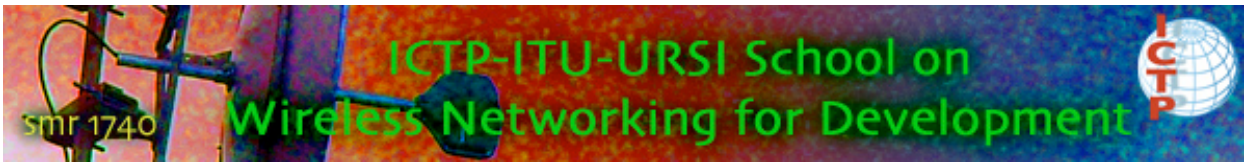

Competition

School on Wireless Networking for Development
February 2006

Group number: _____ **Group Name:** _____

Group members: _____

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For final antenna competition:

Can antenna label: _____

Channel #: _____

Center Freq.: _____ **GHz**

1. A plane wave circularly polarized

- is composed of two linearly polarized wave planes
- has nothing in common with common plane waves

2. If you want to use a regular telephone on a VOIP network, in addition to the phone, you would need:

- An RJ-11 jack
- An analog telephone adapter(ATA)
- a 50V power outlet
- a phone scratch card for a VOIP provider

3. Before setting up a Voice-over-IP system in your region/country, what should you do before anything else?

- Design the network, including what VOIP equipment you will need, such as an ATA, PSTN Gateway, etc.
- Decide which VOIP protocol you are going to use (SIP, H.323, MGCP, etc.)
- Determine what sort of network connection would be best to use, such as ISM wireless, VSAT, DSL, etc.
- Check the regulations regarding the installing and operating of telecom equipment in your home country/region.

4. When choosing antennas for WiFi, which of the following statements is true?

- It is not very important which polarization to use, as long as it is the same at both ends of the link.
- The largest dimension of the antenna specifies the polarization.
- For many feed-reflector structures rotating the feed without changing the reflector is enough to change the polarization.
- In a wire antenna, the long dimension of the wire feed corresponds to the polarization.

5. You have a dish antenna shaped like this:

Which direction should you align first?

- **o** Vertical
- **o** Horizontal
- **o** Doesn't matter

6. When setting up a wireless link of approximately 1 Km, what is the approximate free space loss?

- **o** 1 dB
- **o** 10 dB
- **o** 100 dB
- **o** 1000 dB

7. When setting up a wireless link of approximately 10 Km, what is the approximate free space loss?

- **o** 3 dB
- **o** 90 dB
- **o** 120 dB
- **o** 150 dB
- **o** > 150 dB

8. Name two devices that can be used to detect a cordless phone that is causing interference with an 802.11g network:

- **o** Wispy
- **o** Kismet
- **o** Spectrum analyzer
- **o** Can antenna + Netstumbler

9. Name a device that can be used to display clients associated with an access point:

- o Wispy
- o Kismet
- o Spectrum analyzer
- o Can antenna + Netstumbler

10. When performing a site survey, you notice busy networks occupying channels 1, 3, and 11. Which of the following channels would be a good choice for your access point?

- o Channel 1
- o Channel 2
- o Channel 6
- o Channel 9
- o Any of the above

11. When using a wireless network, which of the following provides the strongest protection of sensitive data?

- o Using a "closed" access point (turning off beacons)
- o MAC filtering
- o An SSL tunnel
- o Choosing an ESSID that is not easy to guess

12. What is one difference between a passive and active network scanner?

- o A passive scanner captures less data than an active scanner.
- o An active scanner is completely silent, while a passive scanner is easily detected.
- o Active scanners cannot detect 802.11 frames, but passive scanners can.
- o Passive scanners do not work well with GPS systems.

13. A radiated electromagnetic field strength in free space decreases with the distance from the antenna as:

- o d^2
- o d^3
- o d^4

14. A radiated electromagnetic field strength in a densely populated urban environment decreases with the distance as

- o d^2
- o d^3
- o d^4

15. 802.11b standard uses a

- o Frequency Division full duplex channel
- o Frequency Division half duplex channel
- o Time Division half duplex channel
- o Time Division full duplex channel

16. Which of the following will allow voice transmission over an 802.11b network

- o Push to Talk connected to the speaker
- o Software solution that takes advantage of the computer audio card
- o Using the RTP protocol
- o Using a special Voice Over IP Gateway

17. A good telecommunications ground can be accomplished by

- o Connecting to the barbed wire fence
- o Connecting to the lamp post
- o Connecting to the hot water plumbing
- o Connecting to a 2m long copper rod sunken into the ground

18. You are trying to use a can antenna to connect to a 24 dBi parabolic dish at a distance of 1 Km with clear line of sight. Radios on each side of the link transmit at 20 dB, and the dish is mounted using horizontal polarization. The received signal strength is very weak, and there is very low noise indicated by your site survey tool. Assuming that all hardware components are functioning properly, what can you do to improve the link?

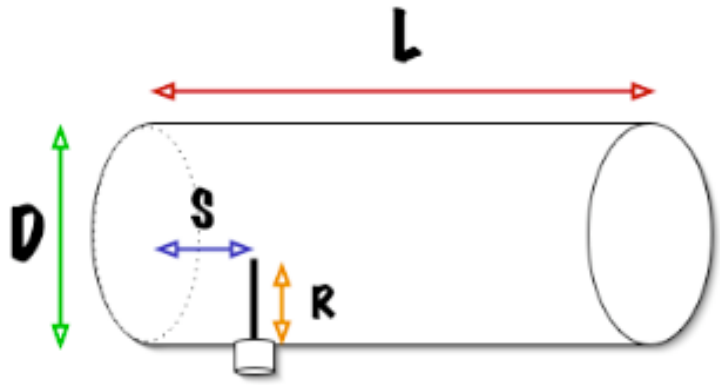
- o Trim the wire inside the can
- o Use a larger can
- o Rotate the can 90 degrees
- o Change the channel
- o Add an amplifier between the radio and the antenna

19. You have a 10Km 802.11b point-to-point link that works well at night, but degrades during the daytime. On a sunny day, your site survey tool indicates very low noise and a received signal strength of about -82 dBm. The sensitivity of your radio cards are rated for 11 Mbps at -82 dBm. What can you do to improve the link?

- **o** Use a higher gain antenna on either side of the link
- **o** Use higher power radios
- **o** Add an amplifier to both sides of the link
- **o** Use radios with greater sensitivity
- **o** Any of the above

20. What is the function of a pigtail?

- **o** It acts as a high-pass filter in an antenna system
- **o** It makes it possible to connect a radio or access point to an external antenna
- **o** It reduces harmonics and spurious emissions created by the radio
- **o** It increases the gain of an antenna
- **o** It serves no useful purpose



$$\lambda_G = \frac{\lambda}{\sqrt{1-\left(\frac{\lambda}{1.706D}\right)^2}} \qquad S = 0.25\,\lambda_G$$

For 2447 GHz (ch 8, λ=12.25) **D = 90mm** **L = 15.3cm** **R = 3.06cm** **S = ???**

21. Given the diagram and given values, what is the value of S?
    - o 6.0 cm
    - o 2.53 cm
    - o 5.07 cm
    - o 10.14 cm
    - o 3.06 cm