

Lecture 2



PRINCIPLES OF SATELLITE COMMUNICATION

Synch. Sat. Contt...



- Satellite provides continuous coverage .
- Ground station is of sufficiently low cost.

Disadvantages

- Time delay
- Not useful for global coverage, for small mobile phones and data transmission, typically used for radio and TV transmission
- bad elevations in areas with latitude above 60° due to fixed position above the equator

Communication Satellite



- Synchronous Satellite used for communication are called communication satellite.
- Classification
 1. Territorial coverage:
(global, regional, or national)
 2. Types of services :
fixed, mobile, maritime, aeronautical, point to point ,
broadcasting

International Regulation and Frequency Coordination



- ITU(International Telecommunication Union)
- IFRB(International frequency registration board)
- CCIR(International Radio Consultative Committee)
- CCITT(International Telegraphy and Telephone Committee)
- General secretarial is located in Geneva

Satellite Frequency Allocation and Band Spectrum

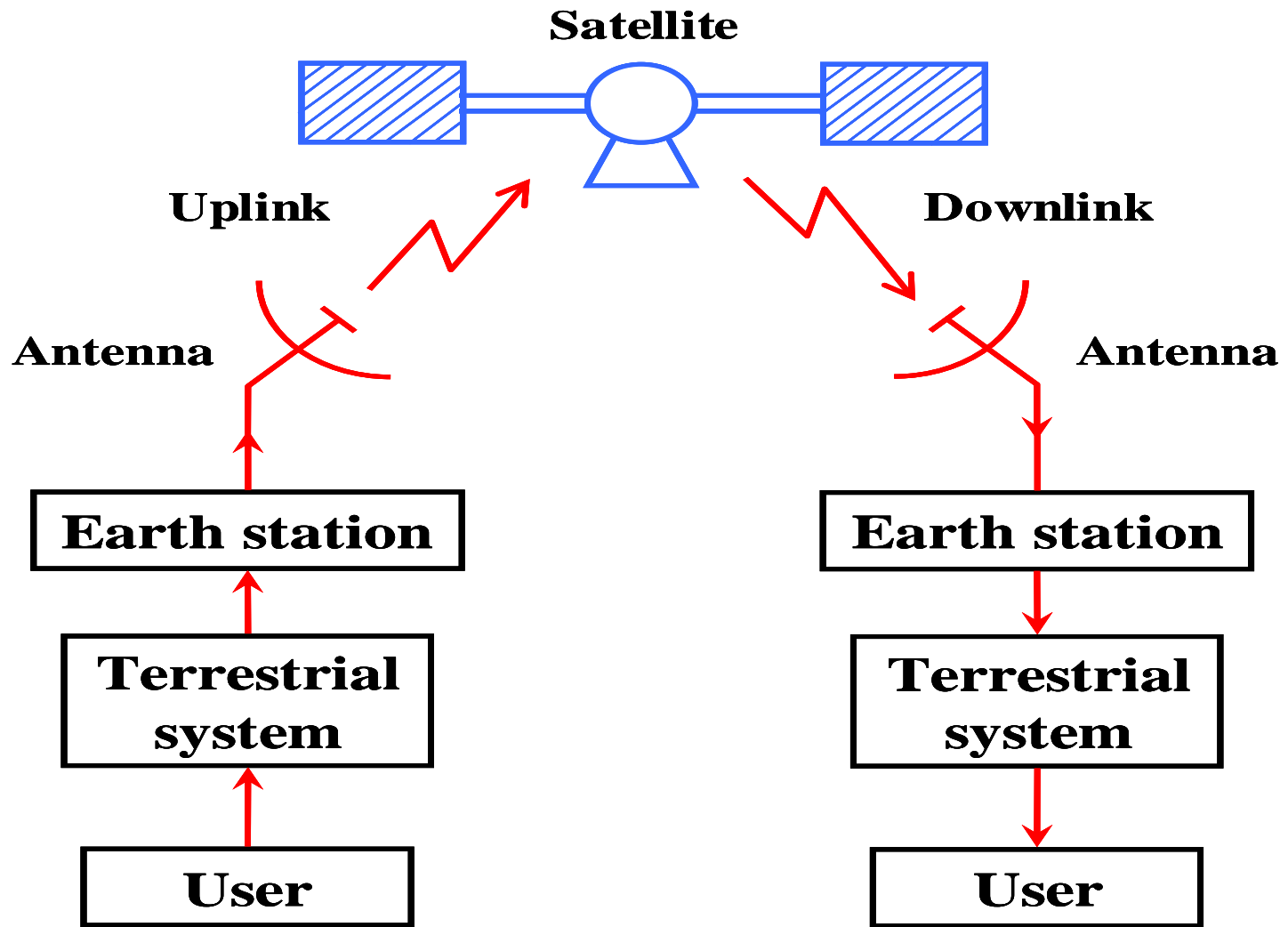


	Down link band MHz	Uplink Band MHz
UHF –military	250- 270 (Approx)	292-312(approx)
C-band- commercial	3700-4200	5925-6425
X band – Military	7250- 7750	7900-8400
Ku band –commercial	11700-12200	14000-14500
Ka band –Commercial	17,700- 21200	27500-30,000
Ka band -Military	20200-21200	43500-45500

Satellite Frequency Allocation and Band Spectrum



- Frequencies 40-300 GHz are for satellite communication
- Frequency -806Mhz- 265 GHz for mobile Satellite services
- Frequency range allocated for meteorological aids/meteorological satellites
1668.4-7550 MHz



Block diagram of satellite communication.

Contt...



- 6/4 GHz bands:
 - Most popular
 - Fewer propagation problems
 - RF components are easily available
 - Rain attenuation is not a serious problem
 - Sky noise is also low
 - Receiver with lower noise temperature

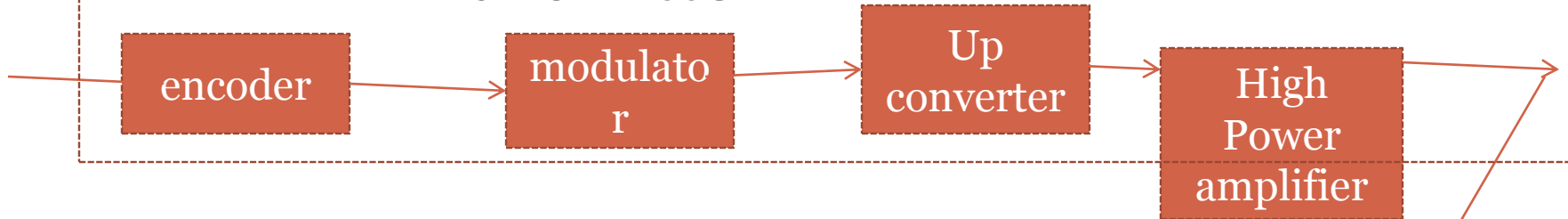
Contt...



- 14/12 GHz band communication satellite
- Uplink (12.75 -14.8) down link (10.7 – 12.3)
- Rain attenuation is a problem
- 20/30 GHz in future

Basic Block Diagram

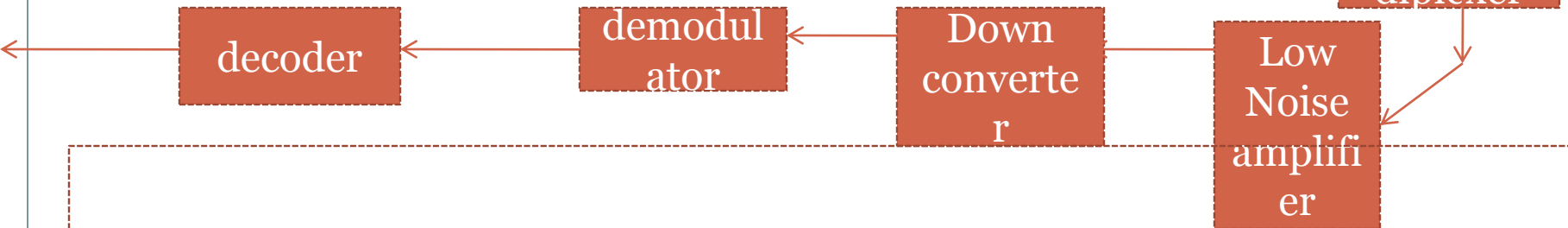
Transmitter



Polarized
duplexer
diplexer



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Receiver

Advantages of satellite



- The coverage area of a satellite is more.
- Transmission cost of a satellite is independent of the distance from the center of the coverage area.
- Satellite to Satellite communication is very precise.
- Higher Bandwidths are available for use.
- Point – multi point communication.

Disadvantages



- Launching satellites into orbit is costly.
- Satellite bandwidth is gradually becoming used up.
- There is a larger propagation delay in satellite communication.
- If needed to repair, it is nearly impossible.