

8-8. longer bandwidth.

- 1-1. Analog transmission \rightarrow analog transmission with coding \rightarrow digital transmission.
- 1-2. cellular system, mobile management, mobile IP, Wi-Fi, WiMAX, ad hoc network, wireless network security, wireless personal data area network, sensor network, Internet of things, software defined network.
- 2-1. Wired media needs cable or optical fibers while wireless media needs atmosphere.
- 2-2. Licensed band is held by the ITU-R and is auctioned.
- 2-3. Terrain, operating frequency, moving speed of mobile terminal.
- 2-4. Reflection occurs when the blockage's size is larger than the wave length of the electronic wave. Diffraction occurs when the route is blocked by some sharp edges. Scattering occurs when the number of blockage is large and the size of blockage is smaller than the wave length.
- 2-5 Indoor: reflection, diffraction and scattering. Outdoor: reflection and diffraction.
- 2-6. $\frac{P_r}{P_t} = G_t G_r \cdot \frac{h^2 h_m^2}{d^4}$
- 2-7. free space modeling: $10 \lg P_r = 10 \lg P_t - 20 \lg d$
2-ray modeling: $10 \lg P_r = 10 \lg P_t - 10 \lg(d)$
- 2-8. the change of signal power because of the change of location.
- 2-9. $f_{d,n} = f_d = f_m \cos \theta = \frac{v}{c} f_c \cos \theta$
- 2-10. spatial atmosphere: $n=2$.
- 2-11. multipath fading: different signals arrive with different distance, time and phase.
Doppler-effect: The movement of transmitter toward or backward from base station.

8-26. a set of can access multiple users

2-12. Rayleigh:

$$f_{ray}(r) = \frac{r}{\sigma^2} \exp\left(-\frac{r^2}{2\sigma^2}\right), r \geq 0$$

Ricean:

$$f_{rice}(r) = \frac{r}{\sigma^2} \exp\left(-\frac{r^2 + a^2}{2\sigma^2}\right) I_0\left(\frac{ar}{\sigma^2}\right), r \geq 0, a \geq 0$$

2-13.

$$\mu(x) = \int_0^x x f_{ray}(x) dx = \sigma \sqrt{\frac{x}{2}}$$

3-1 2G: TDMA \rightarrow 3G: CDMA

3-2. the backbone of the cellular concept

3-3. two or more base stations.

3-4. the entire network coverage area is

divided into cells based on the principle of frequency use.

3-5. VLR contains a copy of most of the data stored at HLR.

3-6.

3-7. faster and more efficient

3-8. the transition from GSM to CDMA.

3-9. The inter-SGSN routing update is the most complicated routing update. the MS changes from one SGSN area to another, and it must establish a new connection to a new SGSN.

3-10. CDMA 2000, WCDMA, TD-SCDMA

3-11. CDMA

3-12. EDGE contains GPRS 2.5G tech rates in the order of 200 kbits/s, just as the original UMTS WCDMA versions, and thus formally fulfills the IMT 2000 requirements on 3G systems.

3-13. multiplexing method. In this context, multiplexing is provided by the physical layer.

3-14. 3G-cellular networks towards a uniform architecture for all-IP wireless networks.

5-1. Mobile compute cloud, mobile Website
mobile web initiative.

6-1. monitor the signal strength changes. Once it exceed the threshold, switch begins. mobile station begin to recognize the new base station. After several interaction, the new link was established

6-2. The handoff procedure in which the mobile unit adjacent cellular system which is controlled from the home network to the care-of by same MTSO is referred as intra handoff.

6-3. MAHO: Mobile station monitor the signal strength and network make the switch choice
MCHO: network monitor the signal strength and launch the switch.

6-4. soft handoff: can be terminated abnormally
hard handoff: at any moment in time one call uses only one channel

Disadvantages: soft switch: require more complex hardware in the phone. Hard switch: ping-ponging effect may occur.

6-5. The signal strength between base unit and mobile unit can be monitored.

6-6. a macroscopic mobility model.

6-7. straight-line model: user's behaviour is linear

6-8. Intra-switch: a mobile signal finds other cell within its system to which it can transfer the call then it uses Intra system handoff.

6-9. The smaller the cell is, the higher the handoff rate is.

6-12. Service delivery. Cellular Network search for the available access interface for called user. If succeed, caller will send a feedback to end this service delivery.
Source

6-10. transfer training signal data/match the movement history for selecting k largest probability reference points.

6-11. Calculate the center of gravity.
7-1. Mobile IP enables IP datagrams to mobile nodes.

7-4. The home agent redirects datagrams. address by constructing a new IP header that contains the mobile node's care-of address as the destination IP address.

7-5. priority register/

7-6. the only change to the Registration Request packet is the additional 'T'

7-7. If a foreign or home agent that does not support reverse tunnels receives a request with the 'T' bit set, the Registration Request fails.

7-8. PCF - point coordinations

7-9. DCF - Distributed coordination function.

7-10. backoffTime = random() * aSlotTime

8-1 DIFS - DCF Interframe spacing.
SIFS → shortest Interframe spacing.

CTS - Clear To Send

DIFS = SIFS + 2 * slotTime (/math)

PIFS - PCF Interframe Space

PIFS = SIFS + Slot time / math.

8-2. Enhanced distributed channel access.

Ad hoc mod: allows each device to communicate directly with each other. There is no Accessory Point Controlling device communication.

The following 2 conditions are met,

- 8-8. longer bandwidth.
- 8-9. PLCP PDU are in 802.11 standards so far.
- 8-10. 802.11 defines the signal character and modulation ways.
- 8-11. code-division, frequency-division and time division transfer data bits to receiver by division.
- 8-12. Unicast of any to be transfered WiFi; 8-27. making the difficulty of attacking wireless LAN and to attack the limited local area network is very difficult
- 8-14. logical abstraction which limits the need for physical carrier - sensing to save power.
- 8-15. QoS is supported in 802.11 by means the quality of service via bit rate.
- 8-16. synchronization to full full time any users.
- 8-17. Time synchronizing
- 8-18. presence of wireless LAN not PLCP.
- 8-19. Clock synchronization.
- 8-20. The power cannot be inefficient to the mobile devices, so we need power Management
- 8-21. Awake and sleep switch every small time period; in ad-hoc mode, the frequency may be higher to suit the high mobility.
- 8-22. Management frame with no frame body
- 8-23. Entirely driven by STA.
- 8-24. fragment it to use send to transit.
- 8-25. The MAC header contain the message source and destination.

- 8-16. a set of can access multiple user each user can take multiple user terms.
- 8-27. 802.11a standard is a follow-on standard for IEEE 802.11b, which adopts OFDM while b adopts DSSS.
- 8-28. Limited local area networks.
- 8-30. specific modification.
- 8-31. 24-bit Initialization Vector (IV) to form the RC4 key.
- 8-32. data confidentiality comparable to that of a traditional wired network.
- 8-33. With a passive scan, the client radio listens on each channel for beacons sent periodically by an AP
- 8-35. depends on the specific combination
- 9-1. WiMAX has QoS guarantee, high transmission speed, variety of business adopted advanced tech such as OFDM, OFDMA/AAS/MIMO.
- 9-2. the transport convergence sublayer is responsible for transmitting the convergence sublayer data unit to the received MAC layer data unit.
- 9-3. a number of orthogonal subchannels.
 - 10.1 One is the traditional ad hoc mode
 - 10.2. The following 2 conditions are met, then mode i and j can be transfered. No

- 10.4. the transmission rate of each node must be strictly controlled and carefully scheduled
- 10.5. existence of hidden terminal and exposed terminal will cause the disorderly contention and waste of ad hoc network time slot resources, increase the probability of data collision, and seriously affect the network throughput, capacity and data transmission delay.
- 11-1. Working station PSK.
- 11-2. Web controlled access based on the interface
- 11-3. WEP: on side attack.
WAPI: a mechanism is added to realize the recognition of the user's identity
- 12-1. bluetooth 4.0 is the lowest version of 2012. low power / dual mode / the lower of power consuming and effective area is within 60 meter.
- 12-2. page, page scan, inquiry, inquiry scan.
- 12-3. master response, slave response.
- 12-4. inquire response and connection / the state transition from inquiry scan.
- 12-5. RFID TAG.
RFID TAG READER.
- 12-6. the energy supply of tag.
- 12-7. school card, RFID, etc.
- 13-1. WSN is built of nodes.
- 13-2. hardware of a sensor node generally includes 4 parts
- 13-3. online monitoring system for transmission lines.
- 13-4. the sensor network nodes broadcast their status to the surroundings and receive status from other nodes to detect each other
- 13-5. Communication distance of the nodes in the network is generally short.
- 13-6. The transmission rate, ambient energy harvesting.
- 13-7. Ambient energy harvesting.
- 14-1. software defined radio, cognitive radio
- 14-2. good security, low cost, accurate positioning
- 14-3. bluetooth low energy.
- 14-4. monitors its own performance control
- 14-5. BAN devices embedded inside the body.
- 14-6. military and space applications
- 14-7. Wireless identification system.
- 15-1. Directly programmable / agile / programmatically / open-standards.
- 15-2. openflow, vshield, DNS, NAT, DHCP
- 15-3. Openlight, protocol oblivious forwarding POF
- 15-4. OCP
- 15-5. LEAP - fug Path design.
- 16-1. Sensor & electronic machinery
- 3. video camera 4. GPS. 5. microphone
- 6. sonar 7. WiFi
- 17-1. MIMO refers to multiple input multiple output while SISO means single input
- 17-2. Space-diversity, space-multiplexing
- 18-3. WiFi DAS, multi-user MIMO
- 19-4. huge-loss of diversity
- 21/22. security value / of account security function.