



SNS COLLEGE OF TECHNOLOGY

Coimbatore – 35

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19ECT311 / Wireless Communication

III ECE/ VI SEMESTER

Unit II - MOBILE RADIO PROPAGATION

Topic 5 : Link Budget using path loss model



Guess!!!!!!!!!!!!!!!!!!!!



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Link Budget

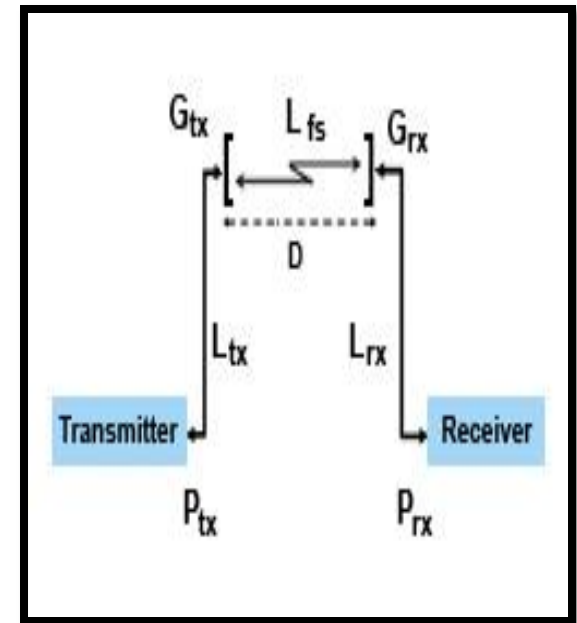
- BUDGET????
- What is Communication link?
- Characteristics of link.
- Path loss
- Required received power



Link Budget - Need

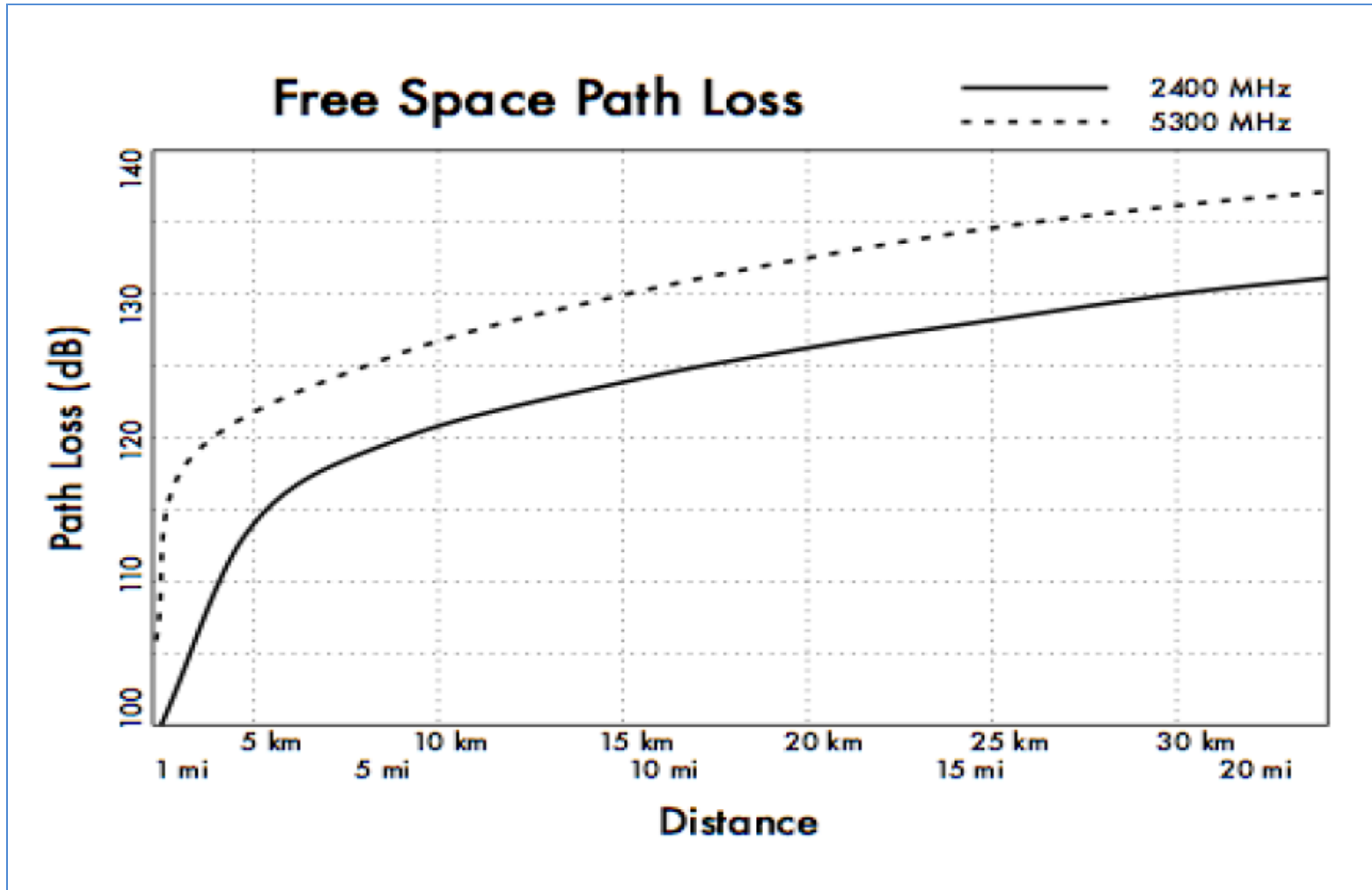
A link budget is used to predict performance before the link is established.

- ❖ Show in advance if it will be acceptable
- ❖ Show if one option is better than another
- ❖ Provide a criterion to evaluate actual performance



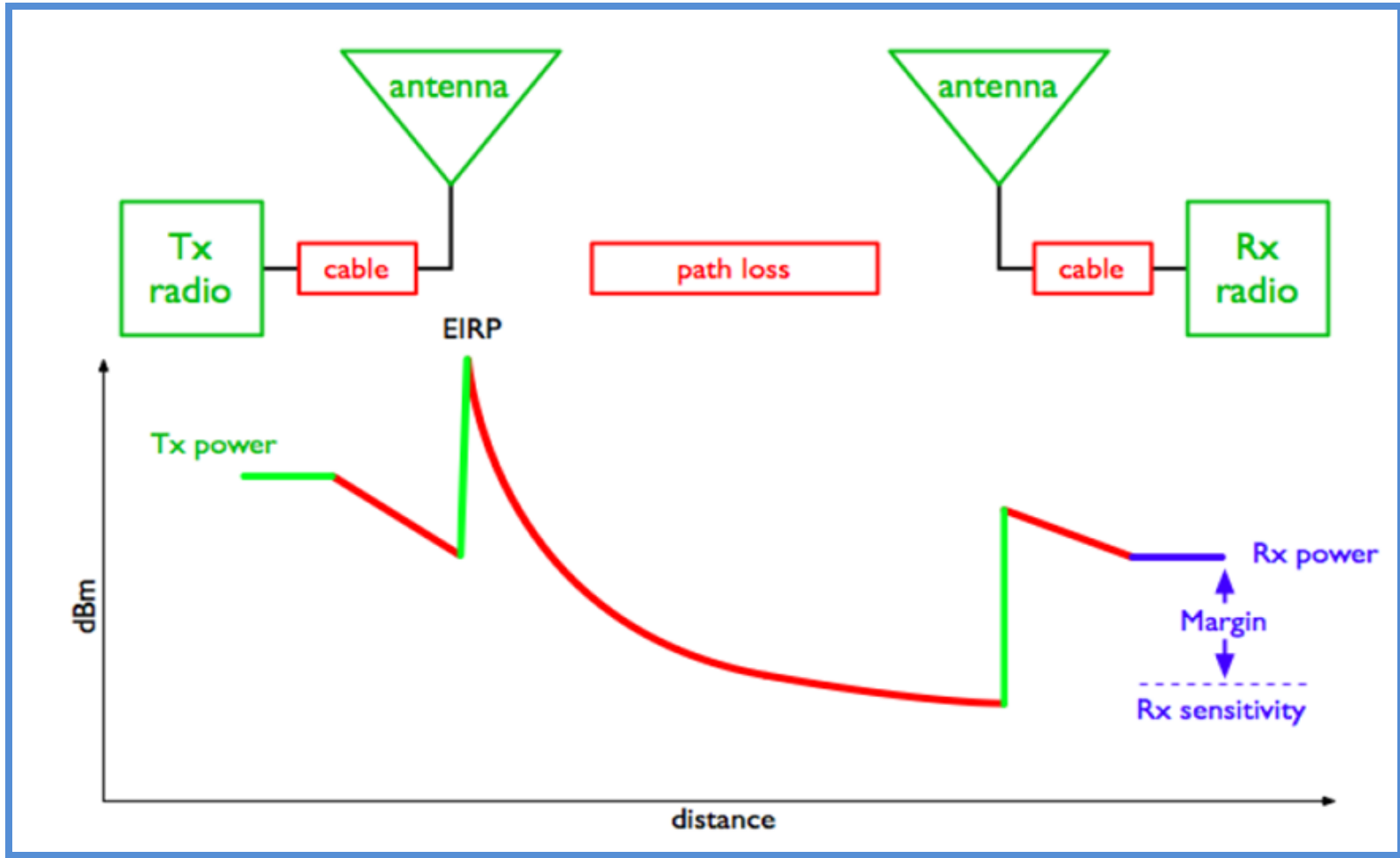


Path Loss





Power in Wireless System





ACTIVITY

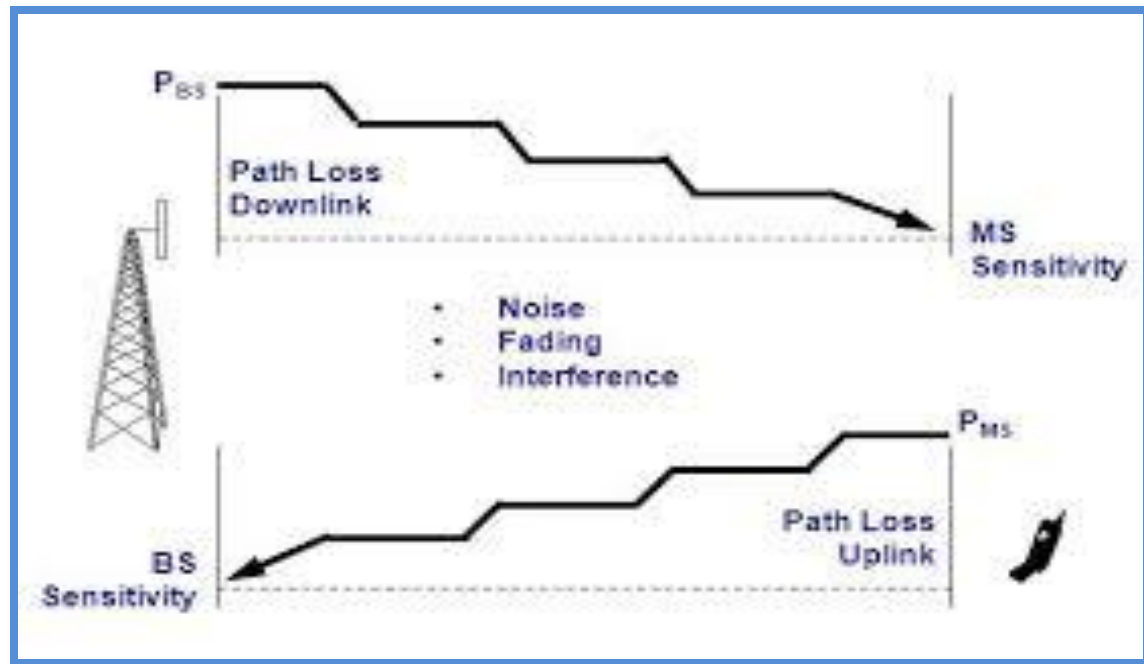


Activity: Draw a logo which may describe your character or things you like.



Link Design

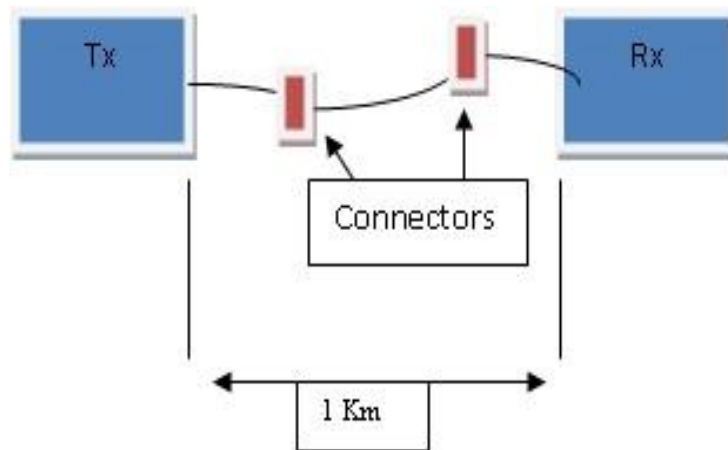
- The performance of any communication link depends on the quality of the equipment being used
- The link budget is a quantifying analysis of the link performance





Link Design

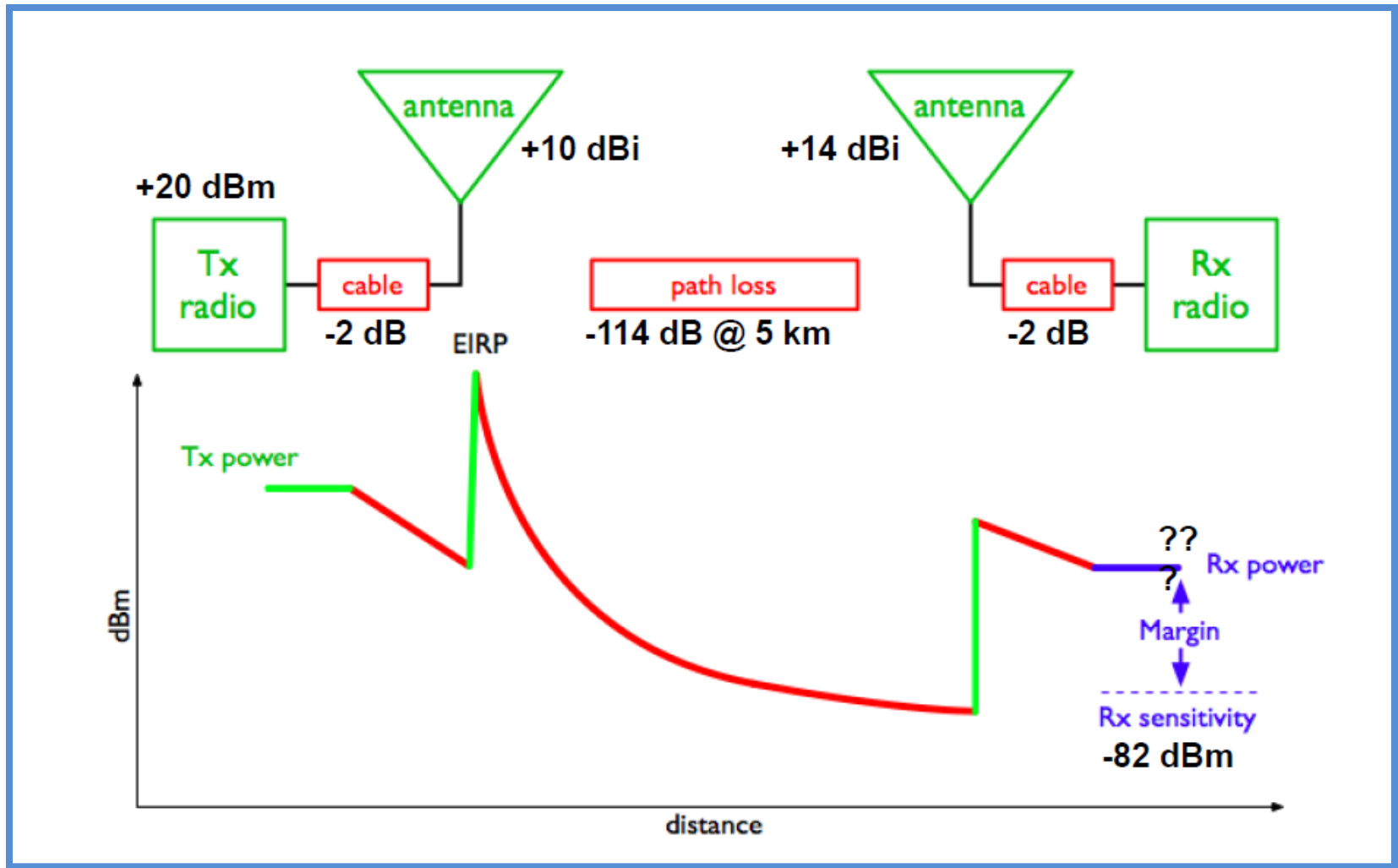
- The difference between the minimum received signal level and the actual received power is called the Link Margin
- Link margin is a positive value and should be maximized



System Power budget (Min. received Signal level) = 14 dB
Actual received power (due to Link loss) = 2.5 dB
Link Margin = 12.5 dB



Client Link





Calculation



20 dBm (TX Power AP)

+10 dBi (Antenna Gain AP)

- 2 dB (Cable Losses AP)

+14 dBi (Antenna Gain Client)

- 2 dB (Cable Losses Client)

40 dB Total Gain

-114 dB (free space loss @ 5 km)

- 74 dBm (expected received signal level)

-82 dBm (sensitivity of Client)

8 dB (Link Margin)



CONCLUSION

- A link budget makes a log by keeping all entries of losses and gains in signal propagation
- A wave is attenuated via amplifiers and antennas to increase the gain product and eliminate noise
- Data can be lost during propagation of a signal between the transmitter and receiver within one device or between two or more devices
- Keeping track of such losses and gains is important to calculate the reliability and efficiency of a link



Assessment



- Link budget consists of calculation of
 - a) Useful signal power
 - b) Interfering noise power
 - c) Useful signal & Interfering noise power**
 - d) Signal and Noise
- Link budget can help in predicting
 - a) Equipment weight and size
 - b) Technical risk
 - c) Prime power requirements
 - d) Equipment weight and size, Technical risk and Prime power requirements.**
- Space loss occurs due to decrease in
 - a) Electric field strength**
 - b) Efficiency
 - c) Phase
 - d) Signal power





Thank you