The ‘alphabet soup’ of the 802.11 family of wireless standards

The IEEE 802.11 wireless LAN working group has 250 supporting companies, 650 active members and a predilection for incomprehensible acronyms. These are the ones you need to know about:

802.11

The original 1997 2.4GHz wireless Ethernet standard, running at 1 or 2Mbit/s. As with modems, newer standards can fall back to this standard under difficult conditions or if in contact with an older interface. There were two variants, **frequency hopping** and **direct sequence**, but these were for political rather than technical reasons.

802.11a

A nominal 54Mbit/s in the 5GHz band. Same speed as 802.11g at short ranges, but gets slightly slower as the distance increases and is of overall shorter range. The standard is fixed, but regional implementations in Europe are still under discussion. Although not quite as good as 802.11g on paper, in practice it is likely to be as good or better – if only because the 5GHz band has far fewer competing users.

802.11b

11Mbit/s in the 2.4GHz band, by far the most widely used WiFi standard. Wireless hotspots, domestic wireless broadband gateways and company WLANs nearly all support 802.11b.

802.11c

Modified 802.1d – MAC level bridging – to include 802.11 frames, thus helping with quality of service and filtering issues. Of no interest to anyone not designing wireless LAN hardware.

802.11d

Global harmonisation group. Different countries have different parts of the 2.4 and 5GHz bands available for unlicensed wireless networking. 802.11d seeks to help create standards that will be approvable in as many different countries as possible.

802.11e

QoS (Quality of Service) initiative for MAC level issues. Allows packets with specific requirements for transmission delay and bandwidth to be passed preferentially, which helps streamed audio and video work better.

802.11f

Inter-access point roaming protocol. Will let you move through a wireless LAN with multiple access points from different manufacturers, and maintain your connection.

802.11g

55Mbit/s in the 2.4GHz band. Downwards compatible with 802.11b. Access points and other devices supporting both 802.11g and 802.11b are now widely available.

802.11h

H is for Hiperlan, the competing European standard wireless LAN. This never really took off, so 802.11h adds some features to 802.11a to make it suitable for European use. These features are frequency and power management to make sure that 802.11a networks don’t interfere with radar and satellite services.

802.11i

The next level of security for 802.11. It will include key management and distribution, encryption and authentication.

802.11 IR

802.11 for infra-red. Developed at the same time as 802.11 itself, and supporting 1 or 2Mbit/s, it was then and is now a technical oddity. No products have ever been known to support this standard.

802.11j

An equivalent of 802.11h for the Japanese regulatory environment.

802.11k

A recently started project to standardise the way 802.11a, b and g networks report measurements of radio and network conditions to other parts of the network stack and new applications. Should be good for network management and fault finding.

802.11m

A collection of maintenance releases for 802.11 as a whole. Internal IEEE housekeeping.

802.11n

A proposal for 540Mbit/s (raw throughput) wireless through an array of four 'receive' and four 'transmit' antennas in a MIMO configuration (4x4). Would use 40 MHz of bandwidth, or about

twice that used in current 802.11b and g, but would fall back to 2x2 antennas and 20 MHz of spectrum (135Mb/s). Intended for ‘the last mile’ copper replacement domestic broadband.

802.11p

Wireless Access in Vehicular Environments (WAVE). 5.9 GHz DSRC (Dedicated Short Range Communications) is a short to medium range communications service that supports both public safety and private operations in roadside to vehicle and vehicle communication environments. DSRC is meant to complement cellular communications by providing high data transfer rates in circumstances where minimizing latency in the communication link and isolating relatively small communication zones are important.

802.11r

Fast roaming/access point hand-off for voice applications. New protocols, such as pre-authentication, promise to achieve the desired low roaming time even when lengthy 802.11i authentication is required.

802.11s

Aims to define a MAC and PHY for meshed networks. In such networks, access points relay information from one to another, hop by hop, in a router-like fashion. As you add users and access points, you add capacity – adding nodes becomes a scalable and redundant endeavour.

802.11t

Proposed standard for performance testing.

‘802.11x’

Journalistic shorthand for any 802.11 standard, meaning the person concerned couldn’t be bothered to type 802.11a/b/g. Not to be confused with 802.1X, which is an Ethernet security standard sometimes used u sed with wireless.

Information adapted in part from ‘A to Z of wireless standards’ by Rupert Goodwins: http://insight.zdnet.co.uk/communications/wireless/0,39020430,2132483,00.htm [1]

Links
[1] http://insight.zdnet.co.uk/communications/wireless/0,39020430,2132483,00.htm