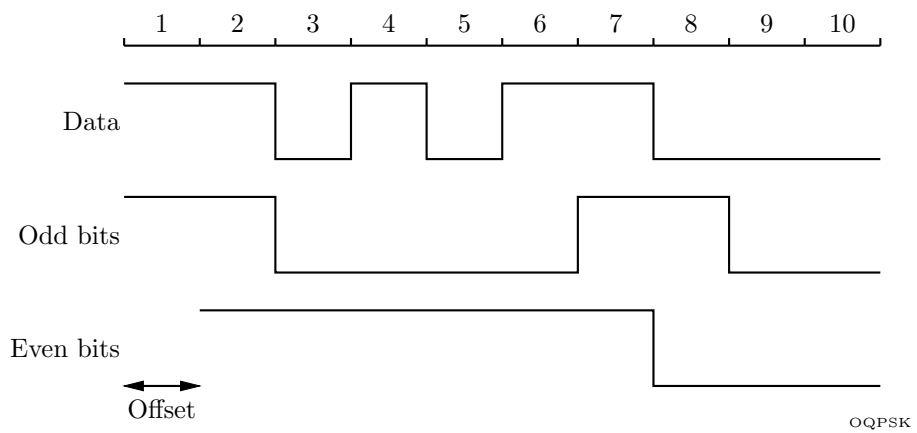


Figure 29: Offset Quadrature Phase Shift Keying

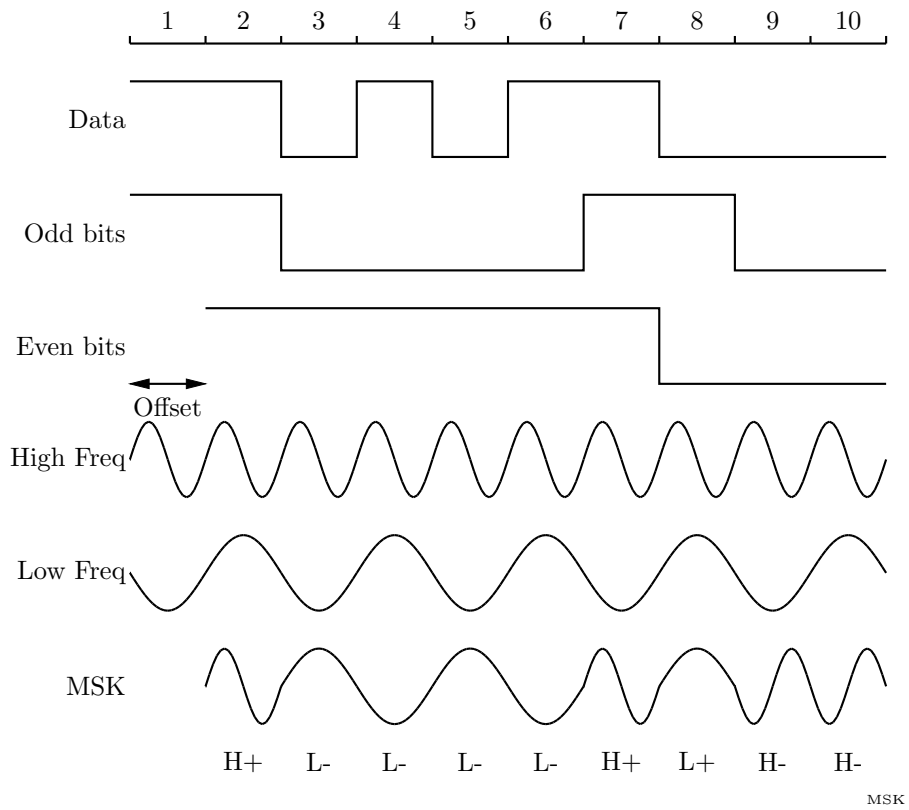


Figure 30: Minimum Shift Keying

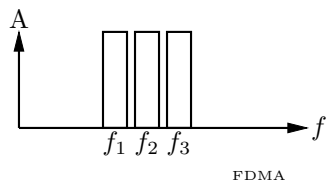


Figure 31: Frequency Division Multiple Access

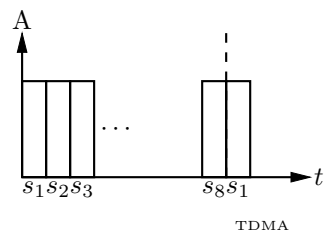


Figure 32: Time Division Multiple Access

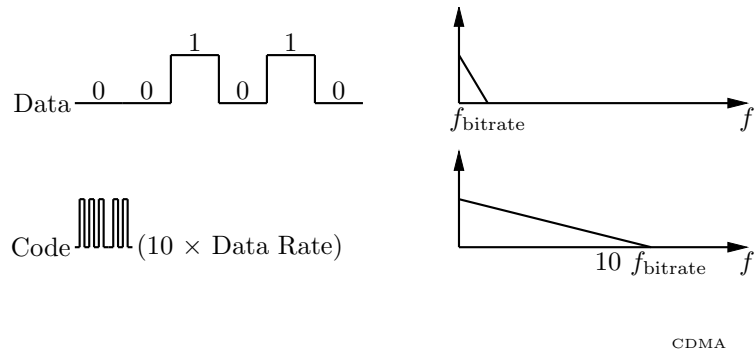


Figure 33: Code Division Multiple Access Spreads the Spectrum.

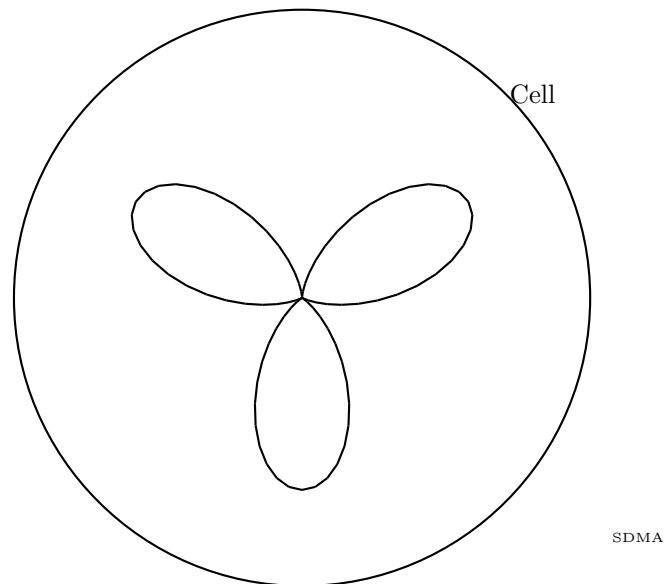


Figure 34: Space Division Multiple Access with "Smart" antennas.

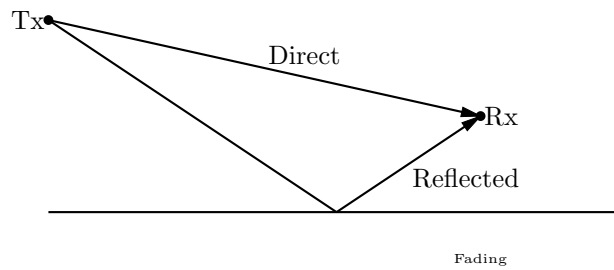


Figure 35: Fading due to Multipath Cancellation

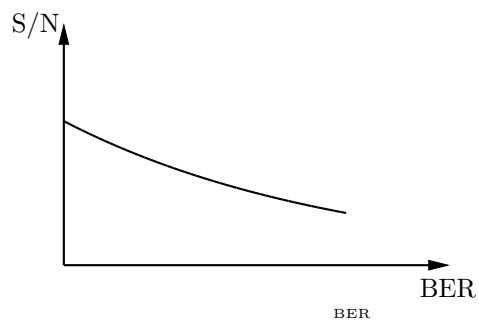


Figure 36: Bit Error Rate increases with decreasing S/N ratio.