

Gemini Communication Ltd.

Wireless Specifications

IEEE 802.11b and 802.11a PHY Layer Specifications

Key Resource

● Spectrum:

- 802.11 operates in the unlicensed band (ISM – Industrial Scientific and Medical band) ~ 3 such bands
 - **Cordless Telephony:** 902 to 928 MHz
 - **802.11b:** 2.4 to 2.483 GHz
 - **3rd ISM Band:** 5.725 to 5.875 GHz
 - **802.11a:** 5.15 to 5.825 GHz

Data Rates and Range

- **802.11:** 2Mbps (Proposed in 1997)
- **802.11b:** 1, 2, 5.5 and 11 Mbps, 100mts. range (product released in 1999, no product for 1 or 2 Mbps)
- **802.11g:** 54Mbps, 100mts. Range.
- **802.11a:** 6 to 54 Mbps, 50mts. range (uses OFDM)

802.11x

- a → OFDM in the 5GHz band
- b → High Rate DSSS in the 2.4GHz band
- c → Bridge Operation Procedures
- e → MAC Enhancements for QoS to improve QoS for better support of audio and video (such as MPEG-2) applications.
- g → OFDM based 2.4 GHz WLAN.**
- i → Medium Access Method (MAC) Security Enhancements: enhance security and authentication mechanisms.

IEEE 802.11a

- 5 GHz (5.15-5.25, 5.25-5.35, 5.725-5.825 GHz)
- OFDM (Orthogonal Freq. Div. Multiplexing)
- 52 Subcarriers in OFDM
- BPSK/QPSK/QAM
- Forward Error Correction (Convolutional)
- Rates: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

Base specifications:

- Common MAC (Medium Access Control) for all 802.11 family
- Three Physical Layers:
 - FHSS (Frequency Hopping Spread Spectrum)
 - DSSS (Direct Sequence Spread Spectrum)
 - OFDM (Orthogonal Frequency Division Multiplexing)

802.11b DSS Operating Channels

- DSS PHY has 14 channels, each 22MHz wide, placed 5MHz apart
- Channel 1 is placed at center freq. 2.412 GHz, Channel 2 at 2.417 GHz, and so on up to Channel 14 placed at 2.477 GHz
- Allowed channels
 - US/Canada 1 to 11 (2.412 – 2.462 GHz)
 - Europe (excluding France & Spain) 1 to 13 (2.412-2.472 GHz)
 - France 10 to 13 (2.457-2.462 GHz)
 - Spain 10 to 11 (2.457-2.462 GHz)
 - Japan 14 (2.477 GHz)
- 3 non-overlapping channels

Operating Channels ...

Non Overlapping channels.



Overlapping channels.

