ARRL The national association for AMATEUR RADIO®

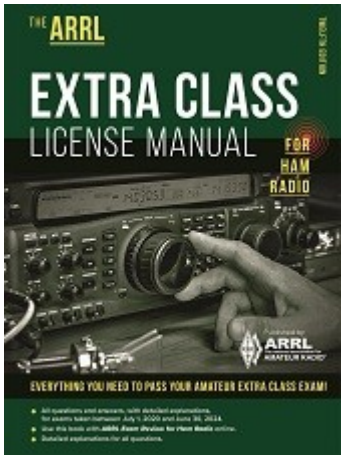
# The ARRL Extra Class License Course

## All You Need to Pass Your Extra Class Exam

## LEVEL 3: Extra

For use with *The ARRL Extra Class License Manual*, 12th Edition

# Extra License Manual and other resources

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# What is meant by the blocking dynamic range of a receiver?

A. The difference in dB between the noise floor and the level of an incoming signal that will cause 1 dB of gain compression

B. The minimum difference in dB between the levels of two FM signals that will cause one signal to block the other

C. The difference in dB between the noise floor and the third order intercept point

D. The minimum difference in dB between two signals which produce third order intermodulation products greater than the noise floor

E4D01 ECLM Page (7 - 20)

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D. The minimum difference in dB between two signals which produce third order intermodulation products greater than the noise floor

(A) E4D01 ECLM Page (7 - 20)

# Which of the following describes problems caused by poor dynamic range in a receiver?

A. Spurious signals caused by cross-modulation and desensitization from strong adjacent signals

B. Oscillator instability requiring frequent retuning and loss of ability to recover the opposite sideband

C. Cross-modulation of the desired signal and insufficient audio power to operate the speaker

D. Oscillator instability and severe audio distortion of all but the strongest received signals

E4D02 ECLM Page (7 - 22)

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(A) E4D02 ECLM Page (7 - 22)

# How can intermodulation interference between two repeaters occur?

A. When the repeaters are in close proximity and the signals cause feedback in the final amplifier of one or both transmitters

B. When the repeaters are in close proximity and the signals mix in the final amplifier of one or both transmitters

C. When the signals from the transmitters are reflected out of phase from airplanes passing overhead

D. When the signals from the transmitters are reflected in phase from airplanes passing overhead

E4D03 ECLM Page (7 - 22)

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(B) E4D03 ECLM Page (7 - 22)

Which of the following may reduce or eliminate intermodulation interference in a repeater caused by another transmitter operating in close proximity?

A. A band-pass filter in the feed line between the transmitter and receiver

B. A properly terminated circulator at the output of the repeater's transmitter

C. Utilizing a Class C final amplifier

D. Utilizing a Class D final amplifier

E4D04 ECLM Page (7 - 22)

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(B) E4D04 ECLM Page (7 - 22)

What transmitter frequencies would cause an intermodulation-product signal in a receiver tuned to 146.70 MHz when a nearby station transmits on 146.52 MHz?

A. 146.34 MHz and 146.61 MHz

B. 146.88 MHz and 146.34 MHz

C. 146.10 MHz and 147.30 MHz

D. 173.35 MHz and 139.40 MHz

E4D05 ECLM Page (7 - 18)

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(A) E4D05 ECLM Page (7 - 18)

What is the term for spurious signals generated by the combination of two or more signals in a non-linear device or circuit?

A. Amplifier desensitization

B. Neutralization

C. Adjacent channel interference

D. Intermodulation

E4D06 ECLM Page (7 - 22)

What is the term for spurious signals generated by the combination of two or more signals in a non-linear device or circuit?

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(D ) E4D06 ECLM Page (7 - 22)

# Which of the following reduces the likelihood of receiver desensitization?

A. Decrease the RF bandwidth of the receiver

B. Raise the receiver IF frequency

C. Increase the receiver front end gain

D. Switch from fast AGC to slow AGC

E4D07 ECLM Page (7 - 17)

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(A) E4D07 ECLM Page (7 - 17)

# What causes intermodulation in an electronic circuit?

A. Too little gain

B. Lack of neutralization

C. Nonlinear circuits or devices

D. Positive feedback

E4D08 ECLM Page (7 - 22)

# What causes intermodulation in an electronic circuit?

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C. Nonlinear circuits or devices

D. Positive feedback

(C) E4D08 ECLM Page (7 - 22)

# What is the purpose of the preselector in a communications receiver?

A. To store often-used frequencies

B. To provide a range of AGC time constants

C. To increase rejection of signals outside the desired band

D. To allow selection of the optimum RF amplifier device

E4D09 ECLM Page (7 - 14)

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D. To allow selection of the optimum RF amplifier device

(C) E4D09 ECLM Page (7 - 14)

# What does a third-order intercept level of 40 dBm mean with respect to receiver performance?

A. Signals less than 40 dBm will not generate audible third-order intermodulation products

B. The receiver can tolerate signals up to 40 dB above the noise floor without producing third-order intermodulation products

C. A pair of 40 dBm input signals will theoretically generate a third-order intermodulation product that has the same output amplitude as either of the input signals

D. A pair of 1 mW input signals will produce a third-order intermodulation product that is 40 dB stronger than the input signal

E4D10 ECLM Page (7 - 19)

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(C) E4D10 ECLM Page (7 - 19)

# Why are odd-order intermodulation products, created within a receiver, of particular interest compared to other products?

A. Odd-order products of two signals in the band of interest are also likely to be within the band

B. Odd-order products overload the IF filters

C. Odd-order products are an indication of poor image rejection

D. Odd-order intermodulation produces three products for every input signal within the band of interest

E4D11 ECLM Page (7 - 18)

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(A) E4D11 ECLM Page (7 - 18)

What is the term for the reduction in receiver sensitivity caused by a strong signal near the received frequency?

A. Desensitization

B. Quieting

C. Cross-modulation interference

D. Squelch gain rollback

E4D12 ECLM Page (7 - 16)

What is the term for the reduction in receiver sensitivity caused by a strong signal near the received frequency?

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C. Cross-modulation interference

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(A) E4D12 ECLM Page (7 - 16)

What problem can occur when using an automatic notch filter (ANF) to remove interfering carriers while receiving CW signals?

A. Removal of the CW signal as well as the interfering carrier

B. Any nearby signal passing through the DSP system will overwhelm the desired signal

C. Received CW signals will appear to be modulated at the DSP clock frequency

D. Ringing in the DSP filter will completely remove the spaces between the CW characters

E4E01 ECLM Page (7 - 27)

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(A) E4E01 ECLM Page (7 - 27)

Which of the following types of noise can often be reduced with a digital signal processing noise filter?

A. Broadband white noise

B. Ignition noise

C. Power line noise

D. All these choices are correct

E4E02 ECLM Page (7 - 27)

Which of the following types of noise can often be reduced with a digital signal processing noise filter?

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C. Power line noise

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(D) E4E02 ECLM Page (7 - 27)

# Which of the following signals might a receiver noise blanker be able to remove from desired signals?

A. Signals that are constant at all IF levels

B. Signals that appear across a wide bandwidth

C. Signals that appear at one IF but not another

D. Signals that have a sharply peaked frequency distribution

E4E03 ECLM Page (7 - 26)

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(B) E4E03 ECLM Page (7 - 26)

# How can conducted and radiated noise caused by an automobile alternator be suppressed?

A. By installing filter capacitors in series with the DC power lead and a blocking capacitor in the field lead

B. By installing a noise suppression resistor and a blocking capacitor in both leads

C. By installing a high-pass filter in series with the radio's power lead and a low-pass filter in parallel with the field lead

D. By connecting the radio's power leads directly to the battery and by installing coaxial capacitors in line with the alternator leads

E4E04 ECLM Page (7 - 26)

# How can conducted and radiated noise caused by an automobile alternator be suppressed?

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D. By connecting the radio's power leads directly to the battery and by installing coaxial capacitors in line with the alternator leads

(D) E4E04 ECLM Page (7 - 26)

# How can radio frequency interference from an AC motor be suppressed?

A. By installing a high-pass filter in series with the motor's power leads

B. By installing a brute-force AC-line filter in series with the motor leads

C. By installing a bypass capacitor in series with the motor leads

D. By using a ground-fault current interrupter in the circuit used to power the motor

E4E05 ECLM Page (7 - 25)

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(B) E4E05 ECLM Page (7 - 25)

# What is one type of electrical interference that might be caused by a nearby personal computer?

A. A loud AC hum in the audio output of your station receiver

B. A clicking noise at intervals of a few seconds

C. The appearance of unstable modulated or unmodulated signals at specific frequencies

D. A whining type noise that continually pulses off and on

E4E06 ECLM Page (7 - 25)

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(C) E4E06 ECLM Page (7 - 25)

# Which of the following can cause shielded cables to radiate or receive interference?

A. Low inductance ground connections at both ends of the shield

B. Common mode currents on the shield and conductors

C. Use of braided shielding material

D. Tying all ground connections to a common point resulting in differential mode currents in the shield

E4E07 ECLM Page (7 - 25)

# Which of the following can cause shielded cables to radiate or receive interference?

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(B) E4E07 ECLM Page (7 - 25)

# What current flows equally on all conductors of an unshielded multi-conductor cable?

A. Differential-mode current

B. Common-mode current

C. Reactive current only

D. Return current

E4E08 ECLM Page (7 - 25)

# What current flows equally on all conductors of an unshielded multi-conductor cable?

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(B) E4E08 ECLM Page (7 - 25)

# What undesirable effect can occur when using an IF noise blanker?

A. Received audio in the speech range might have an echo effect

B. The audio frequency bandwidth of the received signal might be compressed

C. Nearby signals may appear to be excessively wide even if they meet emission standards

D. FM signals can no longer be demodulated

E4E09 ECLM Page (7 - 26)

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(C) E4E09 ECLM Page (7 - 26)

# What might be the cause of a loud roaring or buzzing AC line interference that comes and goes at intervals?

A. Arcing contacts in a thermostatically controlled device

B. A defective doorbell or doorbell transformer inside a nearby residence

C. A malfunctioning illuminated advertising display

D. All these choices are correct

E4E10 ECLM Page (7 - 25)

# What might be the cause of a loud roaring or buzzing AC line interference that comes and goes at intervals?

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(D) E4E10 ECLM Page (7 - 25)

# What could cause local AM broadcast band signals to combine to generate spurious signals in the MF or HF bands?

A. One or more of the broadcast stations is transmitting an over-modulated signal

B. Nearby corroded metal joints are mixing and re-radiating the broadcast signals

C. You are receiving skywave signals from a distant station

D. Your station receiver IF amplifier stage is defective

E4E11 ECLM Page (7 - 23)

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(B) E4E11 ECLM Page (7 - 23)