

Title	Performance test and repair faulty electronic communications equipment		
Level	4	Credits	15

Purpose	<p>This unit standard is intended for electronics technicians who are responsible for performance testing and the diagnosis and repair of faults in electronic communications equipment to unit or component level.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – performance test electronic communications equipment; – diagnose faulty electronic communications equipment; and – repair, test, and restore electronic communications equipment to service.
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Classification	Electronic Engineering > Electronic Installation and Maintenance
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Available grade	Achieved
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Guidance Information

- 1 This unit standard has been developed for learning and assessment on-job or off-job.
- 2 References

AS/NZS 3760: 2022, *In-service safety inspection and testing of electrical equipment and RCDs* available at [AS/NZS 3760:2022: Standards New Zealand](#);

AS/NZS 4836:2023, *Safe working on or near low-voltage and extra-low voltage electrical installations and equipments* available at [AS/NZS 4836:2023: Standards New Zealand](#);

Electricity Act 1992;

Electricity (Safety) Regulations 2010;

Health and Safety at Work Act 2015 and associated regulations;

IPC-7711/7721 B *Rework, Modification and Repair of Electronic Assemblies*, (November 2007) at [IPC-7711C-7721C table of contents](#);

Radiocommunications Act 1989;

Radiocommunications Regulations 2001;

Radio spectrum management licensing requirements available from the Ministry of Economic Development website at; [Licence compliance requirements | Radio Spectrum Management New Zealand \(rsm.govt.nz\)](#);

and all subsequent amendments and replacements.

3 Definitions

AM – amplitude modulation.

BITE – built in test equipment.

BER – Bit Error Rate

Communications equipment – dedicated receiver or transmitter equipment or the receiver or transmitter section of transceivers and includes any of – LF, HF, UHF, VHF, SHF, using AM, FM, or DM.

DM – digital modulation. The process of varying one or more parameters of a carrier wave as a function of two or more finite and discrete states of a signal.

Enterprise practice – those practices and procedures that have been promulgated by the company or enterprise for use by their employees.

FM – frequency modulation.

HF – high frequency.

Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.

LF – low frequency.

RF – radio frequency.

SHF – super high frequency.

SINAD – *signal to noise and distortion ratio, frequency, modulation, distortion, signal noise and distortion.*

UHF – ultra high frequency.

VHF – very high frequency.

4 Range

- a The type of diagnosis and repair work required to achieve this unit standard must include:
 - i diagnosis and repair of equipment to unit and/or component level depending on servicing data and enterprise policy;
 - ii use of test instruments to identify faults, measure and adjust equipment, and confirm proper performance. Typical instruments include multimeters, oscilloscopes, signal generators, and signal tracers. More specialised instruments may be required depending on the nature of the equipment.
- b Candidates are expected to meet the outcomes of this unit standard without direct technical supervision, and with complete responsibility for the quality and quantity of output.
- c Electrical, radiation, and workshop or laboratory safety practices are to be observed at all times.
- d Measurements may be expressed in Système Internationale (SI) or Imperial units, and, where required, converted from Imperial units to SI units and vice versa.
- e Recognised industrial standards are to be used for calculations.
- f All activities and evidence presented for all outcomes and evidence requirements in this unit standard must be in accordance with legislation, policies, procedures, ethical codes, Standards, applicable site and enterprise practice, and industry practice; and, where appropriate, manufacturers' instructions, specifications, and data sheets.
- g Evidence for the number and type of equipment chosen are left to the discretion of the assessor, but must be sufficient to assess competence in all outcomes of the unit standard.

- 5 Recommended skills and knowledge:
Unit 26725, *Demonstrate and apply knowledge of electronic product reliability and advanced electronic measurement and diagnosis* or demonstrate equivalent knowledge and skills.

Outcomes and performance criteria

Outcome 1

Performance test electronic communications equipment.

Performance criteria

- 1.1 Transmitter equipment operation is tested and compared against specifications.
- Range may include but is not limited to – use of BIT (Built in Tests) and ATE (Automatic Test Equipment), output power on AM modes at ten frequencies each and FM modes at twenty five frequencies, frequency stability on FM and AM on three frequencies each, analogue voice deviation at FM and NBFM Narrow Band FM, peak modulation on AM, TX Distortion on AM and FM, transmitter current at five frequencies AM and FM, modulation limiting at four modulation frequencies, transmitter hum and noise on NBFM, standby current.
- 1.2 Receiver equipment performance is tested and compared against specifications.
- Range may include but is not limited to – use BITE and ATE, SINAD on AM and FM at five frequencies each, audio distortion, adjacent channel rejection, IF rejection, spurious rejection, analogue voice deviation in FM and NBFM, rx current in AM and FM, receiver hum and noise.
- 1.3 Test results are recorded in accordance with enterprise practice.

Outcome 2

Diagnose faulty electronic communications equipment.

Performance criteria

- 2.1 Fault symptoms or substandard equipment performance are identified.
- 2.2 Diagnostic techniques, tools, instruments, BITE where available, and servicing data are used.
- 2.3 The lowest replaceable or repairable faulty unit or component is identified, in accordance with servicing data and enterprise practice.

2.4 Anti-static precautions are observed to protect components from static damage.

Range includes but is not limited to – packaging, storage, transport, handling.

2.5 The equipment is not damaged by diagnostic processes.

2.6 Diagnostic report is written in accordance with enterprise practice.

Outcome 3

Repair, test, and restore electronic communications equipment to service.

Performance criteria

3.1 Replacement or repair of faulty units or components is done in accordance with servicing data and enterprise practice.

3.2 The other parts of the equipment are not damaged by replacement or repair.

3.3 Equipment is reassembled in a manner that prevents damage and conforms to the manufacturers' layout.

Range layout – lead dress, screw location, shields and screens, board positioning and securing, cover positioning and fastening.

3.4 Electrical safety is confirmed by testing.

3.5 The repaired equipment being ready for service is confirmed by testing.

3.6 All actions are recorded in accordance with enterprise practice.

Replacement information	This unit standard replaced unit standard 6062 and unit standard 6063.
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Planned review date	31 December 2028
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2011	31 December 2027
Review	2	24 August 2023	N/A

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

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.