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CWNA-109
Certified Wireless Network Administrator

Questions & Answers PDF

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Question: 1

An RF signal sometimes bends as it passes through some material other than free space. What is the term that describes this behavior?

A. Refraction
B. Warping
C. Scattering
D. Reflection

Answer: A

Explanation:
Refraction is the bending of an RF signal as it passes through a medium with a different density than free space. This can cause the signal to change its direction and speed, which can affect the accuracy and reliability of wireless communication. Refraction is influenced by factors such as temperature, humidity, and atmospheric pressure12. Reference: CWNA-109 Study Guide, Chapter 2: Radio Frequency Fundamentals, page 72; CWNA-109 Study Guide, Chapter 2: Radio Frequency Fundamentals, page 67.

Question: 2

What can an impedance mismatch in the RF cables and connectors cause?

A. Increased range of the RF signal
B. Fewer MCS values in the MCS table
C. Increased amplitude of the RF signal
D. Excessive VSWR

Answer: D

Explanation:
VSWR stands for Voltage Standing Wave Ratio, which is a measure of how well the impedance of the RF cable and connectors matches the impedance of the transmitter and the antenna. Impedance is the opposition to the flow of alternating current in an RF circuit, and it depends on the frequency, resistance, capacitance, and inductance of the components. A perfect impedance match would have a VSWR of 1:1, meaning that all the power is transferred from the transmitter to the antenna, and none is reflected back. However, in reality, there is always some degree of mismatch, which causes some power to be reflected back to the transmitter, creating standing waves along the cable. This reduces the efficiency and performance of the wireless system, and can also damage the transmitter. Excessive VSWR can be caused by using poor quality or damaged cables and connectors, or by using components that have different impedance ratings123. Reference: CWNA-109 Study Guide, Chapter 2: Radio

Frequency Fundamentals, page 90; CWNA-109 Study Guide, Chapter 2: Radio Frequency Fundamentals, page 86; CWNP website, CWNA Certification.

Question: 3

What factor does not influence the distance at which an RF signal can be effectively received?

A. Receiving station’s radio sensitivity
B. Receiving station’s output power
C. Transmitting station’s output power
D. Free Space Path Loss

Answer: B

Explanation:
In wireless communication, several factors influence the effective reception of RF signals, including the receiving station's radio sensitivity, the transmitting station's output power, and free space path loss. However, the receiving station's output power does not influence the distance at which an RF signal can be effectively received. The key factors that impact signal reception distance are:
Receiving Station's Radio Sensitivity: This refers to the lowest signal strength at which the receiver can process a signal with an acceptable error rate. Higher sensitivity allows for better reception at greater distances.
Transmitting Station's Output Power: This is the power with which a transmitter sends out a signal. Higher output power can extend the range of transmission, making it easier for distant receivers to detect the signal.
Free Space Path Loss (FSPL): FSPL represents the attenuation of radio energy as it travels through free space. It increases with distance and frequency, reducing the signal strength as the distance from the transmitter increases.
The output power of the receiving station is related to how strong a signal it sends out, not how well it can receive or process incoming signals. Therefore, it does not affect the reception distance of incoming RF signals.
Reference:
CWNA Certified Wireless Network Administrator Official Study Guide: Exam PW0-105, by David D. Coleman and David A. Westcott.
RF fundamentals and RF design considerations in wireless communication systems.

Question: 4

A WLAN transmitter that emits a 50 mW signal is connected to a cable with 3 dB loss. If the cable is connected to an antenna with 9dBi gain, what is the EIRP at the antenna element?

A. 26 dBm
B. 13 dBm
C. 23 dBm

D. 10 dBm

Answer: C

Explanation:
To calculate the EIRP at the antenna element, we need to add the transmitter output power, subtract the cable loss, and add the antenna gain. All these values need to be converted to dBm first, if they are not already given in that unit. In this case, we have:
Transmitter output power = 50 mW = 10 log (50) dBm = 16.99 dBm Cable loss = 3 dB Antenna gain = 9 dBi
EIRP = Transmitter output power - Cable loss + Antenna gain EIRP = 16.99 - 3 + 9 EIRP = 22.99 dBm
Rounding up to the nearest integer, we get 23 dBm as the EIRP at the antenna element12. Reference: CWNA-109 Study Guide, Chapter 2: Radio Frequency Fundamentals, page 92; CWNA-109 Study Guide, Chapter 2: Radio Frequency Fundamentals, page 88.

Question: 5

In a long-distance RF link, what statement about Fade Margin is true?

A. A Fade Margin is unnecessary on a long-distance RF link if more than 80% of the first Fresnel zone is clear of obstructions.
B. The Fade Margin is a measurement of signal loss through free space and is a function of frequency and distance.
C. Fade Margin is an additional pad of signal strength designed into the RF system to compensate for unpredictable signal fading.
D. The Fade Margin of a long-distance radio link should be equivalent to the receiver’s low noise filter gain.

Answer: C

Explanation:
Fade Margin is an additional pad of signal strength designed into the RF system to compensate for unpredictable signal fading. It is the difference between the receiver’s sensitivity and the actual received signal level. A higher Fade Margin indicates a more robust link that can withstand interference, attenuation, or other factors that may reduce the signal strength. A lower Fade Margin means that the link is more susceptible to failure or performance degradation. Fade Margin is usually expressed in decibels (dB) and can be calculated by subtracting the receiver sensitivity from the received signal level. Reference: 1, Chapter 2, page 51; 2, Section 2.1