General Class License Course
Supplemental Information
(Updated: 10/12/20)

CW – Continuous Wave
AM – Amplitude Modulation (Double Sideband w/Carrier)
SSB/USB – Single Sideband/Upper Sideband w/Suppressed Carrier
SSB/LSB – Single Sideband/Lower Sideband w/Suppressed Carrier
FM – Frequency Modulation

Lab Demonstration To Go Along With Questions:
G2B05 – Pg. 48
G4D10 – Pg. 49
G4D08 – Pg. 49
G4D11 – Pg. 49
G4D09 – Pg. 49
Software Defined Receiver

Transceiver

Dummy Load

RF Sample

Oscilloscope (Time Domain)

SDR Display (Frequency Domain)

28.40 MHz.
Radio Spectrum

In Amateur Radio, a Band refers to the approximate wavelength of the signal being transmitted, such as:

- 80-Meter Band = 3.5 to 4.0 MHz
- 40-Meter Band = 7.0 to 7.3 MHz
- 20-Meter Band = 14.0 to 14.350 MHz
- 10-Meter Band = 28.0 to 29.7 MHz
- 6-Meter Band = 50.0 to 54.0 MHz
- 2-Meter Band = 144.0 to 148.0 MHz
- 70-Centimeter Band = 420.0 to 450.0 MHz
Radio Signals
Radio Signals

- A radio wave carrying information is a *radio signal*.
- Each signal occupies a range of frequencies.
- Receivers “tune in” a signal by listening at the signal's frequency.
I will be demonstrating:
An Oscillator
CW (Continuous Wave for Morse Code)
AM (Amplitude Modulation, Double Sideband with Carrier)
USB (Upper Sideband with Suppressed Carrier)
LSB (Lower Sideband with Suppressed Carrier)

Note: You would not typically use all of these modes at this frequency, but for the sake of time and setup, and the fact that I am NOT really on the air (Transmitting into a Dummy Load), I will demonstrate these modes at this frequency.
Entire 10 Meter Band

Receiver/Spectral View (Frequency Domain)

28.0 MHz

28.4 MHz

29.7 MHz
28.4 MHz Sine Wave from Transceiver’s Oscillator

$F = \frac{1}{t}$

$T = \frac{1}{f}$
Amplitude Modulation Full Carrier
Single-Sideband No Carrier
28.4 MHz Sine Wave from Transceiver’s Oscillator

10 Meter Band

Receiver/Spectral View (Frequency Domain)

Continuous Wave (CW)

Noise Floor
Carrier Frequency

28.4 MHz
Solid Continuous Wave (CW)
Very Narrow Bandwidth. It’s About 150 Hz. Wide
Continuous Wave (CW)

Carrier Frequency

Each Mark Equals .5 kHz or 500 Hz

I'm sending “CQ” in Morse Code.

Continuous Wave (CW) broken up.
28.4 MHz
28.403 MHz
USB
6000 Hz Bandwidth (AM)

Each Mark Equals 0.5 kHz or 500 Hz

Carrier Frequency

10 Meter Band 28.400000

Note: You would NOT use AM on this Frequency

Amplitude Modulation (AM)
28.4 MHz

USB 28.397 MHz LSB

3000 Hz Bandwidth (SSB) (USB)

Upper Sideband (USB) Suppressed Carrier

Suppressed Lower Sideband

NO Carrier Frequency

10 Meter Band 28.400 MHz

Each Mark Equals .2 kHz or 200 Hz

Note: This is the proper Mode for this Frequency
Each Mark Equals .2 kHz or 200 Hz

Lower Sideband (LSB) Suppressed Carrier
Suppressed Upper Sideband

Note: You would NOT use LSB on this Frequency

Receiver/Spectral View (Frequency Domain)

Oscilloscope View (Time Domain)
Oscilloscope (Time Domain)

Software Defined Receiver

SDR Display (Frequency Domain)

Transceiver

146.52 MHz. (2 Meter Calling Frequency)

Dummy Load

RF Sample

Control Operator’s Hand

☺
I will be demonstrating:

FM (Frequency Modulation)

**Note:** I am **NOT** really on the air (Transmitting into a Dummy Load).
144.0 MHz
146.52 MHz
148.0 MHz

Entire 2 Meter Band
This is FM (Frequency Modulation) The Carrier Frequency Amplitude does not vary. The Frequency deviates. It happens so fast; we can’t see it in the Time Domain. We must view it in the Frequency Domain.

146.52 MHz (Rounded) 2 Meter Calling Frequency
The approximate bandwidth of a VHF repeater FM phone signal is between 10 and 15 kHz.

Each mark equals 0.5 kHz or 500 Hz.