Subelement T2 - Operating Procedures

Group T2A - - Station operation: choosing an operating frequency, calling another station, test transmissions; Band plans: calling frequencies, repeater offsets

T2A01 (B)

What is a common repeater frequency offset in the 2 meter band?

- A. Plus or minus 5 MHz
- B. Plus or minus 600 kHz
- C. Plus or minus 500 kHz
- D. Plus or minus 1 MHz

T2A02 (A)

What is the national calling frequency for FM simplex operations in the 2 meter band?

- A. 146.520 MHz
- B. 145.000 MHz
- C. 432.100 MHz
- D. 446.000 MHz

T2A03 (A)

What is a common repeater frequency offset in the 70 cm band?

- A. Plus or minus 5 MHz
- B. Plus or minus 600 kHz
- C. Plus or minus 500 kHz
- D. Plus or minus 1 MHz

T2A04 (B)

What is an appropriate way to call another station on a repeater if you know the other station's call sign?

- A. Say "break, break," then say the station's call sign
- B. Say the station's call sign, then identify with your call sign
- C. Say "CQ" three times, then the other station's call sign
- D. Wait for the station to call CQ, then answer

T2A05 (C)

How should you respond to a station calling CQ?

- A. Transmit "CQ" followed by the other station's call sign
- B. Transmit your call sign followed by the other station's call sign
- C. Transmit the other station's call sign followed by your call sign
- D. Transmit a signal report followed by your call sign

T2A06 (A)

Which of the following is required when making on-the-air test transmissions?

- A. Identify the transmitting station
- B. Conduct tests only between 10 p.m. and 6 a.m. local time
- C. Notify the FCC of the transmissions
- D. All these choices are correct

T2A07 (A)

What is meant by "repeater offset"?

- A. The difference between a repeater's transmit and receive frequencies
- B. The repeater has a time delay to prevent interference
- C. The repeater station identification is done on a separate frequency
- D. The number of simultaneous transmit frequencies used by a repeater

T2A08 (D)

What is the meaning of the procedural signal "CQ"?

- A. Call on the quarter hour
- B. Test transmission, no reply expected
- C. Only the called station should transmit
- D. Calling any station

T2A09 (B)

Which of the following indicates that a station is listening on a repeater and looking for a contact?

- A. "CQ CQ" followed by the repeater's call sign
- B. The station's call sign followed by the word "monitoring"
- C. The repeater call sign followed by the station's call sign
- D. "QSY" followed by your call sign

T2A10 (A)

What is a band plan, beyond the privileges established by the FCC?

- A. A voluntary guideline for using different modes or activities within an amateur band
- B. A list of operating schedules
- C. A list of available net frequencies
- D. A plan devised by a club to indicate frequency band usage

T2A11 (C)

What term describes an amateur station that is transmitting and receiving on the same frequency?

- A. Full duplex
- B. Diplex
- C. Simplex
- D. Multiplex

T2A12 (D)

What should you do before calling CQ?

- A. Listen first to be sure that no one else is using the frequency
- B. Ask if the frequency is in use
- C. Make sure you are authorized to use that frequency
- D. All these choices are correct

Group T2B - - VHF/UHF operating practices: FM repeater, simplex, reverse splits; Access tones: CTCSS, DTMF; DMR operation; Resolving operational problems; Q signals

T2B01 (C)

How is a VHF/UHF transceiver's "reverse" function used?

- A. To reduce power output
- B. To increase power output
- C. To listen on a repeater's input frequency
- D. To listen on a repeater's output frequency

T2B02 (D)

What term describes the use of a sub-audible tone transmitted along with normal voice audio to open the squelch of a receiver?

- A. Carrier squelch
- B. Tone burst
- C. DTMF
- D. CTCSS

T2B03 (A)

Which of the following describes a linked repeater network?

- A. A network of repeaters in which signals received by one repeater are transmitted by all the repeaters in the network
- B. A single repeater with more than one receiver
- C. Multiple repeaters with the same control operator
- D. A system of repeaters linked by APRS

T2B04 (D)

Which of the following could be the reason you are unable to access a repeater whose output you can hear?

- A. Improper transceiver offset
- B. You are using the wrong CTCSS tone
- C. You are using the wrong DCS code
- D. All these choices are correct

T2B05 (C)

What would cause your FM transmission audio to be distorted on voice peaks?

- A. Your repeater offset is inverted
- B. You need to talk louder
- C. You are talking too loudly
- D. Your transmit power is too high

T2B06 (A)

What type of signaling uses pairs of audio tones?

- A. DTMF
- B. CTCSS
- C. GPRS
- D. D-STAR

T2B07 (C)

How can you join a digital repeater's "talkgroup"?

- A. Register your radio with the local FCC office
- B. Join the repeater owner's club
- C. Program your radio with the group's ID or code
- D. Sign your call after the courtesy tone

T2B08 (A)

Which of the following applies when two stations transmitting on the same frequency interfere with each other?

- A. The stations should negotiate continued use of the frequency
- B. Both stations should choose another frequency to avoid conflict
- C. Interference is inevitable, so no action is required
- D. Use subaudible tones so both stations can share the frequency

T2B09 (A)

Why are simplex channels designated in the VHF/UHF band plans?

- A. So stations within range of each other can communicate without tying up a repeater
- B. For contest operation
- C. For working DX only
- D. So stations with simple transmitters can access the repeater without automated offset

T2B10 (A)

Which Q signal indicates that you are receiving interference from other stations?

- A. QRM
- B. QRN
- C. QTH
- D. QSB

T2B11 (B)

Which Q signal indicates that you are changing frequency?

- A. QRU
- B. QSY
- C. QSL
- D. QRZ

T2B12 (A)

What is the purpose of the color code used on DMR repeater systems?

- A. Must match the repeater color code for access
- B. Defines the frequency pair to use
- C. Identifies the codec used
- D. Defines the minimum signal level required for access

T2B13 (B)

What is the purpose of a squelch function?

- A. Reduce a CW transmitter's key clicks
- B. Mute the receiver audio when a signal is not present
- C. Eliminate parasitic oscillations in an RF amplifier
- D. Reduce interference from impulse noise

Group T2C - - Public service: emergency operations, applicability of FCC rules, RACES and ARES, net and traffic procedures, operating restrictions during emergencies, use of phonetics in message handling

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T2C01 (D)

When do FCC rules NOT apply to the operation of an amateur station?

- A. When operating a RACES station
- B. When operating under special FEMA rules
- C. When operating under special ARES rules
- D. FCC rules always apply

T2C02 (C)

Which of the following are typical duties of a Net Control Station?

- A. Choose the regular net meeting time and frequency
- B. Ensure that all stations checking into the net are properly licensed for operation on the net frequency
- C. Call the net to order and direct communications between stations checking in
- D. All these choices are correct

T2C03 (C)

What technique is used to ensure that voice messages containing unusual words are received correctly?

- A. Send the words by voice and Morse code
- B. Speak very loudly into the microphone
- C. Spell the words using a standard phonetic alphabet
- D. All these choices are correct

T2C04 (D)

What is RACES?

- A. An emergency organization combining amateur radio and citizens band operators and frequencies
- B. An international radio experimentation society
- C. A radio contest held in a short period, sometimes called a "sprint"
- D. An FCC part 97 amateur radio service for civil defense communications during national emergencies

T2C05 (A)

What does the term "traffic" refer to in net operation?

- A. Messages exchanged by net stations
- B. The number of stations checking in and out of a net
- C. Operation by mobile or portable stations
- D. Requests to activate the net by a served agency

T2C06 (A)

What is the Amateur Radio Emergency Service (ARES)?

- A. A group of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service
- B. A group of licensed amateurs who are members of the military and who voluntarily agreed to provide message handling services in the case of an emergency
- C. A training program that provides licensing courses for those interested in obtaining an amateur license to use during emergencies
- D. A training program that certifies amateur operators for membership in the Radio Amateur Civil Emergency Service

T2C07 (C)

Which of the following is standard practice when you participate in a net?

- A. When first responding to the net control station, transmit your call sign, name, and address as in the FCC database
- B. Record the time of each of your transmissions
- C. Unless you are reporting an emergency, transmit only when directed by the net control station
- D. All these choices are correct

T2C08 (A)

Which of the following is a characteristic of good traffic handling?

- A. Passing messages exactly as received
- B. Making decisions as to whether messages are worthy of relay or delivery
- C. Ensuring that any newsworthy messages are relayed to the news media
- D. All these choices are correct

T2C09 (D)

Are amateur station control operators ever permitted to operate outside the frequency privileges of their license class?

- A. No
- B. Yes, but only when part of a FEMA emergency plan
- C. Yes, but only when part of a RACES emergency plan
- D. Yes, but only in situations involving the immediate safety of human life or protection of property

T2C10 (D)

What information is contained in the preamble of a formal traffic message?

- A. The email address of the originating station
- B. The address of the intended recipient
- C. The telephone number of the addressee
- D. Information needed to track the message

T2C11 (A)

What is meant by "check" in a radiogram header?

- A. The number of words or word equivalents in the text portion of the message
- B. The call sign of the originating station
- C. A list of stations that have relayed the message
- D. A box on the message form that indicates that the message was received and/or relayed

Subelement T3 - Radio Wave Propagation

Group T3A - - Radio wave characteristics: how a radio signal travels, fading, multipath, polarization, wavelength vs absorption; Antenna orientation

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T3A01 (C)

Why do VHF signal strengths sometimes vary greatly when the antenna is moved only a few feet?

- A. The signal path encounters different concentrations of water vapor
- B. VHF ionospheric propagation is very sensitive to path length
- C. Multipath propagation cancels or reinforces signals
- D. All these choices are correct

T3A02 (B)

What is the effect of vegetation on UHF and microwave signals?

- A. Knife-edge diffraction
- B. Absorption
- C. Amplification
- D. Polarization rotation

T3A03 (C)

What antenna polarization is normally used for long-distance CW and SSB contacts on the VHF and UHF bands?

- A. Right-hand circular
- B. Left-hand circular
- C. Horizontal
- D. Vertical

T3A04 (B)

What happens when antennas at opposite ends of a VHF or UHF line of sight radio link are not using the same polarization?

- A. The modulation sidebands might become inverted
- B. Received signal strength is reduced
- C. Signals have an echo effect
- D. Nothing significant will happen

T3A05 (B)

When using a directional antenna, how might your station be able to communicate with a distant repeater if buildings or obstructions are blocking the direct line of sight path?

- A. Change from vertical to horizontal polarization
- B. Try to find a path that reflects signals to the repeater
- C. Try the long path
- D. Increase the antenna SWR

T3A06 (B)

What is the meaning of the term "picket fencing"?

- A. Alternating transmissions during a net operation
- B. Rapid flutter on mobile signals due to multipath propagation
- C. A type of ground system used with vertical antennas
- D. Local vs long-distance communications

T3A07 (C)

What weather condition might decrease range at microwave frequencies?

- A. High winds
- B. Low barometric pressure
- C. Precipitation
- D. Colder temperatures

T3A08 (D)

What is a likely cause of irregular fading of signals propagated by the ionosphere?

- A. Frequency shift due to Faraday rotation
- B. Interference from thunderstorms
- C. Intermodulation distortion
- D. Random combining of signals arriving via different paths

T3A09 (B)

Which of the following results from the fact that signals propagated by the ionosphere are elliptically polarized?

- A. Digital modes are unusable
- B. Either vertically or horizontally polarized antennas may be used for transmission or reception
- C. FM voice is unusable
- D. Both the transmitting and receiving antennas must be of the same polarization

T3A10 (D)

What effect does multi-path propagation have on data transmissions?

- A. Transmission rates must be increased by a factor equal to the number of separate paths observed
- B. Transmission rates must be decreased by a factor equal to the number of separate paths observed
- C. No significant changes will occur if the signals are transmitted using FM
- D. Error rates are likely to increase

T3A11 (C)

Which region of the atmosphere can refract or bend HF and VHF radio waves?

- A. The stratosphere
- B. The troposphere
- C. The ionosphere
- D. The mesosphere

T3A12 (B)

What is the effect of fog and rain on signals in the 10 meter and 6 meter bands?

- A. Absorption
- B. There is little effect
- C. Deflection
- D. Range increase

Group T3B - - Electromagnetic wave properties: wavelength vs frequency, nature and velocity of electromagnetic waves, relationship of wavelength and frequency; Electromagnetic spectrum definitions: UHF, VHF, HF

T3B01 (D)

What is the relationship between the electric and magnetic fields of an electromagnetic wave?

- A. They travel at different speeds
- B. They are in parallel
- C. They revolve in opposite directions
- D. They are at right angles

T3B02 (A)

What property of a radio wave defines its polarization?

- A. The orientation of the electric field
- B. The orientation of the magnetic field
- C. The ratio of the energy in the magnetic field to the energy in the electric field
- D. The ratio of the velocity to the wavelength

T3B03 (C)

What are the two components of a radio wave?

- A. Impedance and reactance
- B. Voltage and current
- C. Electric and magnetic fields
- D. Ionizing and non-ionizing radiation

T3B04 (A)

What is the velocity of a radio wave traveling through free space?

- A. Speed of light
- B. Speed of sound
- C. Speed inversely proportional to its wavelength
- D. Speed that increases as the frequency increases

T3B05 (B)

What is the relationship between wavelength and frequency?

- A. Wavelength gets longer as frequency increases
- B. Wavelength gets shorter as frequency increases
- C. Wavelength and frequency are unrelated
- D. Wavelength and frequency increase as path length increases

T3B06 (D)

What is the formula for converting frequency to approximate wavelength in meters?

- A. Wavelength in meters equals frequency in hertz multiplied by 300
- B. Wavelength in meters equals frequency in hertz divided by 300
- C. Wavelength in meters equals frequency in megahertz divided by 300
- D. Wavelength in meters equals 300 divided by frequency in megahertz

T3B07 (A)

In addition to frequency, which of the following is used to identify amateur radio bands?

- A. The approximate wavelength in meters
- B. Traditional letter/number designators
- C. Channel numbers
- D. All these choices are correct

T3B08 (B)

What frequency range is referred to as VHF?

- A. 30 kHz to 300 kHz
- B. 30 MHz to 300 MHz
- C. 300 kHz to 3000 kHz
- D. 300 MHz to 3000 MHz

T3B09 (D)

What frequency range is referred to as UHF?

- A. 30 to 300 kHz
- B. 30 to 300 MHz
- C. 300 to 3000 kHz
- D. 300 to 3000 MHz

T3B10 (C)

What frequency range is referred to as HF?

- A. 300 to 3000 MHz
- B. 30 to 300 MHz
- C. 3 to 30 MHz
- D. 300 to 3000 kHz

T3B11 (B)

What is the approximate velocity of a radio wave in free space?

- A. 150,000 meters per second
- B. 300,000,000 meters per second
- C. 300,000,000 miles per hour
- D. 150,000 miles per hour

Group T3C - - Propagation modes: sporadic E, meteor scatter, auroral propagation, tropospheric ducting; F region skip; Line of sight and radio horizon

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T3C01 (C)

Why are simplex UHF signals rarely heard beyond their radio horizon?

- A. They are too weak to go very far
- B. FCC regulations prohibit them from going more than 50 miles
- C. UHF signals are usually not propagated by the ionosphere
- D. UHF signals are absorbed by the ionospheric D region

T3C02 (C)

What is a characteristic of HF communication compared with communications on VHF and higher frequencies?

- A. HF antennas are generally smaller
- B. HF accommodates wider bandwidth signals
- C. Long-distance ionospheric propagation is far more common on HF
- D. There is less atmospheric interference (static) on HF

T3C03 (B)

What is a characteristic of VHF signals received via auroral backscatter?

- A. They are often received from 10,000 miles or more
- B. They are distorted and signal strength varies considerably
- C. They occur only during winter nighttime hours
- D. They are generally strongest when your antenna is aimed west

T3C04 (B)

Which of the following types of propagation is most commonly associated with occasional strong signals on the 10, 6, and 2 meter bands from beyond the radio horizon?

- A. Backscatter
- B. Sporadic E
- C. D region absorption
- D. Gray-line propagation

T3C05 (A)

Which of the following effects may allow radio signals to travel beyond obstructions between the transmitting and receiving stations?

- A. Knife-edge diffraction
- B. Faraday rotation
- C. Quantum tunneling
- D. Doppler shift

T3C06 (A)

What type of propagation is responsible for allowing over-the-horizon VHF and UHF communications to ranges of approximately 300 miles on a regular basis?

- A. Tropospheric ducting
- B. D region refraction
- C. F2 region refraction
- D. Faraday rotation

T3C07 (B)

What band is best suited for communicating via meteor scatter?

- A. 33 centimeters
- B. 6 meters
- C. 2 meters
- D. 70 centimeters

T3C08 (D)

What causes tropospheric ducting?

- A. Discharges of lightning during electrical storms
- B. Sunspots and solar flares
- C. Updrafts from hurricanes and tornadoes
- D. Temperature inversions in the atmosphere

T3C09 (A)

What is generally the best time for long-distance 10 meter band propagation via the F region?

- A. From dawn to shortly after sunset during periods of high sunspot activity
- B. From shortly after sunset to dawn during periods of high sunspot activity
- C. From dawn to shortly after sunset during periods of low sunspot activity
- D. From shortly after sunset to dawn during periods of low sunspot activity

T3C10 (A)

Which of the following bands may provide long-distance communications via the ionosphere's F region during the peak of the sunspot cycle?

- A. 6 and 10 meters
- B. 23 centimeters
- C. 70 centimeters and 1.25 meters
- D. All these choices are correct

T3C11 (C)

Why is the radio horizon for VHF and UHF signals more distant than the visual horizon?

- A. Radio signals move somewhat faster than the speed of light
- B. Radio waves are not blocked by dust particles
- C. The atmosphere refracts radio waves slightly
- D. Radio waves are blocked by dust particles