Wireless LANs – what and how

What is a WLAN?

A wireless local area network (WLAN) is the generic term used for equipment that can form data networks with other equipment over short distances (usually less than 500 metres) without the use of connecting wires.

WLANs can exist either as a stand-alone network (also known as an ‘ad-hoc network’) or be connected to a wired network through an ‘access point’. Usually WLANs are connected to a corporate ethernet LAN or by a service provider to the internet.

The Institute of Electrical and Electronics Engineers (IEEE), a US standards-making body, has developed technical standards covering equipment used in LANs. The most recent WLAN standard is the IEEE 802.11-2007 standard that encompasses all amendments and previous standards from 1999 to 2005. During this period there have been a number of technological developments that have enhanced WLAN characteristics including higher data rates.

Commonly deployed previous standards known as IEEE 802.11a, IEEE 802.11b and IEEE 802.11g, that are now included in the IEEE 802.11-2007 standard, operate in the 5.15-5.35 GHz/5.725-5.825 GHz and the 2.4-2.4835 GHz frequency bands. More recently another IEEE 802.11n draft standard, has been developed utilizing improved technology on either frequency band or both simultaneously to achieve higher data rates. While the IEEE 802.11n draft standard is still pending ratification, industry has already adopted the draft standard and 802.11n draft products are widely available.

There are also WLAN standards developed by the European Telecommunications Standards Institute (ETSI), known as the HyperLAN family of standards. An industry organisation known as the Wi-Fi Alliance aims to ensure WLAN equipment made by different manufacturers will be compatible. It has coined the term ‘Wi-Fi’ to signify compliance. Compliance is achieved by ensuring all equipment meets defined interoperability requirements during testing in an independent laboratory before manufacturers may use the Wi-Fi logo. Look for the Wi-Fi Certified logo if you are buying IEEE 802.11a, 802.11b, 802.11g and 802.11n draft equipment.

A characteristic of IEEE 802.11 WLAN equipment is its low cost, which is partly because its popularity has allowed manufacturers to achieve some economies of scale. A factor contributing to this popularity is that operation of WLAN equipment is authorised by a radiocommunications class licence. Class licences do not have to be applied for and no licence fees are payable. They are ‘open, standing authorities’ allowing anyone to operate specific equipment, provided that operation is within the conditions of the licence.

WLAN devices supplied to the Australian market are subject to radiocommunications standards and labelling arrangements. They may also, depending on their application, be required to comply with EMR, EMC and telecommunications requirements. Details of the arrangements can be obtained from the ACMA website.

Using a WLAN

While there is no licence fee for operating radiocommunications equipment covered by a class licence, this does not mean there is ‘unlicensed’ spectrum. Operation of every radiocommunications transmitter must be authorised by licence under the Radiocommunications Act 1992. If not, use of the equipment is illegal.

If the equipment complies with the conditions listed in a class licence, it is automatically covered by that licence.

Class licences operate in a similar manner to a ‘public park’. All users operate in the same band and are subject to the same limits. Operation within the same frequency band is ‘uncoordinated’, but interference is generally avoided by the design of the equipment and by restricting power.

Spectrum sharing requires all users to transmit at very low power. Because of this sharing arrangement, users of the ‘public park’ have no guarantee that they can operate free of interference from other users.

For example, WLAN 802.11b equipment shares the same spectrum as equipment such as household microwave ovens, cordless phones, barcode readers, biomedical telemetry, movement detectors, radio location devices, video surveillance, other industrial scientific and medical devices, and many others. Any one of these items has the potential to interfere with the operation of WLAN 802.11b equipment.
More information

More information about Wi-Fi compliance is on the Wi-Fi Alliance website.

There is more information about WLANs licensing and operation on the ACMA website as follows:

- Radiocommunications Class Licence (Low Interference Potential Devices) covering IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and IEEE 802.11n draft equipment and an information paper.

- answers to frequently asked questions Wireless local area networks in the 2.4 GHz band accessing the public telecommunications network and related issues

- an industry fact sheet WLANs - licensing requirements

- a consumer fact sheet Wireless LANs - design and security with information about how to design a WLAN and security features.

Please note: this document is intended as a guide only and should not be relied on as legal advice or regarded as a substitute for legal advice in individual cases.