QUESTION : DIFFERENCE BETWEEN 802.11a AND 802.11b

IEEE 802.11a

1. It is released in the year 1999.
2. It used frequency band of 5 GHz (5.150 GHz – 5.895 GHz) with around 37 channels.
3. It offers the maximum speed of 54 Mbps.
4. It follows OFDM.
5. OFDM AND OFDMA – OFDM(Orthogonal Frequency Division Multiplexing) is a digital modulation scheme that splits the single carrier width into multiple sub carriers each are ensured to be orthogonal to each other reducing the chance of interference between carriers and each are accompanied with QAM modulations to boost the data rate and to reduce ISI further, guard bands are installed between sub carriers and also last part of the ofdm symbols are attached in front – Cyclic prefix. Thereby, data can be multiplexed across different sub carriers boosting data rate.
6. It reduces congestion and interference (Bluetooth and microwave oven already uses 2.4 GHz only) by moving to 5 GHz. It is the first ever wifi standard to use 5 GHz band of frequencies.
7. Shorter range due to more attenuation.

IEEE 802.11b

1. It is released in the year 1999.
2. It is the first mass adoption wifi standard.
3. It follows DSSS.
4. DSSS – Direct Sequence Spread Spectrum Modulation techniques is one of the very popular modulation schemes that was in use in wifi technology. It basically extends or widens the bandwidth of the data being transmitted to larger bandwidth for reducing Power Spectral Density so as to avoid Narrow Band Interference and to get hidden under environmental noise to avoid information tapping. It also enables the security to avoid eavesdropping by using unique PN sequence per session/user to extend the bandwidth by multiplying each bit of information with this chip sequence and transmits with 2.4 GHz carrier signal (spreading )thus making it harder to decode without using proper PN sequence in receiver side. It also enables continuous transmission instead of FHSS which switches Frequency in realtime and expects frequency synchronization in receiver side for proper decoding. It also offers spreading gain while dispreading the information in receiver side.

It helps in achieving higher data rates like 11 Mbps in 802.11b wifi standard.

(Cons – limited scalability due to unique PN sequence requirement, can’t avoid Wide Band Interference and inefficient spectrum usage)

1. It offers the maximum speed of 11 Mbps.
2. It uses 2.4 GHz frequency band (2.4 – 2.483 GHz with 14 channels)
3. More susceptible to interference due to **crowded 2.4 GHz spectrum.**