

<b>Title</b>	<b>Demonstrate knowledge of and install wireless local area computer networks</b>		
<b>Level</b>	<b>6</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	<p>This unit standard covers installation of wireless local area networks including setting up access points, wireless bridges and wireless network interface cards.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– demonstrate knowledge of wireless technologies;</li> <li>– apply appropriate configuration and installation techniques to wireless access points, bridges, adapters, and antennae;</li> <li>– demonstrate knowledge of security in relation to wireless networks;</li> <li>– apply security to a wireless network;</li> <li>– apply site survey techniques and safety practices;</li> <li>– demonstrate knowledge of and apply configurations to enable monitoring technologies; and</li> <li>– fault-find and repair wireless installation and configuration problems.</li> </ul>
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<b>Classification</b>	Electronic Engineering > Computer Engineering
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<b>Available grade</b>	Achieved
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<b>Prerequisites</b>	Unit 22717, <i>Demonstrate and apply intermediate knowledge of computer network engineering principles</i> , or demonstrate equivalent knowledge and skills.
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### Guidance Information

- 1 This unit standard is intended for use in engineering courses at diploma level.
- 2 References  
*Fundamentals of Wireless LANs Companion Guide* (Cisco Networking Academy Program), Cisco Systems;  
 Health and Safety at Work Act 2015;  
 ISO/IEC/IEEE 8802-11:2012/AMD 5:2015, *Standards for Information Technology – Telecommunications and Information Exchange between Systems – Local and Metropolitan Area Network – Specific Requirements – Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*;  
 and all subsequent amendments and replacements.

- 3 Definitions
- 802.1x* – IEEE 802.1x standard.
  - AP* – access point.
  - CLI* – command line interface.
  - DSSS* – direct sequence spread spectrum.
  - EAP* – extensible authentication protocol.
  - EIRP* – effective isotropic radiated power.
  - FHSS* – frequency hopping spread spectrum.
  - Industry practice* – practice used and recommended by organisations involved in the electrotechnology industry.
  - LAN* – local area network.
  - LEAP* – lightweight EAP.
  - MAC filtering* – media access control address filtering.
  - OFDM* – orthogonal frequency division multiplexing.
  - SNMP* – simple network management protocol.
  - Syslog* – a TCP/IP protocol for sending system messages to a central logging server.
  - WEP* – wired equivalent privacy.
  - WLAN* – wireless LAN.
- 4 All measurements are to be expressed in Système International (SI) units, and, where required, converted from Imperial units into SI units.
- 5 All activities must comply with: any policies, procedures, and requirements of the organisations involved; the standards of relevant professional bodies; and any relevant legislative and/or regulatory requirements.
- 6 Range
- a performance in relation to the outcomes of this unit standard must comply with the Health and Safety at Work Act 2015;
  - b laboratory and workshop safety practices are to be observed at all times.

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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of wireless technologies.

#### Performance criteria

- 1.1 Technologies and topologies used with WLANs are identified in accordance with industry practice.

Range FHSS, DSSS, OFDM, Basic Service Set (BSS), Independent BSS (IBSS) or peer-to-peer, Extended Service Set (ESS), point-to-point.

- 1.2 The relationship of the IEEE 802.11 standards to other 802 standards is explained, and the key characteristics in the 802.11 standards are identified.

Range IEEE 802.11 a, b and, g operating characteristics.

**Outcome 2**

Apply appropriate configuration and installation techniques to wireless access points, bridges, adapters, and antennae.

**Performance criteria**

- 2.1 Wireless adapters are installed in accordance with industry practice.
- 2.2 Wireless access points and bridges are configured using the CLI and a web based device manager.
- 2.3 Antennae are selected and installed according to industry practice.
  - Range may include but is not limited to – omnidirectional dipole, mast, directional patch, Yagi, cables, EIRP rules.

**Outcome 3**

Demonstrate knowledge of security in relation to wireless networks.

**Performance criteria**

- 3.1 Security threats and vulnerabilities to wireless networks are discussed in terms of likelihood, impact, likely perpetrators, and targets.
- 3.2 Measures that may be applied to reduce the risk of security breaches are discussed in terms of their application and practicability.
  - Range may include but is not limited to – WEP, EAP, LEAP, 802.1x.

**Outcome 4**

Apply security to a wireless network.

**Performance criteria**

- 4.1 MAC filtering is used in accordance with industry practice.
- 4.2 Security technologies are applied in accordance with industry practice.
  - Range may include but is not limited to – WEP, LEAP, EAP, and 802.1x.

**Outcome 5**

Apply site survey techniques and safety practices.

**Performance criteria**

5.1 The best position for access points is determined using site survey techniques.

Range may include but is not limited to – site survey tools, access points and cards, antennae and attenuators, site drawings.

5.2 Appropriate safety practices in a wireless network are used in accordance with industry practice.

Range may include but is not limited to – building codes, fire codes, OSH, proximity to operating antennae.

**Outcome 6**

Demonstrate knowledge of and apply configurations to enable monitoring technologies.

Range may include but is not limited to – SNMP and Syslog.

**Performance criteria**

6.1 The principles of management and data logging are identified in accordance with industry practice.

6.2 An AP is configured to provide monitoring and logging functions in accordance with industry practice.

**Outcome 7**

Fault-find and repair wireless installation and configuration problems.

**Performance criteria**

7.1 Wireless installation and configuration problems are determined and corrected using troubleshooting techniques in accordance with industry practice.

Range may include but is not limited to – cable testers, network monitors, sniffers, spectrum analysers, logs.

**This unit standard is expiring. Assessment against this standard must take place by the last date for assessment set out below.**

**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	18 December 2006	31 December 2021
Rollover and Revision	2	28 June 2018	31 December 2021
Review	3	28 January 2021	31 December 2021

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

This unit standard is expiring