

UNIVERSITY OF CALIFORNIA, LOS ANGELES  
CS M117

CS M117 Student name Michael Zhang DIS:

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**Pre-laboratory HW #2. (Due 10/11)** (HW must be typed)

**Bluetooth Communications**  
**(Lecture 3 + Reading 2)**

**Section A:**

1. (4) Wireless nets:

- (a) What is the main similarity between a Wireless LAN and an Ad Hoc network
- (b) What is the main difference?

(a) They are both wireless networks that allow for data communication between different devices

(b) An ad hoc network does not require any sort of base/central station – each node with in the network is able to act as both a sender and a reciever

2. (2) Why is multihopping used in Ad-Hoc nets?

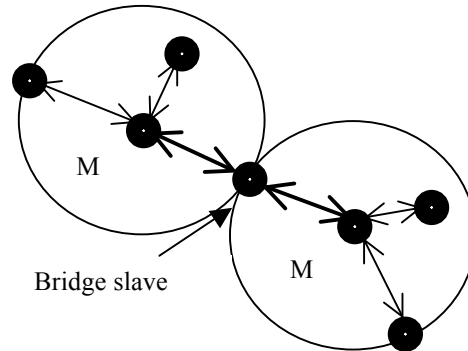
This allows messages to travel futher than the distance of one piconet. It also allows the network to maximize its utilization and efficiency.

3. (1) What is the principal difference between connectionless communication and connection-oriented communication? (See Reading 1).

A connection oriented service is modeled after the telephone system, the user must first establish a connection, use a connection then release it. Order is mostly preserved. A connectionless system is modeled after the postal system, where each message has the full destiniation and is routed independent of others.

**Section B:**  
**Bluetooth Communications**  
**(T. Ch. 4. 310-317)**

1). (4) From Figure 1 shown bellow; we see that a Bluetooth device can be in two piconets at the same time.



*Figure 1*

Is there any reason why one device cannot be the master in both of them at the same time?

By definition, all devices with the same master must be on the same piconet. The master device controls the clock and decides which device communicates in which timeslot. The bridge slave has to time share, spending some slots in one piconet and the rest in another. This means that they can't act as a master for both.

2). (a) (4) Figure 2 shows several physical layer protocols. Which of these is closest to the Bluetooth physical layer protocol?

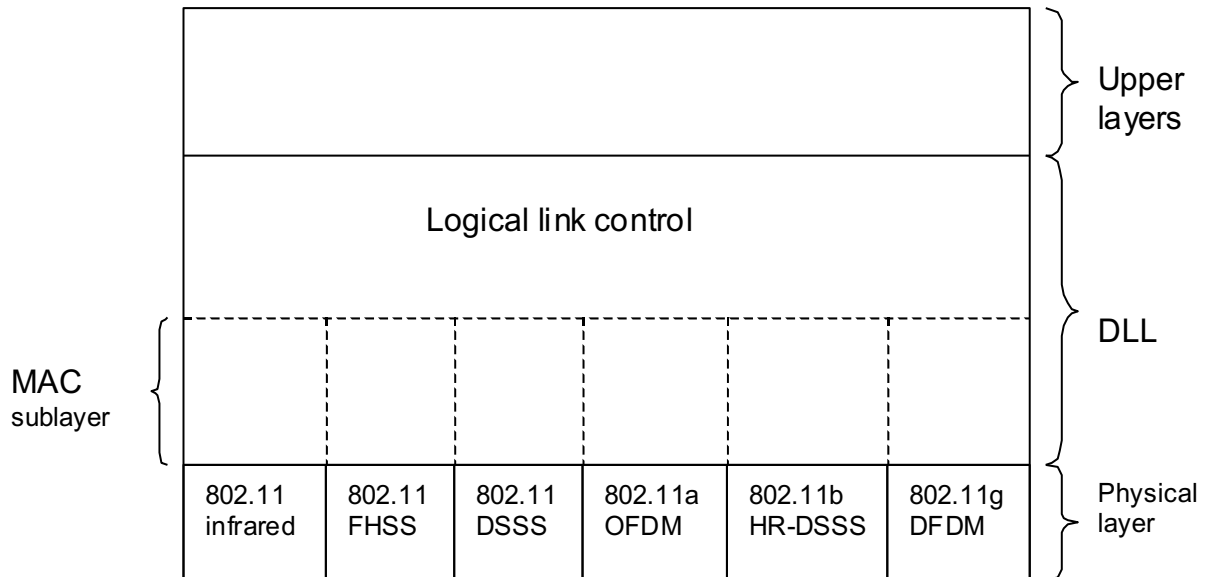


Figure 2

(b) (1). What is the biggest difference between the two?

- Bluetooth is based on FH-CDMA technology, which stands for frequency hopping CDMA. In that case, it would be most related to the 802.11 FHSS physical layer – which also uses frequency hopping.
- Bluetooth has a more specific dwell time, while the FHSS has a more general specification of less than 400 msec.

3). (4) Beacon frame in the frequency hopping spread spectrum variant of 802.11 contain the dwell time, Do you think the analogous beacon frame in Bluetooth also contain the dwell time? Discuss your answer.

As mentioned in the above, the hop dwell time for Bluetooth is set specifically to 625 microseconds, while the 802.11 has a more general dwell time of any time under 400msec. While both have dwell time, they won't be the same, so in a sense the analogous frames in Bluetooth **will not** contain the dwell time. The 625 microsecond limit was chosen specifically to correspond to a single spot.