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# Technician Question Pool

## July 2018 to June 2022

### The MORE Project

<http://n2re.org/m-o-r-e-project>

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# Radio Wave Characteristics

## No-Nonsense pages 27 - 30

### Properties of Radio Waves and Propagation Modes

Amateur radio operators must always try to use the correct frequency and mode when communicating. To do this, we need to know how radio signals travel from one point to another, and what effects frequency, our antennas and even our location have on signal propagation.



# T3C01

Why are direct (not via a repeater) UHF signals rarely heard from stations outside your local coverage area?

- 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 reflected by the ionosphere
- D. UHF signals are absorbed by the ionospheric D layer



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# T3C11

Why do VHF and UHF radio signals usually travel somewhat farther than the visual line of sight distance between two stations?

- A. Radio signals move somewhat faster than the speed of light
- B. Radio waves are not blocked by dust particles
- C. The Earth seems less curved to radio waves than to light
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What should you do if another operator reports that your station's 2 meter signals were strong just a moment ago, but now they are weak or distorted?

- A. Change the batteries in your radio to a different type
- B. Turn on the CTCSS tone
- C. Ask the other operator to adjust his squelch control
- D. Try moving a few feet or changing the direction of your antenna if possible, as reflections may be causing multi-path distortion



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# T3A10

What may occur if data signals arrive via multiple paths?

- A. Transmission rates can 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



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# T3A05

When using a directional antenna, how might your station be able to access 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



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Which of the following effects might cause radio signals to be heard despite obstructions between the transmitting and receiving stations?

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





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# T3A06

What term is commonly used to describe the rapid fluttering sound sometimes heard from mobile stations that are moving while transmitting?

- A. Flip-flopping
- B. Picket fencing
- C. Frequency shifting
- D. Pulsing



# T3A06

What term is commonly used to describe the rapid fluttering sound sometimes heard from mobile stations that are moving while transmitting?

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# T3A02

Why might the range of VHF and UHF signals be greater in the winter?

- A. Less ionospheric absorption
- B. Less absorption by vegetation
- C. Less solar activity
- D. Less tropospheric absorption



# T3A02

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# T3B02

What property of a radio wave is used to describe 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



# T3B02

What property of a radio wave is used to describe its polarization?

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- D. The ratio of the velocity to the wavelength



# T3A04

What can happen if the 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. Signals could be significantly weaker
- C. Signals have an echo effect on voices
- D. Nothing significant will happen



# T3A04

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# T3A03

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

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



RWC2 Q11 of 18

FCC Tech 7/18 to 6/22  
Radio Wave Properties

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# T3A03

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

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# T3C04

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

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



RWC2 Q12 of 18

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# T3C03

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

- A. Signals from distances of 10,000 or more miles are common
- B. The signals exhibit rapid fluctuations of strength and often sound distorted
- C. These types of signals occur only during winter nighttime hours
- D. These types of signals are generally strongest when your antenna is aimed west



RWC2 Q13 of 18

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# T3C07

What band is best suited for communicating via meteor scatter?

- A. 10 meter band
- B. 6 meter band
- C. 2 meter band
- D. 70 centimeter band



RWC2 Q14 of 18

# T3C07

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- B. 6 meter band**
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- D. 70 centimeter band



# T3C06

What mode 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 layer refraction
- C. F2 layer refraction
- D. Faraday rotation



RWC2 Q15 of 18

# T3C06

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- C. F2 layer refraction
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*Note: The FCC question pool answer has slightly different wording than the one in the No Nonsense book.*



# T3C08

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



RWC2 Q16 of 18

FCC Tech 7/18 to 6/22  
Radio Wave Properties

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RWC2 A16 of 18

FCC Tech 7/18 to 6/22  
Radio Wave Properties

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# T3A13

What weather condition would decrease range at microwave frequencies?

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



RWC2 Q17 of 18

# T3A13

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# T3A12

How might fog and light rain affect radio range on the 10 meter and 6 meter bands?

- A. Fog and rain absorb these wavelength band
- B. Fog and rain have little effect on these bands
- C. Fog and rain will deflect these signals
- D. Fog and rain will increase radio range



RWC2 Q18 of 18

# T3A12

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A non-profit initiative by the IEEE and ARDC to increase the numbers of youth (12-18) and non-males in Amateur Radio. Participants earn FCC licenses and receive free 2-way radios.

For MORE information: [n2re.org/m-o-r-e-project](http://n2re.org/m-o-r-e-project)  
Dr. Rebecca Mercuri, Grant Administrator, [rtmercuri@ieee.org](mailto:rtmercuri@ieee.org)

