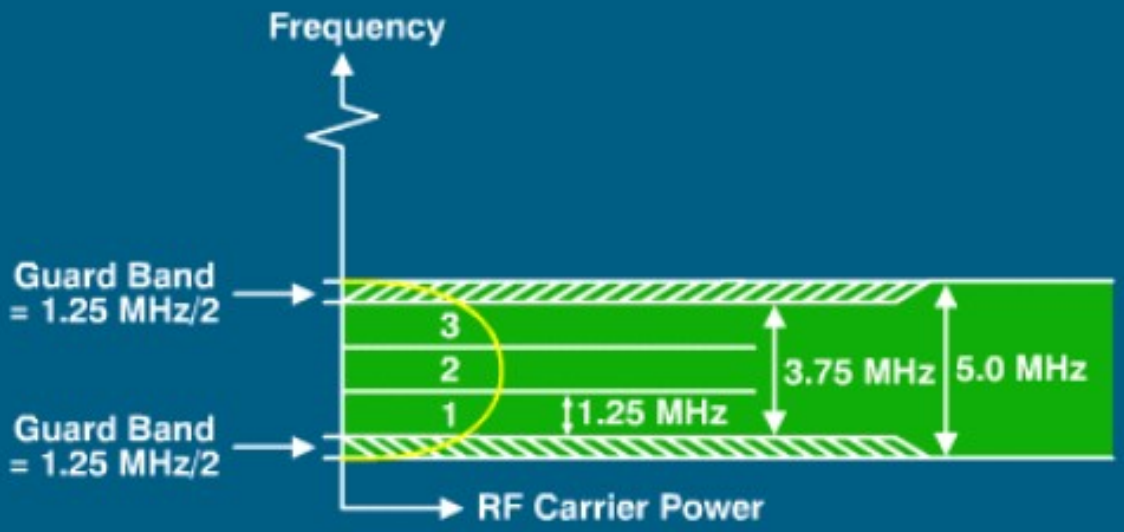
CDMA2000
Multi Carrier operation

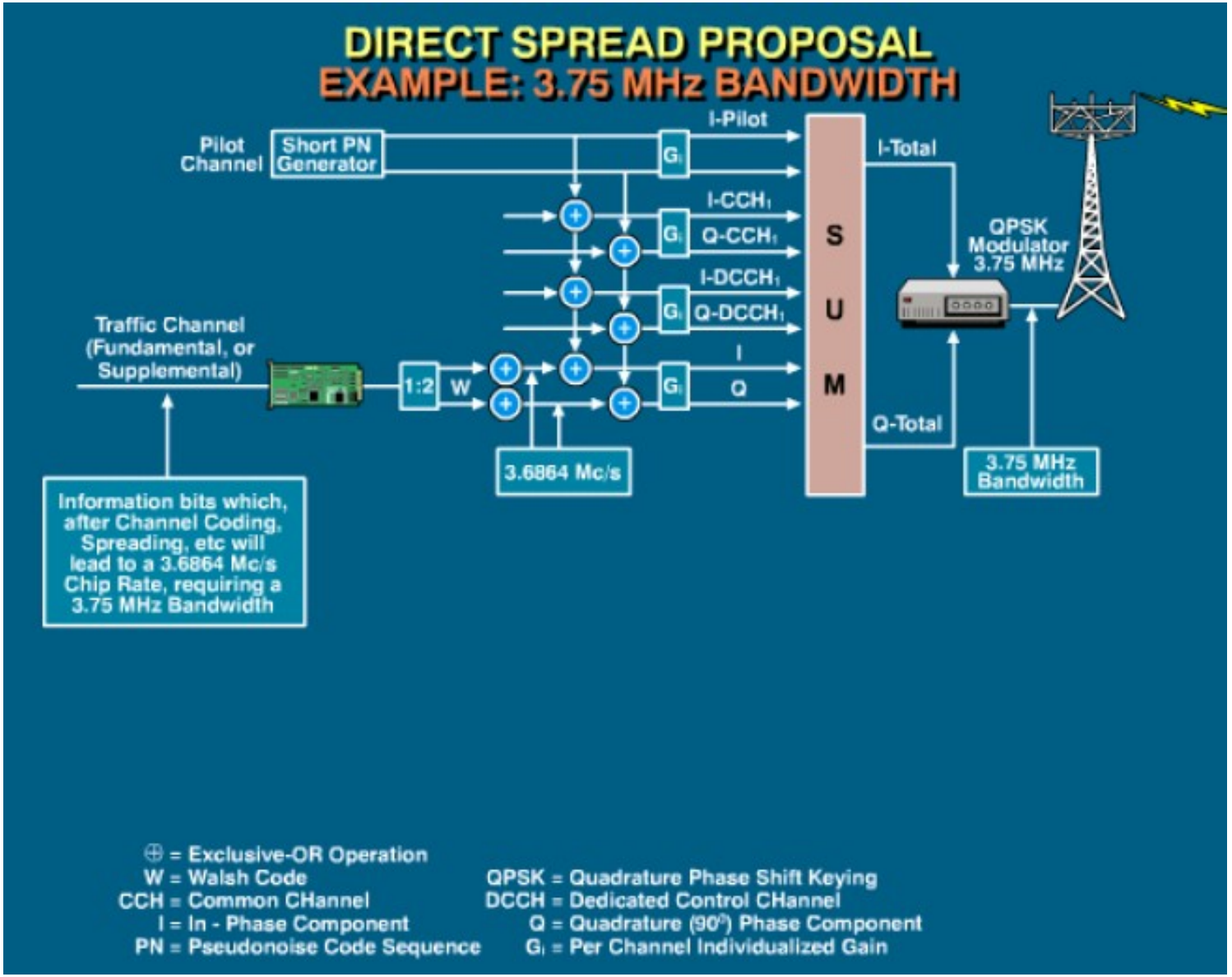
CDMA2000 RADIO TECHNOLOGY
UNIT LESSONS

- CDMA2000 Forward Radio Carrier (Downlink)
  - Pilot, Sync, Paging, and Fundamental Channels
  - Supplemental Channels
    - Packet Mode Operation
    - Configuration and Data Rate Options
  - Multi-Carrier Operation
- CDMA2000 Reverse Radio Carrier (Uplink)
- CDMA2000 Evolution to 1xEV-DO and 1xEV-DV

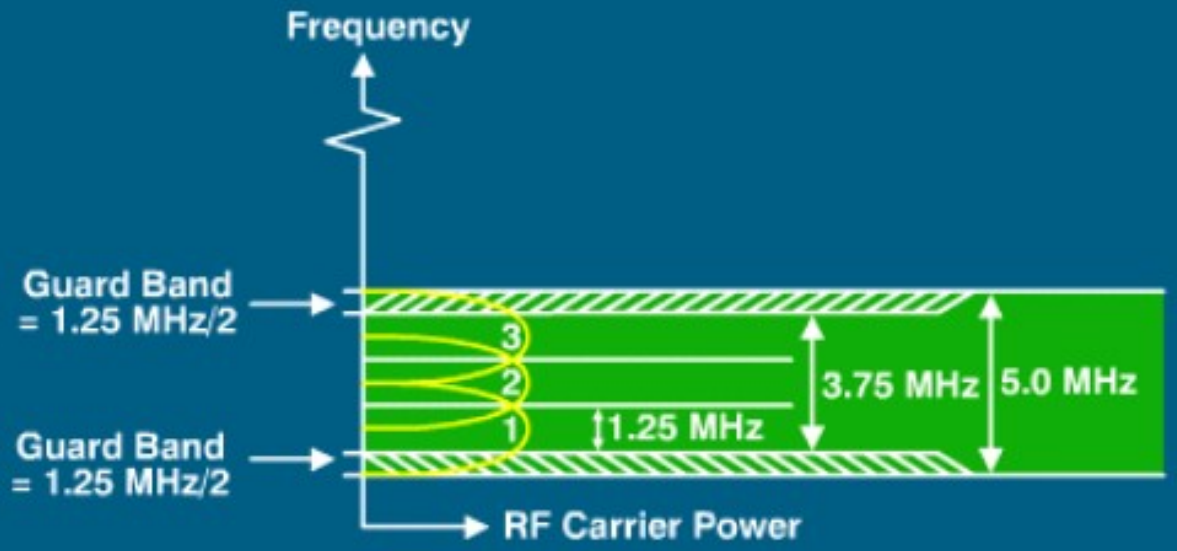
DIRECT SPREAD PROPOSAL
EXAMPLE: 3.75 MHz BANDWIDTH



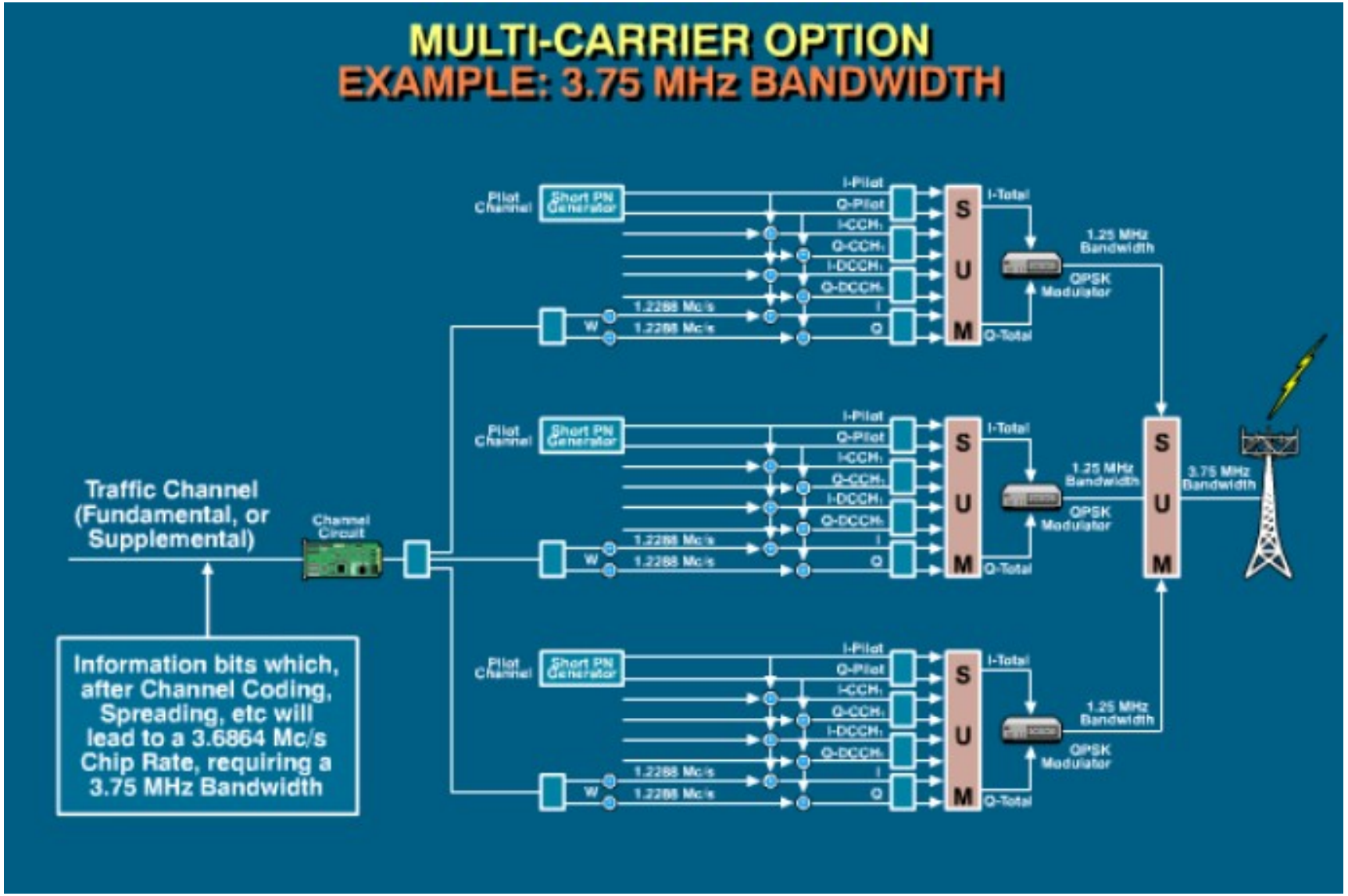
- 3.75 MHz Bandwidth
- Minimum Spectrum is 5.0 MHz, allowing for Guardbands

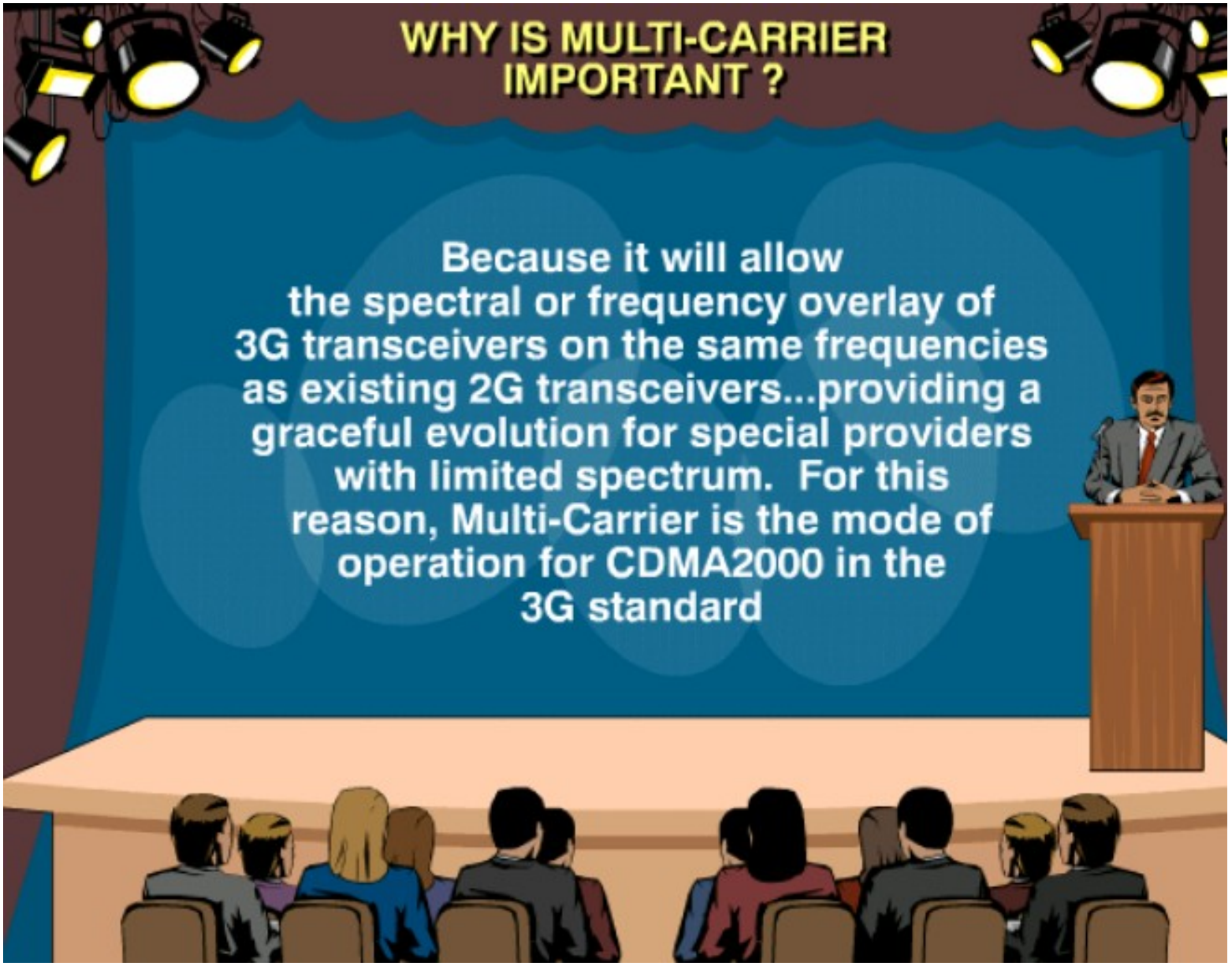

DIRECT SPREAD PROPOSAL
EXAMPLE: 3.75 MHz BANDWIDTH
Pilot Channel
Short PN Generator
I-Pilot
I-CCH1
Q-CCH1
I-DCCH1
Q-DCCH1
I
Q
G1
S
U
M
I-Total
Q-Total
QPSK Modulator 3.75 MHz
3.75 MHz Bandwidth
Traffic Channel (Fundamental, or Supplemental)
1:2
W
3.6864 Mc/s
Information bits which, after Channel Coding, Spreading, etc will lead to a 3.6864 Mc/s Chip Rate, requiring a 3.75 MHz Bandwidth
⊕ = Exclusive-OR Operation
W = Walsh Code
CCH = Common CHannel
I = In - Phase Component
PN = Pseudonoise Code Sequence
QPSK = Quadrature Phase Shift Keying
DCCH = Dedicated Control CHannel
Q = Quadrature (90°) Phase Component
Gi = Per Channel Individualized Gain

MULTI-CARRIER OPTION
EXAMPLE: 3.75 MHz BANDWIDTH

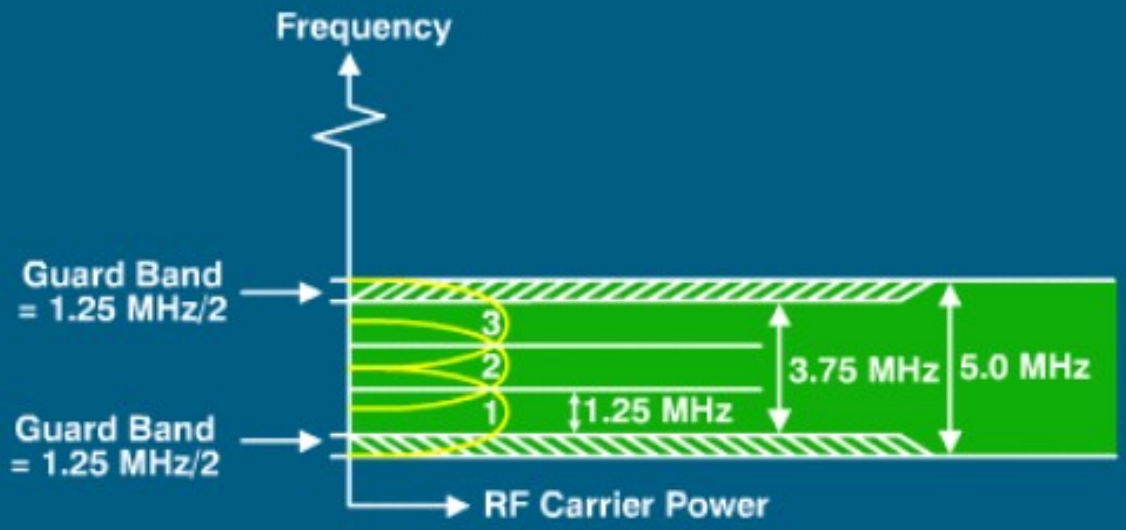


- 3.75 MHz Bandwidth is the Aggregate sum of THREE 1.25 MHz RF Carriers
- Minimum Spectrum is 5.0 MHz, allowing for Guardbands


MULTI-CARRIER OPTION
EXAMPLE: 3.75 MHz BANDWIDTH
Traffic Channel
(Fundamental, or
Supplemental)
Channel
Circuit
Information bits which,
after Channel Coding,
Spreading, etc will
lead to a 3.6864 Mc/s
Chip Rate, requiring a
3.75 MHz Bandwidth
Pilot
Channel
Short PN
Generator
W
1.2288 Mc/s
I-Pilot
Q-Pilot
I-CCH
Q-CCH
I-DCCH
Q-DCCH
I
Q
S
U
M
I-Total
Q-Total
1.25 MHz
Bandwidth
QPSK
Modulator
3.75 MHz
Bandwidth

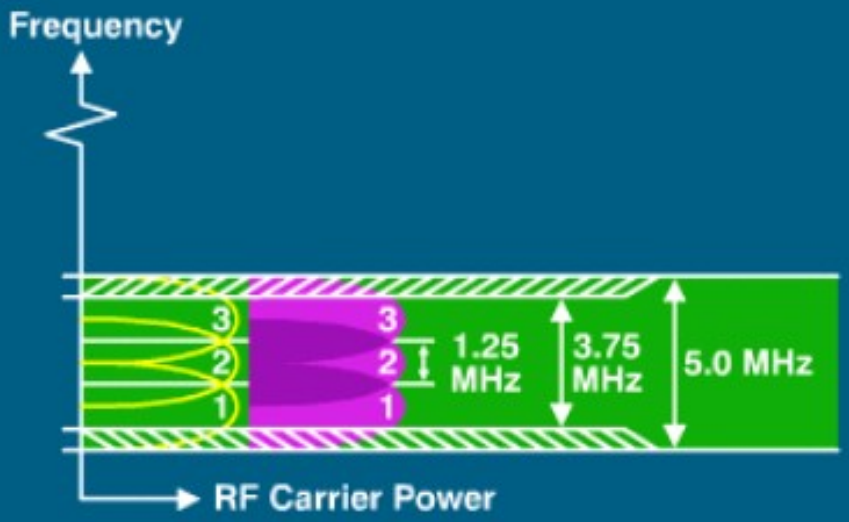

WHY IS MULTI-CARRIER IMPORTANT ?
Because it will allow the spectral or frequency overlay of 3G transceivers on the same frequencies as existing 2G transceivers...providing a graceful evolution for special providers with limited spectrum. For this reason, Multi-Carrier is the mode of operation for CDMA2000 in the 3G standard

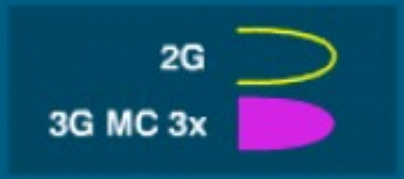
THE NEED FOR MULTI-CARRIER FREQUENCY OVERLAY



With only 5 MHz of allocated spectrum (in each direction) and only 1 RF carrier (1.25 MHz bandwidth) of 2G cdmaOne, there is NO room left for even a single 3x RF carrier... unless the Multi-Carrier option is supported!

MULTI-CARRIER OVERLAY
FREQUENCY OVERLAY





END OF LESSON 5