

**2022-2026 Technician Class  
FCC Element 2 Question Pool  
Effective 7/01/2022 – 6/30/2026**

**SUBELEMENT T8 – SIGNALS AND EMISSIONS – [4 Exam Questions - 4 Groups]**

T8A – Basic characteristics of FM and SSB; Bandwidth of various modulation modes: CW, SSB, FM, fast-scan TV; Choice of emission type: selection of USB vs LSB, use of SSB for weak signal work, use of FM for VHF packet and repeaters

T8A01

**Which of the following is a form of amplitude modulation?**

- A. Spread spectrum
- B. Packet radio
- C. Single sideband
- D. Phase shift keying (PSK)

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T8A02

**What type of modulation is commonly used for VHF packet radio transmissions?**

- A. FM or PM
- B. SSB
- C. AM
- D. PSK

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T8A03

**Which type of voice mode is often used for long-distance (weak signal) contacts on the VHF and UHF bands?**

- A. FM
- B. DRM
- C. SSB
- D. PM

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T8A04

**Which type of modulation is commonly used for VHF and UHF voice repeaters?**

- A. AM
- B. SSB
- C. PSK
- D. FM or PM

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T8A05

**Which of the following types of signal has the narrowest bandwidth?**

- A. FM voice
- B. SSB voice
- C. CW**
- D. Slow-scan TV

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T8A06

**Which sideband is normally used for 10 meter HF, VHF, and UHF single-sideband communications?**

- A. Upper sideband**
- B. Lower sideband
- C. Suppressed sideband
- D. Inverted sideband

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T8A07

**What is a characteristic of single sideband (SSB) compared to FM?**

- A. SSB signals are easier to tune in correctly
- B. SSB signals are less susceptible to interference
- C. SSB signals have narrower bandwidth**
- D. All these choices are correct

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T8A08

**What is the approximate bandwidth of a typical single sideband (SSB) voice signal?**

- A. 1 kHz
- B. 3 kHz**
- C. 6 kHz
- D. 15 kHz

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T8A09

**What is the approximate bandwidth of a VHF repeater FM voice signal?**

- A. Less than 500 Hz
- B. About 150 kHz
- C. Between 10 and 15 kHz**
- D. Between 50 and 125 kHz

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T8A10

**What is the approximate bandwidth of AM fast-scan TV transmissions?**

- A. More than 10 MHz
- B. About 6 MHz**
- C. About 3 MHz
- D. About 1 MHz

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T8A11

**What is the approximate bandwidth required to transmit a CW signal?**

- A. 2.4 kHz
- B. 150 Hz**
- C. 1000 Hz
- D. 15 kHz

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T8A12

**Which of the following is a disadvantage of FM compared with single sideband?**

- A. Voice quality is poorer
- B. Only one signal can be received at a time**
- C. FM signals are harder to tune
- D. All these choices are correct

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T8B - Amateur satellite operation: Doppler shift, basic orbits, operating protocols, modulation mode selection, transmitter power considerations, telemetry and telecommand, satellite tracking programs, beacons, uplink and downlink mode definitions, spin fading, definition of "LEO", setting uplink power

T8B01

**What telemetry information is typically transmitted by satellite beacons?**

- A. The signal strength of received signals
- B. Time of day accurate to plus or minus 1/10 second
- C. Health and status of the satellite**
- D. All these choices are correct

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T8B02

**What is the impact of using excessive effective radiated power on a satellite uplink?**

- A. Possibility of commanding the satellite to an improper mode
- B. Blocking access by other users**
- C. Overloading the satellite batteries
- D. Possibility of rebooting the satellite control computer

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T8B03

**Which of the following are provided by satellite tracking programs?**

- A. Maps showing the real-time position of the satellite track over Earth
- B. The time, azimuth, and elevation of the start, maximum altitude, and end of a pass
- C. The apparent frequency of the satellite transmission, including effects of Doppler shift
- D. All these choices are correct**

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T8B04

**What mode of transmission is commonly used by amateur radio satellites?**

- A. SSB
- B. FM
- C. CW/data
- D. All these choices are correct

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T8B05

**What is a satellite beacon?**

- A. The primary transmit antenna on the satellite
- B. An indicator light that shows where to point your antenna
- C. A reflective surface on the satellite
- D. A transmission from a satellite that contains status information

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T8B06

**Which of the following are inputs to a satellite tracking program?**

- A. The satellite transmitted power
- B. The Keplerian elements
- C. The last observed time of zero Doppler shift
- D. All these choices are correct

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T8B07

**What is Doppler shift in reference to satellite communications?**

- A. A change in the satellite orbit
- B. A mode where the satellite receives signals on one band and transmits on another
- C. An observed change in signal frequency caused by relative motion between the satellite and Earth station
- D. A special digital communications mode for some satellites

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T8B08

**What is meant by the statement that a satellite is operating in U/V mode?**

- A. The satellite uplink is in the 15 meter band and the downlink is in the 10 meter band
- B. The satellite uplink is in the 70 centimeter band and the downlink is in the 2 meter band
- C. The satellite operates using ultraviolet frequencies
- D. The satellite frequencies are usually variable

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T8B09

**What causes spin fading of satellite signals?**

- A. Circular polarized noise interference radiated from the sun
- B. Rotation of the satellite and its antennas
- C. Doppler shift of the received signal
- D. Interfering signals within the satellite uplink band

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T8B10

**What is a LEO satellite?**

- A. A sun synchronous satellite
- B. A highly elliptical orbit satellite
- C. A satellite in low energy operation mode
- D. A satellite in low earth orbit

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T8B11

**Who may receive telemetry from a space station?**

- A. Anyone
- B. A licensed radio amateur with a transmitter equipped for interrogating the satellite
- C. A licensed radio amateur who has been certified by the protocol developer
- D. A licensed radio amateur who has registered for an access code from AMSAT

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T8B12

**Which of the following is a way to determine whether your satellite uplink power is neither too low nor too high?**

- A. Check your signal strength report in the telemetry data
- B. Listen for distortion on your downlink signal
- C. Your signal strength on the downlink should be about the same as the beacon
- D. All these choices are correct

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T8C – Operating activities: radio direction finding, contests, linking over the internet, exchanging grid locators

T8C01

**Which of the following methods is used to locate sources of noise interference or jamming?**

- A. Echolocation
- B. Doppler radar
- C. Radio direction finding
- D. Phase locking

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T8C02

**Which of these items would be useful for a hidden transmitter hunt?**

- A. Calibrated SWR meter
- B. A directional antenna
- C. A calibrated noise bridge
- D. All these choices are correct

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T8C03

**What operating activity involves contacting as many stations as possible during a specified period?**

- A. Simulated emergency exercises
- B. Net operations
- C. Public service events
- D. Contesting**

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T8C04

**Which of the following is good procedure when contacting another station in a contest?**

- A. Sign only the last two letters of your call if there are many other stations calling
- B. Contact the station twice to be sure that you are in his log
- C. Send only the minimum information needed for proper identification and the contest exchange**
- D. All these choices are correct

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T8C05

**What is a grid locator?**

- A. A letter-number designator assigned to a geographic location**
- B. A letter-number designator assigned to an azimuth and elevation
- C. An instrument for neutralizing a final amplifier
- D. An instrument for radio direction finding

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T8C06

**How is over the air access to IRLP nodes accomplished?**

- A. By obtaining a password that is sent via voice to the node
- B. By using DTMF signals**
- C. By entering the proper internet password
- D. By using CTCSS tone codes

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T8C07

**What is Voice Over Internet Protocol (VoIP)?**

- A. A set of rules specifying how to identify your station when linked over the internet to another station
- B. A technique employed to "spot" DX stations via the internet
- C. A technique for measuring the modulation quality of a transmitter using remote sites monitored via the internet
- D. A method of delivering voice communications over the internet using digital techniques**

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T8C08

**What is the Internet Radio Linking Project (IRLP)?**

- A. A technique to connect amateur radio systems, such as repeaters, via the internet using Voice Over Internet Protocol (VoIP)**
- B. A system for providing access to websites via amateur radio
- C. A system for informing amateurs in real time of the frequency of active DX stations
- D. A technique for measuring signal strength of an amateur transmitter via the internet

T8C09

**Which of the following protocols enables an amateur station to transmit through a repeater without using a radio to initiate the transmission?**

- A. IRLP
- B. D-STAR
- C. DMR
- D. EchoLink

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T8C10

**What is required before using the EchoLink system?**

- A. Complete the required EchoLink training
- B. Purchase a license to use the EchoLink software
- C. Register your call sign and provide proof of license
- D. All these choices are correct

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T8C11

**What is an amateur radio station that connects other amateur stations to the internet?**

- A. A gateway
- B. A repeater
- C. A digipeater
- D. A beacon

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T8D – Non-voice and digital communications: image signals and definition of NTSC, CW, packet radio, PSK, APRS, error detection and correction, amateur radio networking, Digital Mobile Radio, WSJT modes, Broadband-Hamnet

T8D01

**Which of the following is a digital communications mode?**

- A. Packet radio
- B. IEEE 802.11
- C. FT8
- D. All these choices are correct

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T8D02

**What is a “talkgroup” on a DMR repeater?**

- A. A group of operators sharing common interests
- B. A way for groups of users to share a channel at different times without hearing other users on the channel
- C. A protocol that increases the signal-to-noise ratio when multiple repeaters are linked together
- D. A net that meets at a specified time

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T8D03

**What kind of data can be transmitted by APRS?**

- A. GPS position data
- B. Text messages
- C. Weather data
- D. All these choices are correct

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T8D04

**What type of transmission is indicated by the term "NTSC?"**

- A. A Normal Transmission mode in Static Circuit
- B. A special mode for satellite uplink
- C. An analog fast-scan color TV signal
- D. A frame compression scheme for TV signals

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T8D05

**Which of the following is an application of APRS?**

- A. Providing real-time tactical digital communications in conjunction with a map showing the locations of stations
- B. Showing automatically the number of packets transmitted via PACTOR during a specific time interval
- C. Providing voice over internet connection between repeaters
- D. Providing information on the number of stations signed into a repeater

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T8D06

**What does the abbreviation "PSK" mean?**

- A. Pulse Shift Keying
- B. Phase Shift Keying
- C. Packet Short Keying
- D. Phased Slide Keying

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T8D07

**Which of the following describes DMR?**

- A. A technique for time-multiplexing two digital voice signals on a single 12.5 kHz repeater channel
- B. An automatic position tracking mode for FM mobiles communicating through repeaters
- C. An automatic computer logging technique for hands-off logging when communicating while operating a vehicle
- D. A digital technique for transmitting on two repeater inputs simultaneously for automatic error correction

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T8D08

**Which of the following is included in packet radio transmissions?**

- A. A check sum that permits error detection
- B. A header that contains the call sign of the station to which the information is being sent
- C. Automatic repeat request in case of error
- D. All these choices are correct

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T8D09

**What is CW?**

- A. A type of electromagnetic propagation
- B. A digital mode used primarily on 2 meter FM
- C. A technique for coil winding
- D. Another name for a Morse code transmission

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T8D10

**Which of the following operating activities is supported by digital mode software in the WSJT-X software suite?**

- A. Earth-Moon-Earth
- B. Weak signal propagation beacons
- C. Meteor scatter
- D. All these choices are correct

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T8D11

**What is an ARQ transmission system?**

- A. A special transmission format limited to video signals
- B. A system used to encrypt command signals to an amateur radio satellite
- C. An error correction method in which the receiving station detects errors and sends a request for retransmission
- D. A method of compressing data using autonomous reiterative Q codes prior to final encoding

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T8D12

**Which of the following best describes an amateur radio mesh network?**

- A. An amateur-radio based data network using commercial Wi-Fi equipment with modified firmware
- B. A wide-bandwidth digital voice mode employing DMR protocols
- C. A satellite communications network using modified commercial satellite TV hardware
- D. An internet linking protocol used to network repeaters

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T8D13

**What is FT8?**

- A. A wideband FM voice mode
- B. A digital mode capable of low signal-to-noise operation
- C. An eight channel multiplex mode for FM repeaters
- D. A digital slow-scan TV mode with forward error correction and automatic color compensation