

UNIT – IV EARTH SEGMENT

1. Define earth segment.

Earth segment of a satellite communication system consists of transmit earth station and receive earth station.

Example : TV Receive Only systems (TVRO systems)

2. Give the difference between KU-band and the C-band receive only systems. Operating frequency of outdoor unit.

3. What is mean by ODU and IDU.

ODU – The Home Receiver Outdoor Unit

IDU – The Home Receiver Indoor Unit

4. Explain about MATV system. MATV – Master Antenna TV system.

It is used to provide reception of DBS TV channels to the user group. Example : Apartment users

It consists of one outdoor unit and various indoor units. Each user can independently access all the channels.

5. Write about CATV system.

CATV – Community Antenna TV system.

As in MATV system, it consists of one outdoor unit and separate feeds for each sense of polarization.

6. Define S/N ratio.

The S/N introduced in the preceding section is used to refer to the ratio of signal power to noise power at the receiver output. This is known as S/N ratio.

7. What is noise weighting?

The method used to improve the post detection signal to noise ratio is referred to as noise weighting.

8. What is an EIRP?

EIRP means Equivalent Isotropic Radiated Power. It is a measure of radiated or transmitted power of an antenna.

9. What is noise power spectral density?

Noise power per unit Bandwidth is termed as the noise power spectral density.

10. What is an inter modulation noise?

Inter modulation distortion in high power amplifier can result in signal product which appear as noise and it is referred to as inter modulation noise.

11. What is an antenna loss?

It is added to noise received as radiation and the total antenna noise temperature is the sum of the equivalent noise temperature of all these sources.

12. Define noise factor.

An alternative way of representing amplifier noise is by means of its noise factor.

In defining the noise factor of an amplifiers, usually taken as 290 k.

13. A satellite downlink at 12 GHz operates with a transmit power of 6 W and an antenna gain of 48.2 dB. Calculate the EIRP in dBW.

$$\text{EIRP} = 10 \log 6 + 48.2 = 56 \text{ dBW}$$

14. The range between a ground station and a satellite is 42000 km. Calculate the free space loss a frequency of 6 GHz.

$$[\text{Free space loss}] = 32.4 + 20 \log 42000 + 20 \log 6000 = 200.4 \text{ dB}$$

15. An antenna has a noise temperature of 35 K and it is matched into a receiver which has a noise temperature of 100 K. Calculate the noise power density and the noise power for a BW of 36 MHz.

$$N_0 = (35 + 100) \cdot 1.38 \cdot 10^{-23} = 1.86 \cdot 10^{-21} \text{ W/Hz}$$

$$P_N = 1.86 \cdot 10^{-21} \cdot 36 \cdot 10^6 = 0.067 \text{ PW}$$

16. Define Saturation flux density.

The flux density required at the receiving antenna to produce saturation of TWTA is termed the saturation flux density.