Chapter 5.1 – Quiz 1 – Basic Modes and Bandwidth

G8A02 - What is the name of the process that changes the phase angle of an RF signal to convey information?

- A. Phase convolution
- B. Phase modulation
- C. Phase transformation
- D. Phase inversion

G8A03 - What is the name of the process that changes the instantaneous frequency of an RF wave to convey information?

- A. Frequency convolution
- B. Frequency transformation
- C. Frequency conversion
- D. Frequency modulation

G8A05 - What type of modulation varies the instantaneous power level of the RF signal?

- A. Power modulation
- B. Phase modulation
- C. Frequency modulation
- D. Amplitude modulation

G8A07 - Which of the following phone emissions uses the narrowest bandwidth?

- A. Single sideband
- B. Vestigial sideband
- C. Phase modulation
- D. Frequency modulation

G8A13 - What is a link budget?

- A. The financial costs associated with operating a radio link
- B. The sum of antenna gains minus system losses
- C. The sum of transmit power and antenna gains minus system losses as seen at the receiver
- D. The difference between transmit power and receiver sensitivity

G8A14 - What is link margin?

- A. The opposite of fade margin
- B. The difference between received power level and minimum required signal level at the input to the receiver
- C. Transmit power minus receiver sensitivity
- D. Receiver sensitivity plus 3 dB

End of Quiz 1

Chapter 5.2 – Quiz 2 – Radio’s Building Blocks

G7B07 - Which of the following are basic components of a sine wave oscillator?

- A. An amplifier and a divider
- B. A frequency multiplier and a mixer
- C. A circulator and a filter operating in a feed-forward loop
- D. A filter and an amplifier operating in a feedback loop

G7B09 - What determines the frequency of an LC oscillator?

- A. The number of stages in the counter
- B. The number of stages in the divider
- C. The inductance and capacitance in the tank circuit
- D. The time delay of the lag circuit

G7C05 - Which of the following is characteristic of a direct digital synthesizer (DDS)?

- A. Extremely narrow tuning range
- B. Relatively high-power output
- C. Pure sine wave output
- D. Variable output frequency with the stability of a crystal oscillator

G7C07 - What term specifies a filter's attenuation inside its passband?

- A. Insertion loss
- B. Return loss
- C. Q
- D. Ultimate rejection

G7C09 - What is the phase difference between the I and Q RF signals that software-defined radio (SDR) equipment uses for modulation and demodulation?

- A. Zero
- B. 90 degrees
- C. 180 degrees
- D. 45 degrees

G7C10 - What is an advantage of using I-Q modulation with software-defined radios (SDRs)?

- A. The need for high resolution analog-to-digital converters is eliminated
- B. All types of modulation can be created with appropriate processing
- C. Minimum detectible signal level is reduced
- D. Automatic conversion of the signal from digital to analog

G7C11 - Which of these functions is performed by software in a software-defined radio (SDR)?

- A. Filtering
- B. Detection
- C. Modulation
- D. All these choices are correct

G7C12 - What is the frequency above which a low-pass filter's output power is less than half the input power?

- A. Notch frequency
- B. Neper frequency
- C. Cutoff frequency
- D. Rolloff frequency

G7C13 - What term specifies a filter's maximum ability to reject signals outside its passband?

- A. Notch depth
- B. Rolloff
- C. Insertion loss
- D. Ultimate rejection

G7C14 - The bandwidth of a band-pass filter is measured between what two frequencies?

- A. Upper and lower half-power
- B. Cutoff and rolloff
- C. Pole and zero
- D. Image and harmonic

G8A04 - What emission is produced by a reactance modulator connected to a transmitter RF amplifier stage?

- A. Multiplex modulation
- B. Phase modulation
- C. Amplitude modulation
- D. Pulse modulation

G8B03 - What is another term for the mixing of two RF signals?

- A. Heterodyning
- B. Synthesizing
- C. Frequency inversion
- D. Phase inversion

G8B04 - What is the stage in a VHF FM transmitter that generates a harmonic of a lower frequency signal to reach the desired operating frequency?

- A. Mixer
- B. Reactance modulator
- C. Balanced converter
- D. Multiplier

G8B11 - What combination of a mixer's Local Oscillator (LO) and RF input frequencies is found in the output?

- A. The ratio
- B. The average
- C. The sum and difference
- D. The arithmetic product

(End of Quiz 2)

Chapter 5.3 – Quiz 3 - Transmitters

G2A12 - What control is typically adjusted for proper ALC setting on a single sideband transceiver?

- A. RF clipping level
- B. Transmit audio or microphone gain
- C. Antenna inductance or capacitance
- D. Attenuator level

G4B07 - What signals are used to conduct a two-tone test?

- A. Two audio signals of the same frequency shifted 90 degrees
- B. Two non-harmonically related audio signals
- C. Two swept frequency tones
- D. Two audio frequency range square wave signals of equal amplitude

G4B08 - What transmitter performance parameter does a two-tone test analyze?

- A. Linearity
- B. Percentage of suppression of the carrier and undesired sideband for SSB
- C. Percentage of frequency modulation
- D. Percentage of carrier phase shift

G4D01 - What is the purpose of a speech processor in a transceiver?

- A. Increase the apparent loudness of transmitted voice signals
- B. Increase transmitter bass response for more natural-sounding SSB signals
- C. Prevent distortion of voice signals
- D. Decrease high-frequency voice output to prevent out-of-band operation

G4D02 - How does a speech processor affect a single sideband phone signal?

- A. It increases peak power
- B. It increases average power
- C. It reduces harmonic distortion
- D. It reduces intermodulation distortion

G4D03 - What is the effect of an incorrectly adjusted speech processor?

- A. Distorted speech
- B. Excess intermodulation products
- C. Excessive background noise
- D. All these choices are correct

G4D08 - What frequency range is occupied by a 3 kHz LSB signal when the displayed carrier frequency is set to 7.178 MHz?

- A. 7.178 MHz to 7.181 MHz
- B. 7.178 MHz to 7.184 MHz
- C. 7.175 MHz to 7.178 MHz
- D. 7.1765 MHz to 7.1795 MHz

G4D09 - What frequency range is occupied by a 3 kHz USB signal with the displayed carrier frequency set to 14.347 MHz?

- A. 14.347 MHz to 14.647 MHz
- B. 14.347 MHz to 14.350 MHz
- C. 14.344 MHz to 14.347 MHz
- D. 14.3455 MHz to 14.3485 MHz

G4D10 - How close to the lower edge of a band's phone segment should your displayed carrier frequency be when using 3 kHz wide LSB?

- A. At least 3 kHz above the edge of the segment
- B. At least 3 kHz below the edge of the segment
- C. At least 1 kHz below the edge of the segment
- D. At least 1 kHz above the edge of the segment

G4D11 - How close to the upper edge of a band's phone segment should your displayed carrier frequency be when using 3 kHz wide USB?

- A. At least 3 kHz above the edge of the band
- B. At least 3 kHz below the edge of the band
- C. At least 1 kHz above the edge of the segment
- D. At least 1 kHz below the edge of the segment

G7B10 - Which of the following describes a linear amplifier?

- A. Any RF power amplifier used in conjunction with an amateur transceiver
- B. An amplifier in which the output preserves the input waveform
- C. A Class C high efficiency amplifier
- D. An amplifier used as a frequency multiplier

G7C01 - What circuit is used to select one of the sidebands from a balanced modulator?

- A. Carrier oscillator
- B. Filter
- C. IF amplifier
- D. RF amplifier

G7C02 - What output is produced by a balanced modulator?

- A. Frequency modulated RF
- B. Audio with equalized frequency response
- C. Audio extracted from the modulation signal
- D. Double-sideband modulated RF

G8A08 - Which of the following is an effect of overmodulation?

- A. Insufficient audio
- B. Insufficient bandwidth
- C. Frequency drift
- D. Excessive bandwidth

G8A10 - What is meant by the term "flat-topping," when referring to an amplitude-modulated phone signal?

- A. Signal distortion caused by insufficient collector current
- B. The transmitter's automatic level control (ALC) is properly adjusted
- C. Signal distortion caused by excessive drive or speech levels
- D. The transmitter's carrier is properly suppressed

G8A11 - What is the modulation envelope of an AM signal?

- A. The waveform created by connecting the peak values of the modulated signal
- B. The carrier frequency that contains the signal
- C. Spurious signals that envelop nearby frequencies
- D. The bandwidth of the modulated signal

G8B06 - What is the total bandwidth of an FM phone transmission having 5 kHz deviation and 3 kHz modulating frequency?

- A. 3 kHz
- B. 5 kHz
- C. 8 kHz
- D. 16 kHz

G8B07 - What is the frequency deviation for a 12.21 MHz reactance modulated oscillator in a 5 kHz deviation, 146.52 MHz FM phone transmitter?

- A. 101.75 Hz
- B. 416.7 Hz
- C. 5 kHz
- D. 60 kHz

End of Quiz 3

Chapter 5.3 – Quiz 4 - Amplifiers

G4A04 - What is the effect on plate current of the correct setting of a vacuum-tube RF power amplifier's TUNE control?

- A. A pronounced peak
- B. A pronounced dip
- C. No change will be observed
- D. A slow, rhythmic oscillation

G4A05 - Why is automatic level control (ALC) used with an RF power amplifier?

- A. To balance the transmitter audio frequency response
- B. To reduce harmonic radiation
- C. To prevent excessive drive
- D. To increase overall efficiency

G4A08 - What is the correct adjustment for the LOAD or COUPLING control of a vacuum tube RF power amplifier?

- A. Minimum SWR on the antenna
- B. Minimum plate current without exceeding maximum allowable grid current
- C. Highest plate voltage while minimizing grid current
- D. Desired power output without exceeding maximum allowable plate current

G4A09 - What is the purpose of delaying RF output after activating a transmitter's keying line to an external amplifier?

- A. To prevent key clicks on CW
- B. To prevent transient overmodulation
- C. To allow time for the amplifier to switch the antenna between the transceiver and the amplifier output
- D. To allow time for the amplifier power supply to reach operating level

G7B01 - What is the purpose of neutralizing an amplifier?

- A. To limit the modulation index
- B. To eliminate self-oscillations
- C. To cut off the final amplifier during standby periods
- D. To keep the carrier on frequency

G7B02 - Which of these classes of amplifiers has the highest efficiency?

- A. Class A
- B. Class B
- C. Class AB
- D. Class C

G7B04 - In a Class A amplifier, what percentage of the time does the amplifying device conduct?

- A. 100%
- B. More than 50% but less than 100%
- C. 50%
- D. Less than 50%

G7B08 - How is the efficiency of an RF power amplifier determined?

- A. Divide the DC input power by the DC output power
- B. Divide the RF output power by the DC input power
- C. Multiply the RF input power by the reciprocal of the RF output power
- D. Add the RF input power to the DC output power

G7B11 - For which of the following modes is a Class C power stage appropriate for amplifying a modulated signal?

- A. SSB
- B. FM
- C. AM
- D. All these choices are correct

End of Quiz 4

Chapter 5.4 – Quiz 5 – Receivers

G4A01 - What is the purpose of the notch filter found on many HF transceivers?

- A. To restrict the transmitter voice bandwidth
- B. To reduce interference from carriers in the receiver passband
- C. To eliminate receiver interference from impulse noise sources
- D. To remove interfering splatter generated by signals on adjacent frequencies

G4A02 - What is the benefit of using the opposite or "reverse" sideband when receiving CW?

- A. Interference from impulse noise will be eliminated
- B. More stations can be accommodated within a given signal passband
- C. It may be possible to reduce or eliminate interference from other signals
- D. Accidental out-of-band operation can be prevented

G4A03 - How does a noise blanker work?

- A. By temporarily increasing received bandwidth
- B. By redirecting noise pulses into a filter capacitor
- C. By reducing receiver gain during a noise pulse
- D. By clipping noise peaks

G4A07 - What happens as a receiver's noise reduction control level is increased?

- A. Received signals may become distorted
- B. Received frequency may become unstable
- C. CW signals may become severely attenuated
- D. Received frequency may shift several kHz

G4A13 - What is the purpose of using a receive attenuator?

- A. To prevent receiver overload from strong incoming signals
- B. To reduce the transmitter power when driving a linear amplifier
- C. To reduce power consumption when operating from batteries
- D. To reduce excessive audio level on strong signals

G4D04 - What does an S meter measure?

- A. Carrier suppression
- B. Impedance
- C. Received signal strength
- D. Transmitter power output

G4D05 - How does a signal that reads 20 dB over S9 compare to one that reads S9 on a receiver, assuming a properly calibrated S meter?

- A. It is 10 times less powerful
- B. It is 20 times less powerful
- C. It is 20 times more powerful
- D. It is 100 times more powerful

G4D06 - How much change in signal strength is typically represented by one S unit?

- A. 6 dB
- B. 12 dB
- C. 15 dB
- D. 18 dB

G4D07 - How much must the power output of a transmitter be raised to change the S meter reading on a distant receiver from S8 to S9?

- A. Approximately 1.5 times
- B. Approximately 2 times
- C. Approximately 4 times
- D. Approximately 8 times

G7C04 - How is a product detector used?

- A. Used in test gear to detect spurious mixing products
- B. Used in transmitter to perform frequency multiplication
- C. Used in an FM receiver to filter out unwanted sidebands
- D. Used in a single sideband receiver to extract the modulated signal

G7C06 - Which of the following is an advantage of a digital signal processing (DSP) filter compared to an analog filter?

- A. A wide range of filter bandwidths and shapes can be created
- B. Fewer digital components are required
- C. Mixing products are greatly reduced
- D. The DSP filter is much more effective at VHF frequencies

G7C08 - Which parameter affects receiver sensitivity?

- A. Input amplifier gain
- B. Demodulator stage bandwidth
- C. Input amplifier noise figure
- D. All these choices are correct

G8B01 - Which mixer input is varied or tuned to convert signals of different frequencies to an intermediate frequency (IF)?

- A. Image frequency
- B. Local oscillator
- C. RF input
- D. Beat frequency oscillator

G8B02 - What is the term for interference from a signal at twice the IF frequency from the desired signal?

- A. Quadrature response
- B. Image response
- C. Mixer interference
- D. Intermediate interference

G8B09 - Why is it good to match receiver bandwidth to the bandwidth of the operating mode?

- A. It is required by FCC rules
- B. It minimizes power consumption in the receiver
- C. It improves impedance matching of the antenna
- D. It results in the best signal-to-noise ratio

End of Quiz 5