DATACOMM VİZE

Mehmet Delta
DİKER
040170232

1) $\frac{E_b}{N_0}$ (dB) = SNR (dB) − $\left(\frac{R}{B_T}\right)$ dB

(24)

$\frac{B_T}{R} = \frac{1+r}{\log_2 M} = \frac{1.4}{\log_2 32} = \frac{1.4}{5} = 0.28$

$\frac{R}{B_T} = \frac{5}{1.4} = 3.5714$ ~~= 5.5283~~

↳ log (3.5714) = 5.5283

24 + 5.5283 = ~~29.527~~ = **29.528**

2) P_t = 1000 mW → P_t = 30 dBm

G = 2dB

d = 450m

f = 800MHz

$PL = 20 \cdot \log_{10}\left(\frac{4\pi d f}{c}\right) = 20 \cdot \log_{10}\left(\frac{4\pi \cdot 450m}{3 \cdot 10^8 m} \cdot 800 \cdot 10^6 Hz\right) =$

= 83.567

$P_r = P_t + G_t + G_r - PL = 34 - 83.567 = -49.567$ dBm

30dBm, 4dBm, 83.567dBm

↳ mW e çevir

P_L = 92.4 + 20 log (0.45km · 0.8GHz) = 83.52

−8.8739

3) Wired comm. P_t = 1500 mW, L = 3dB/100m, d = 450m

~~L = 3dB × 3 = 12dB~~ 4.5 = 13.5 dBm mW???

L = 3dB × ~~4.5~~ ~~8dBm~~

~~1500 mW = 31.76 dBm − 9dB = 22.76 dBm~~

1500 mW = 31.76 dBm − 13.5dBm = 18.26dBm

18.26dBm => 66.98mW

4) SNR [dB] of 2MHz Bw channel $r=0$

$BER < 1E-6$ for 8PSK.

$M=8$ 14.5 dB

14

$$\frac{E_b}{N_0}(dB) = SNR(dB) - \left(\frac{R}{B_T}\right) dB$$

$$\frac{B_T}{R} = \frac{1+r}{\log_2 M} = \frac{1}{3} \quad \text{or} \quad \frac{R}{B_T} = 3$$

$$10.\log(3) = 4.77\ dB$$

$$\frac{E_b}{N_0} = 14 = SNR - 4.77 \Rightarrow 18.77 = SNR$$

5) 24

6) $m = 11001011 \quad g = 100111$

```
1100101100000 | 100111
100111
-------
 101011100000
  100111
 -------
  011001100000
  000000
 -------
   11001100000
   100111
  -------
   01110100
   00000
  -------
    1110100
    100111
   -------
     100110
     100111
    -------
        00001
```

Transmitted bitstream $b = 1100101100001$

8) $\frac{20}{0.6} \times 100_m = \frac{2000}{0.6} = 3333.3$

9) $c = \lambda f \rightarrow \frac{3 \cdot 10^8 \frac{m}{s}}{1705 \cdot 10^6 Hz} = \lambda = 0.176\,m$

$-59.8715 = P_r$

$P_r = \frac{P_t \cdot G_t \cdot G_r \cdot \lambda^2}{(4\pi R)^2}$

$R = 700m$

10)

A. $\overset{1000_s}{\curvearrowright}$ B $\overset{1000_s}{\curvearrowright}$ C $= 2000_s$ $\quad \frac{2000}{5_s} = 200$

10_s = 1st Packet

1075_s = 2nd

$10 + \underbrace{(200-1)}_{199} \cdot 5 = 995 + 10 = 1005_s$