

<b>KING FAHD UNIVERSITY OF PETROLEUM &amp; MINERALS</b> <b>DEPARTMENT OF ELECTRICAL ENGINEERING</b>
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EE 672	Satellite Communications	QUIZ # 3
Semester (062)	Section (01)	7 May, 2007

NAME :		
I.D. # :		Score : / 10

A satellite transmits 150 W of power through a transmitting antenna of gain 30 dB, to an earth station. The Path length to the receiving earth station is 37750 km. The down link frequency is 11.7 GHz. The receiving antenna diameter is 0.9 m, receiving antenna efficiency = 65%, antenna noise temperature = 50 K, polarization loss in the receiving antenna = 0.7 dB, pointing error in receiving antenna = 0.6 dB. The LNA gain = 25 dB and its noise temperature = 50 K. The noise temperature of the rest of the receiver = 340 K. The channel bandwidth = 27 MHz.

**(Boltzman's constant = -228.6 dBW/K/Hz)**

Calculate the following:

1. The satellite EIRP in dBW.
2. The free space path loss.
3. The power flux density in dBW/m<sup>2</sup> at the receiving antenna.
4. The receiving antenna gain.
5. The receiver system noise temperature referred to the input terminals of the LNA.
6. The earth station G/T.
7. The down link carrier-to-noise ratio  $C_d/N_d$ .