

HY-330

fall semester 2021

Introduction to telecommunication systems theory

University of Crete
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MultiCarrier Systems

- ✦ OFDM:
 - ✦ Orthogonal Frequency-Division Multiplexing

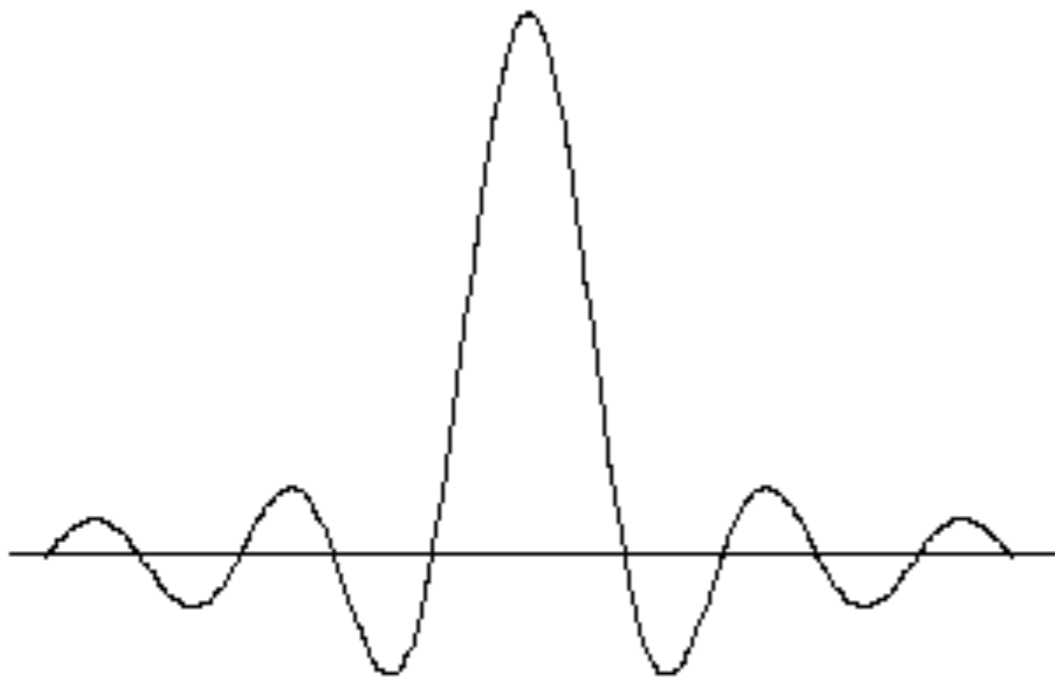
OFDM usage

- xDSL
- DVB-C2
- Power Line Communication (PLC)

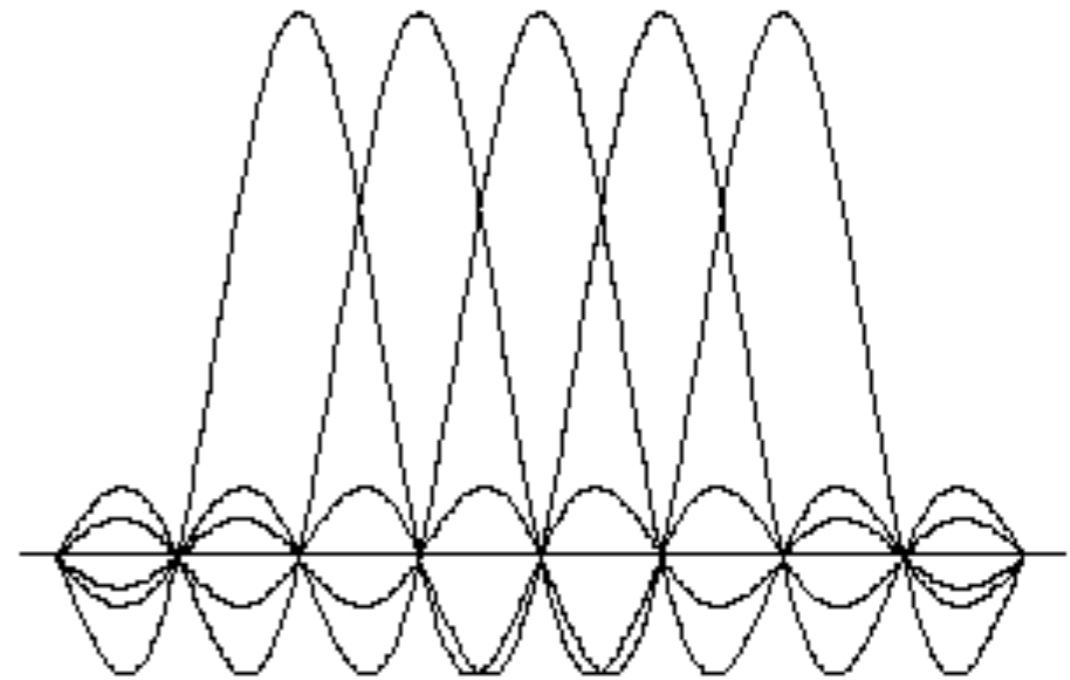
- 802.11a/g/n/ac/ax
- DAB+
- DVB-T, ISDB-T
- 802.16e
- LTE

OFDM Spectrum

A spectrum of an OFDM subchannel (during a single bit)



OFDM spectrum



OFDM

- relations

$$\Delta f = \frac{B}{N} \quad B = N \cdot \Delta f$$

$$T_s = \frac{1}{\Delta f}$$

OFDM

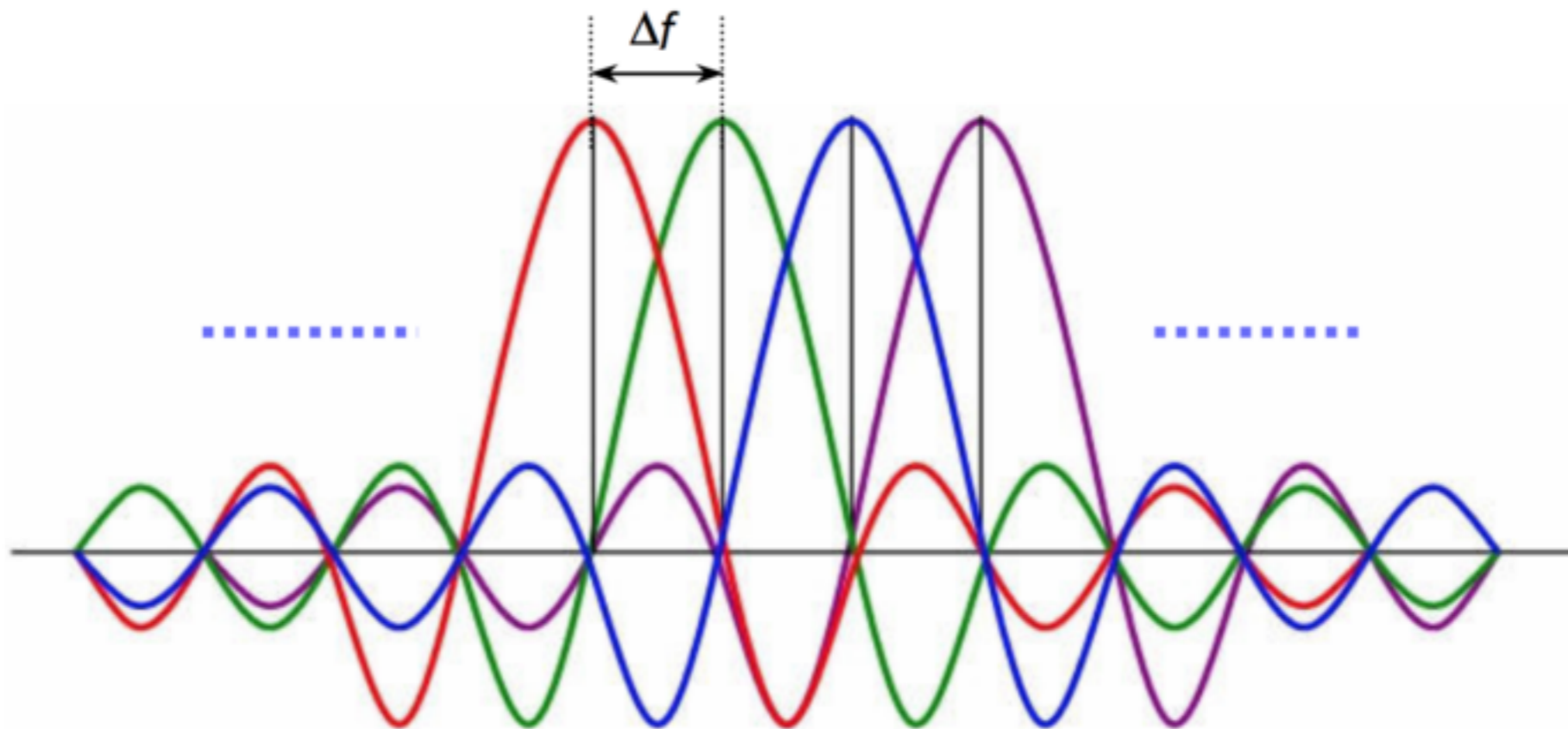
- relations

$$x(t) = \sum_{k=0}^{N-1} X(k) e^{(j2\pi k f_0 t)}$$

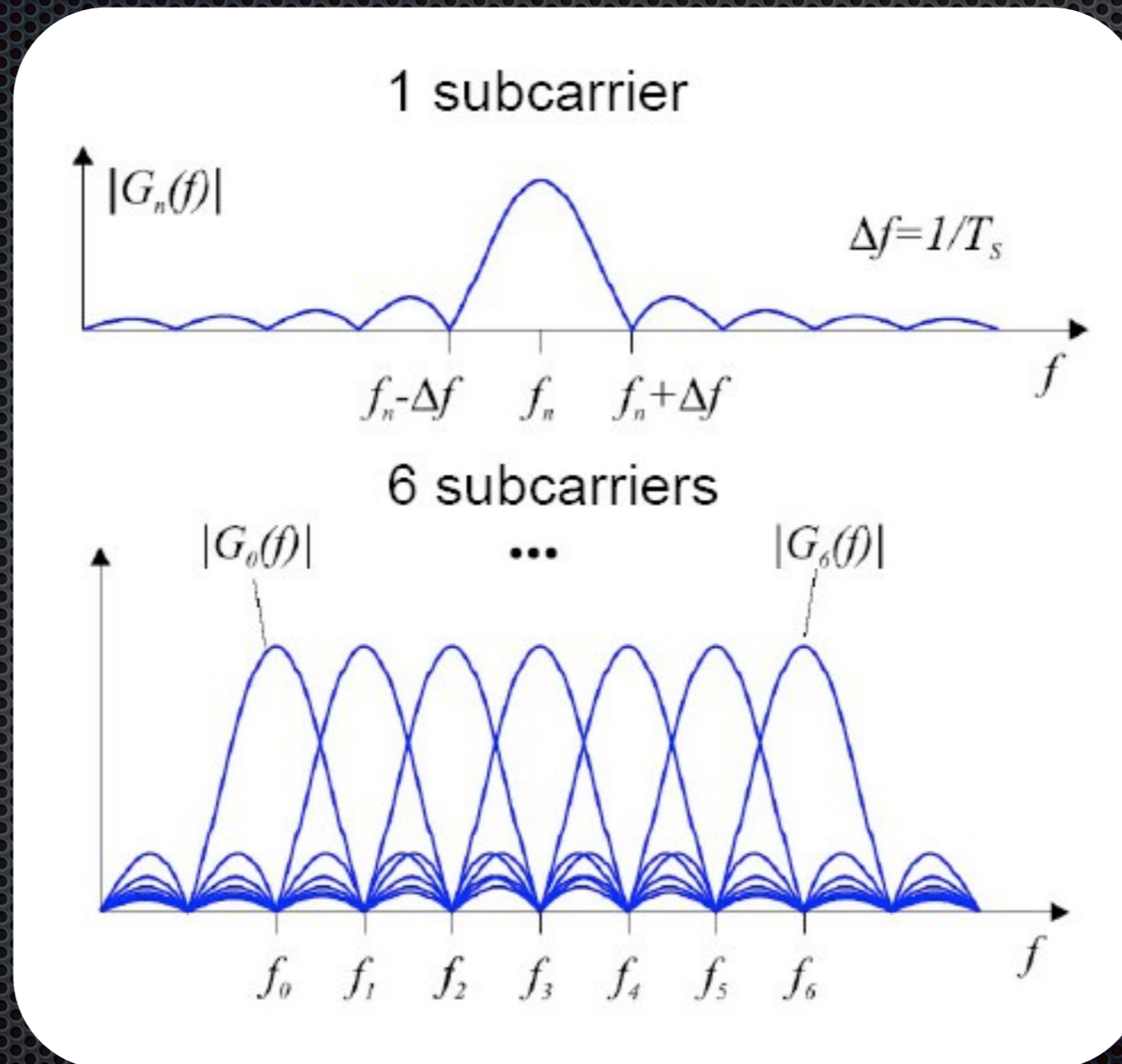
$$x(t = nT) = \sum_{k=0}^{N-1} X(k) e^{(j2\pi n k / N)}$$

$$t = nT \quad f_0 = \frac{1}{NT}$$

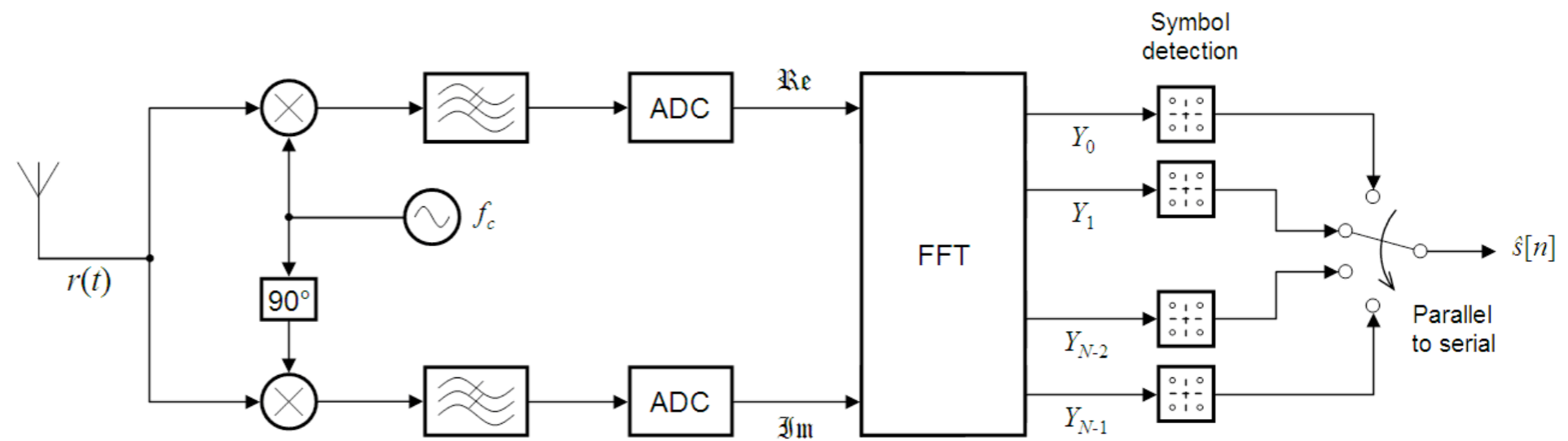
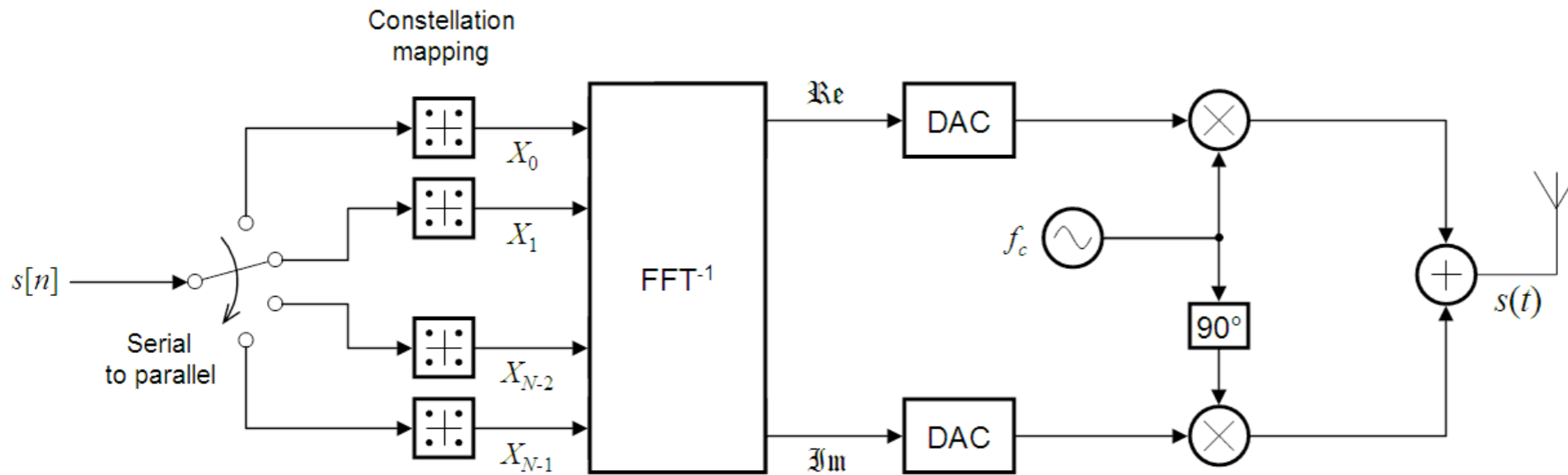
OFDM Spectrum



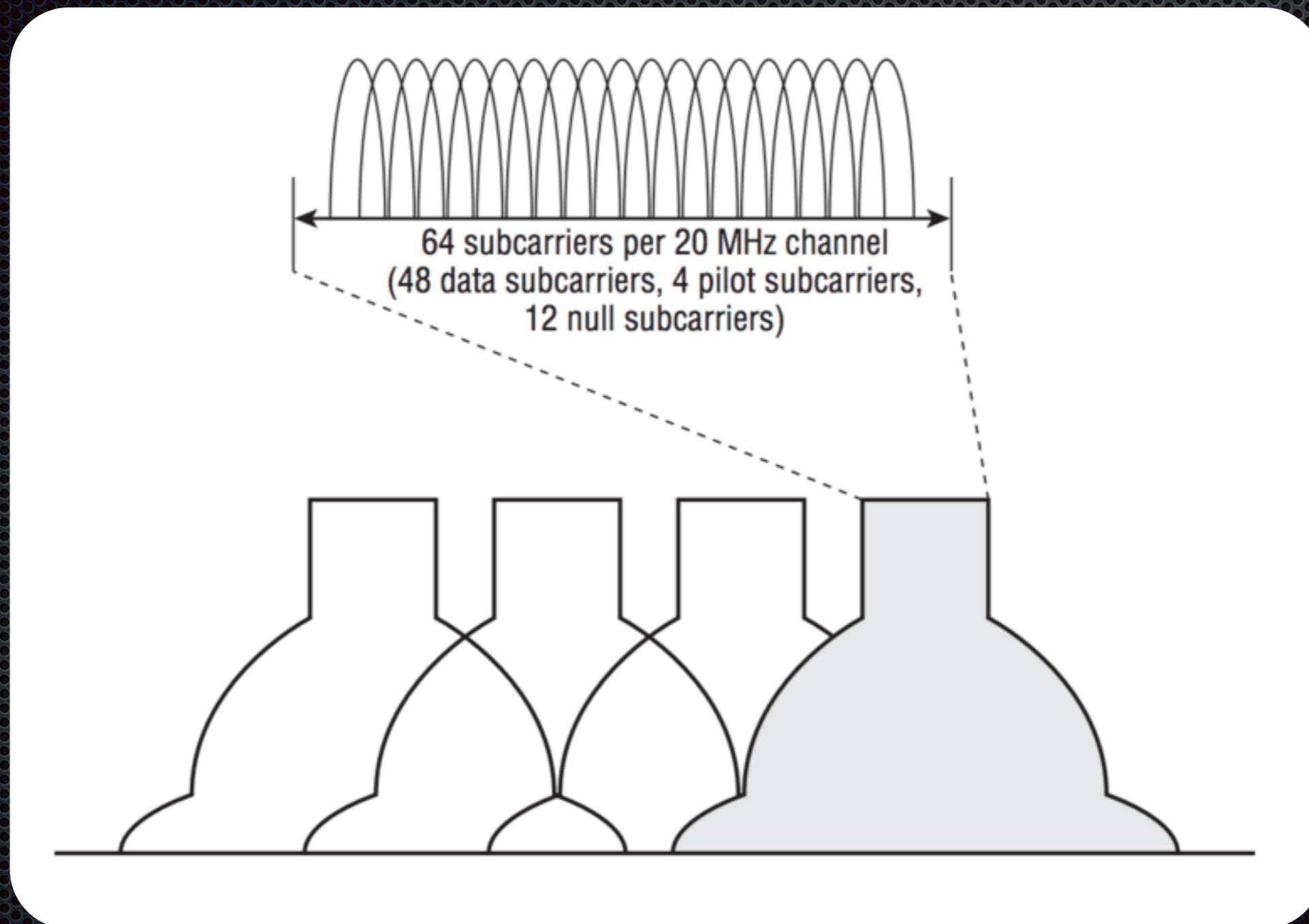
OFDM Example



OFDM Tx - Rx



802.11a/g example



802.11a/g example

