Chapter 1. 冯飞霄 514030423) 10组

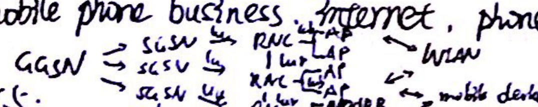
1. electromagnetic induction → electromagnetic induction wave → oscillator → transmission → modulation and communication satellite → NMT GSM WLAN

2. cellular system, Mobile Management, mobile IP, Wi-Fi, Wimax, self-organizing Network, Wireless Network security, wirless personal Area Network, Sensor Network, Internet of things, Software Defined Network

Chapter 2.

1. wired: wire, reliable. low data rate. high cost wireless: unstable. high date rate. low cost
2. Lisensed: 5GHz. WLAN. 28 to 60GHz. LMDS Unlicensed band: ISM. UNII
3. Frequency. environmental noise. weather and terrain.
4. reflection: the obstacle size is larger than wavelength diffraction: sharp objects between transmitter and receiver Scattering: the obstacle is equal or smaller than wavelength and huge number
5. Indoor: affected by reflection and diffraction Outdoor: affected by reflection from buildings. ground. diffraction from roof. LOS path.
6. $P_r = G_t G_r P_t / L$ $G = 4\pi A_e / \lambda^2$ $\frac{P_r}{P_t} = G_t G_r h_t^2 h_m^2 / d^4$
7. free space: $10\lg P_r = 10\lg P_0 - 20\lg d$ $L_{fdB} = 32.45 + 20\lg f_c$ MHz $+ 20\lg d$ km two-ray: $10\lg P_r = 10\lg P_0 - 40\lg d$ $L_p = L_0 + 10\lg D + X$
11. Multipath / small-scale fading: different paths. different period of time and phase and after stacking result in fading
Doppler shift and spectrum: position movement of the wave source and observer cause frequency change.
12. Both describe multipath. Ricean a strong wave in N paths.
8. Cause: a large obstruction between transmitter and receiver. decrease power. like shadow and distance change. Effect: Doppler effect. shadow effect
9.
10. Macro-cell: Urban $L_{dB} = A + B\log_{10}R - E$ Suburban: $A + B\lg R - C$ Open $A + B\lg R - D$
$A = 69.55 + 26.16\lg f_c - 13.82\lg h_b - a(h_m)$ $B = 44.9 - 6.55\lg h_b$ $C = 5.4 + 2\lg^2\frac{f_c}{28}$ $D = 40.94 + 4.78\lg^2 f_c - 18.33\lg f_c$
small city: $a(h_m) = (1.1\lg f_c - 0.7)h_m - (1.56\lg f_c - 0.8)$ big city: $a(h_m) = \begin{cases} 8.29\lg^2 1.54h_m - 1.1 & f_c \le 200M \\ 3.2\lg^2 11.75h_m - 4.97 & f_c \ge 200M \end{cases}$
Micro-cell: $L = \begin{cases} 10n_1\lg r + L_1 & r \le r_b \\ 10n_2\lg(r/r_b) + 10n_1\lg r_b + L_1 & r > r_b \end{cases}$ L_1 = reference path loss at $r = 1m$ r_b = breakpoint distance n_1 path loss exponent $r \le r_b$ n_2 path loss exponent $r > r_b$
13. $V(t) = \frac{v_f}{c}\cos\theta(t)$ base station sent a f. the mobile terminal received a $f + V(t)$.
14. Rayleigh: $f(x) = \frac{r}{\sigma^2} e^{-\frac{r^2}{2\sigma^2}}$ Ricean: $f(r) = \frac{r}{\sigma^2} e^{-\frac{r^2+a^2}{2\sigma^2}} I_0(\frac{ar}{\sigma^2})$
15.

Chapter 3.4

1. GSM and CDMA → 3G TD-SCDMA. WCDMA. CDMA2000.
2. C = MIN $P_{rdB} = P_{0dBm} - 10k\lg\frac{d}{d_0}$
3. $\frac{S}{I} = \frac{R^{-k}}{2(D-R)^{-k} - 2D^{-k} + 2(D+R)^{-k}}$
4. base station: a station to deal with the requirements of devices. Uplink: mobile phone send downlink: base station send location area: base station cover cell: area serviced by a radio mobile switch centers: connect different base station
5. current wireless network: HLR. BSS. UTRAN VLR. VLR: save the information in the area for a short time
HLR: contain the information in the locating area.
6. Mobile switch center and mobile host.
7. speed, voice quality. wide range.
8. CDMA. have a channel to communicate with interfering
9. SGSN/GGSN: Packet service. which are data management. ; wireless source management ; route. MSC/GMSC/HLR: channel dispose. user data management.
10. WCDMA. CDMA2000. TD-SCDMA
12. WCDMA: Without GPS. BW=5M. Rate 3.84Mcps. 1940~1955MHz uplink. 2130-2145 MHz downlink
CDMA2000: GPS. BW: 1.25MHz. Date 1.2288Mcps 1920-1935MHz uplink. 2110-2125MHz downlink
TD-SCDMA: GPS. BW=1.6MHz. Rate. 1.28Mcps. 1880-1920 MHz uplink. 2300-2400MHz downlink.
11. high spectral efficiency. good voice quality. low cost. low electromagnetic radiation. large capacity
13. mobile phone business. internet. phone TV. wireless searching. phone music and so on.
14. 

It's 14 of chapter 6. Sorry I screwed up when I wrote later.

Chapter 5.

1. mobile cloud computing. mobile web. mobile pervasive computing

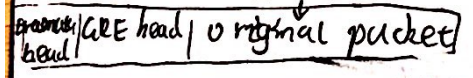
Chapter 6.

1. initial → call → paging → receive → paging → switch.
2. intra handoff: don't change ...

3. MCHO: network decide NCHO: ↳ decide itself MAHO: mobile phone give the data to network for decision
4. hard: one channel soft: when a connection established, the relationship with source broken
5. Base station sends a message and wait for the feed-back. Interval: $2^n T$
6. Straight line: base station connects to the mobile phone directly.
Fluid flow: wait for the flow
7.
8. intial → now links → data rate control
9.
10. The rate will be down 11. control tier and micro area
12. Detect if it's a new area → send a message → service
13. Time-based:
14. In the chapter 3.4 part

Chapter 7

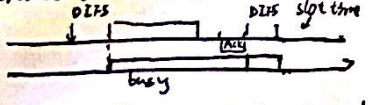
1. To match a same internet as desktop. 2. MN: a changeny node HA: a router on the link route with location
3. tunnel packet as an intermediary FA: a router on the mobile node transferring new location
4. homeown node → HA → Internet → FA → MN toHA. coA: An IP of the transferring node
5. register with home agent → make binding with a limited lifetime. CN: communication object of a node
6. To show the link is end, make sure other route to transmission
7. HA response and MN ~~to~~ know how to link. 8. deliver to HA
9. The router may not route the register to the right HA.
10. IP in IP: directly encapsulated to be a new IP packet
Min encapsulation: the new IP head is inserted in the old IP head and payload.
GRE: original packet 11. It transport the bag to the end directly.



12. Example:
13. Outer agent → Internet → HA → Home node.

Chapter 8

1. DCF: Distributed coordination Function PCF: Point coordination Function DIFS: Distributed Inter-frame spacing
SIFS: shortest inter-frame spacing PIFS: SIFS + slot time.
2. Get ~~pression~~ permission through RTS/CTS and forbid neighbor nodes. then can transfer.
3. IEEE 802.11e: define WLAN quality-of-service. EDCA: enhance distributed channel access
HCF: hybrid coordination access.
4. H ad-hoc is "for this purpose only" net. 5.
6. 802.11 works at TCP/IP network interface layer. and it is the link layer protocol with in the TCP/IP
7. LLC. MAC: data link sublayers. PLCP. PMD: physical sublayers.
8. Radio: wider BW, powerful data transfer function.
9. PLCP. PMD 10. 802.11 defines the modulation ways.
11. code-devision. frequency-devision and time devision transfer data bits to receiver by division.
12. Unicast transmitted over WIFI are highe than multicasts



14. NAV is a logical abstraction. limiting the need for physical carrier-sense to save power
15. 802.11. By measuring quality of service. 16. To fulfill time-synchronization.
17. Timing synchronizing 18.
19. Yes. It's to do with the power management protocol.
20. Because power is necessary to the mobile device. 21. make the receiver and transmitter be awake and asleep every period.
22. ATIM: management frame DTIM: delivery traffic indication message. save power. Ad-hoc, time will be shorter.
23. driven by STA 24. the length may not suit for the packet.
25. 25. contain the source and destination 26. network

29. It makes up a tunnel which is encoded in SSH. 马飞宵 5140309231 Group 10组
30. Can't ~~provide~~ provide enough security.
31. If the decryped text matches original text, the access point and station store WEP key key
32. WEP: demand of keys which hard for cracking MAC: whitelist blacklish; Captive portals: bonding between network operation and content providers
33. Active: client transmits probe request and listens for a probe response. Passive: client listens on each channel for beacons
34. To be a special layer
35. Valid station, semi-mobile station. mobile station combine into a Basic Servic Set.

Chapter 9.

1. long distance. high speed. stability
2. WMAN-SC WMAN-SCa. WMAN-OFDM. WMAN-OFDMA
3. Give a channel into many orthogonal sub-channels and using modulation on each channel for different users.

Chapter 10.

1. Infrastructure: pre-deployed. ad-hoc: self-organized system.
2. Use DSR to achieve the discovery, reply and discaching of route.
3. Some devices can't receive data in the area.
4. RTP/RCTP can provide condition
5. hidden: a node is visible from a wireless ~~accep~~ access point, but not from other nodes communicating with AP.
   Exposed: covered by sending spots

Chapter 11

1. IV + secret key → WEP seed → PRNG → Key stream → Plaintext → Ciphertext.
2. supplicant send EAPOL Start → authentication asks for identity information → supplicant reply → authentication sends it to AS → RADIUS detect → result
3.

Chapter 12

1. Transmission distance. energy consumption 2. Active state. Sniff state. hold state. park state
3. reader: communication. receive commands electronic tag: communication
4. Chip. antenna design. packet. tag application.
5. Manufacturing. Logistics. Medical

Chapter 13:

1. sensor network ~~y~~ give data to base station and monitoring station, then process and send to outside devices
2. each element ~~prodive~~ provide different function
3. Smart dust: military application, medical application; long distance supervision
4.
5. data sent to the station every second
6. the power limit and power self organization
7.

Chapter 14:

1. frequency identification 2. sensing. network and communication

4. change parameters by using artifical intelligence technology ~~make sth~~

5. transmit by human body. Medical insurance, wireless access, military and so on.

Chapter 15

1. Software defined networking programmable. network control can be ~~de~~ separated ~~spe~~ from forwa

2. Judging forward strategy ~~b~~ through control center.

3. Traffic visualization. cloud security.

4. Judging forward strategy through control center.

Chapter 16. 17. 18.

1. Camera. infrared module. ultrasonic module. sensor. wireless network

2. Leap-Frog path design. real-time indoor mapping. fully distributed Scalable smoothing and mapping

Leap-frog path design: let some cars move ~~ou~~ out a special. fixed way.

Chapter 19.

1. Mimo : more channels, use multidiameter effect to increase the rate of information transfer.

2. → encode interleaving ~~mixed~~ → modulated → space-time coding → beamforming upsample

← decode deinterleaver ← demodulated ← space-time decoding ← envelope detection match filter down-sample. symbol synchronization Frame synchronization channel estimate

3. Space-diversity: decrease BER.
Space-multiplexing: increase the rate of information

4. distributed MIMO, multiuser MIMO. MIMO network.
distributed Antenna system is made up of the center processor and remote antenna unit. This kind of technology combining MIMO make up the distributed MIMO

Chapter 21. 22.

1. The value fluctuates a lot. Can be steal. Good for privacy.

2. finder graphics. delimiters. positioning graphics correcting graphics.