• What is a channel
  For that matter, what is “frequency” (or “wavelength”)?
  • We defined frequency as cycles per sec (Hz)
  • Frequency and wavelength are related for Radio signals (if we know one we know the other)
  • Channels are defined as one or two frequencies
  • A channel has a width, the number of Hz is occupies
  • A digital channel has a data rate in Bits/sec

• What is the nature of information?
  What does the reading mean by “analog” and “digital” systems?
  • Analog: continuous variation; any value within a range
  • Digital: fixed symbol times; fixed number of symbols possible
  • Information can be a block of data, or a stream
  • Streams can consist of analog or digital information
  • Streams are measured in bandwidth (Hz) for analog, data rate (bps) in digital

• What is “spectrum”?
  • (A) the frequency content of a data stream
  • (B) a generic term for the range of frequencies available for communication

What is “spectrum coordination”?
What is the ITU and the FCC, and what do they do?
  • International regulatory structure that keeps users from interfering with each other
  • ITU coordinates among countries and recommends
  • US: FCC and NTIA regulates
  • NTIA: National Telecommunications and Information Administration
How do we transmit information?
- Convert analog streams to digital
- Encode using Amplitude, Frequency, or Phase Modulation (or Keying)
- Multiplex by Frequency Division, Time Division, or Code Division

What are the parts that make a mobile system work?
- Base stations define cells
- Base station controllers and Mobile Switching Centers handle signaling for call initiation, call delivery, and hand-offs
- Mobile Switching Centers cooperate to implement roaming
- Different cell phone standards differ in:
  - Frequencies used
  - Multiple Access methods (the "air interface")
  - Encoding (for voice and data)
  - Signaling inside the mobile network

Based on a telephone number, how do we figure out where a call is supposed to go?
- Need a signaling network
- SS7 lets switches and data base servers communicate
- Figure out a route
- Send useful information (Caller ID)
- Look up you serves a telephone number
- Query the HLR/ VLR data bases to locate a mobile

Who keeps track of telephone numbers and who they are assigned to?
- We only started on this one
- We will get back to this in week 7-8
- We do know that the information ends up in SS7 SCPs
- We do know that multiple carriers are involved, and that the numbers are assigned and tracked by a neutral 3rd party.
- We know that US mobile numbers are geographic, like all other plain telephone numbers
- Other parts of the world use special mobile numbers