Chapter 2: Exercises for dB, bandwidth, and channel capacity

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1. Derive the dB values of the following power ratios:
   (a) 12345
   (b) 0.00005
2. Derive the power ratios of the following dB values:
   (a) $-50dB$
   (b) $33dB$
3. Derive the dBm values of the following power values:
   (a) $5W$
   (b) $0.007mW$
4. Derive the power values of the following with unit watt:
   (a) $-66dBm$
   (b) $-33dBW$
5. Given a signal waveform in the time domain, what are the three components to determine it bandwidth?
6. Read the article in the link (`http://www.afar.net/tutorials/fcc-rules`), answer the following questions:
   (a) What is the maximal transmission power fed into the antenna?
   (b) What is the meaning of EIRP?
   (c) What is dBi?
   (d) What kind of antenna can achieve 30dBi?
   (e) How much it cost?

7. Download the latest IEEE 802.11 standard (attached), answer the following questions
   a) How IEEE specify the requirements for power spectral density for a 20 MHz channel?
   b) Why some people claim that the same channel has a bandwidth 22MHz?

8. If a binary signal is transmitted through a $16kHz$ noiseless channel, what is the maximum data rate?

9. If the SNR of a $14KHz$ channel is $26dB$, what is the maximum data rate?