

Australian/New Zealand Standard™

**Digital radio equipment operating in
land mobile and fixed services bands in
the frequency range 29.7 MHz to 1 GHz**

**Part 3: Application of recognized
Standards**



AS/NZS 4768.3:2018

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee RC-006, Radiocommunications Equipment—General. It was approved on behalf of the Council of Standards Australia on 6 September 2018 and by the New Zealand Standards Approval Board on 5 September 2018. This Standard was published on 11 October 2018.

The following are represented on Committee RC-006:

Airservices Australia
Australian Communications and Media Authority
Australian Industry Group
Australian Radio Communications Industry Association
Australian Wireless Audio Group
Civil Aviation Safety Authority
Consumer Electronics Suppliers Association
Electromagnetic Compatibility Society of Australia
Electromagnetic Technical Evaluation Committee
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee RC-006, Radiocommunications Equipment—General.

The objective of this Standard is to formalize a process based on recognition of mature digital Standards from around the world. This will provide the user, manufacturer or supplier of digital radio equipment operating in the frequency range 29.7 MHz to 1 GHz of the VHF and UHF land mobile and fixed services bands with the minimum technical performance characteristics and requirements necessary for effective management of the radiofrequency spectrum in Australia and New Zealand.

This Standard is Part 3 of AS/NZS 4768 series, which consists of the following:

AS/NZS

- 4678 Digital radio equipment operating in land mobile and fixed services bands in the frequency range 29.7 MHz to 1 GHz
- 4678.1 Part 1: Radiofrequency requirements
- 4678.2 Part 2: Methods of test (IEC 60489-6:1999, MOD)
- 4678.3 Part 3: Application of recognized Standards (this Standard)

This Standard extends digital equipment testing and assessment beyond the channel and emission limitations of Part 1 and the associated test methods in Part 2. It includes non-constant envelope emissions, and operation on narrower channel bandwidths. In practice, this Standard replaces Part 1 and Part 2 in relation to ETSI based testing.

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

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FOREWORD

Digital equipment providing an analogue speech (angle modulated) modulation capability is required by regulation in Australia and New Zealand to conform to AS/NZS 4295.

In the absence of a mandated digital Standard in Australia, for many years the ACMA NATA accredited radiocommunications test laboratory had provided a voluntary 'spectrum impact' assessment process to industry, in order for digital equipment to be accepted as suitable for licensing purposes alongside analogue services. That testing was based on the previous AS/NZS 4295 analogue Standard, which followed IEC test methods and established conformance of digital equipment against the analogue equipment performance limits.

The ACMA spectrum impact testing was emissions based and guided by the principle that emissions from the transmitter and receiver are issues that affect other spectrum users. For interference management purposes, digital equipment receiver performance was assumed to be equivalent to AS/NZS 4295 requirements except where there was no analogue equivalent, such as equipment with channel spacings of less than 10 kHz.

In Australia and New Zealand, it is common to import equipment from other parts of the world where there may not be harmonized spectrum management and equipment specification regimes.

This Standard moves beyond the original concept of the spectrum impact testing and includes minimum requirements for receiver performance in recognition of the fact that it also impacts on efficient spectrum use. The requirements specified in this Standard take into account that, in Australia and New Zealand, digital radio equipment may operate in spectrum adjacent to analogue radio equipment.

This Standard will in general align with ETSI and other recognized Standards, as appropriate, in order to assess if equipment is compatible with the current channel arrangements of 25 kHz, 12.5 kHz and 6.25 kHz used in Australia and New Zealand. Regional requirements are included in this Standard and variations (in some limits) in recognition of the previous AS/NZS 4295 standard limits, which have proven acceptable in practice.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Digital radio equipment operating in land mobile and fixed services
bands in the frequency range 29.7 MHz to 1 GHz****Part 3: Application of recognized Standards**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard provides radiofrequency requirements for constant and non-constant envelope emission digital radio equipment operating in land mobile and fixed services radiofrequency bands in the frequency range 29.7 MHz to 1 GHz with channel spacings of 25 kHz, 12.5 kHz or 6.25 kHz.

Categories of equipment within this range include—

- (a) base, mobile, personal mobile and RF control stations operating in designated land mobile bands;
- (b) fixed point-to-point and point-to-multipoint equipment operating in designated single channel fixed service bands; and
- (c) personal mobile, fixed and repeater equipment operating in the maritime mobile service and used for on-board communications in the frequency band 450 MHz to 470 MHz.

NOTE: For operation of land mobile and on-board maritime mobile equipment in these bands, refer to the relevant authorities in Australia and New Zealand.

1.2 APPLICATION

For channel spacings less than 10 kHz, EN 301 166 V2.1.1 with local variations listed in Section 4 shall be applied.

For channel spacings greater than 10 kHz—

- (a) EN 300 113 V2.2.1 with local variations listed in Section 3; or
- (b) one of the Standards listed in Section 4 with local variations shall be applied.

Testing shall be conducted to all the requirements of the applied Standard, not just aspects for which there are local variations. Digital equipment that is capable of operation within the scope of the analogue land mobile Standard AS/NZS 4295 shall conform to the requirements of that Standard (which is based on ETSI EN 300 086 V2.1.2).

NOTE: Section 4 lists alternative approval paths for equipment based on conformance to any of the Standards listed in Table 4.1, including the associated regional requirements such as power limits, mains operating voltage, adjustment mechanisms and labelling, etc.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS

4295 Analogue speech (angle modulated) equipment operating in land mobile and fixed services bands in the frequency range 29.7 MHz to 1 GHz

ANSI/TIA-102.CAAB-C

Project 25 Land Mobile Radio Transceiver Performance Recommendations; Digital Radio Technology C4FM/CQPSK Modulation

ETSI EN

EN 300 086 Land Mobile Service; Radio equipment with an internal or external RF connector intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

300 113 Land Mobile Service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

300 394 Terrestrial Trunked Radio (TETRA); Conformance testing specification

300 394-1 Part 1: Radio

V3.3.1

301 166 Land Mobile Service; Radio equipment for analogue and/or digital communication (speech and/or data) and operating on narrow band channels and having an antenna connector; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

EN

302 561 Land Mobile Service; Radio equipment using constant or non-constant envelope modulation operating in a channel bandwidth of 25 kHz, 50 kHz, 100 kHz or 150 kHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

ITU Technical characteristics of equipment used for on-board vessel communications in the bands between 450 and 470 MHz

1.4 DEFINITIONS

For the purposes of this Standard, the definitions below apply.

1.4.1 Adjacent channel power (transmitter)

That part of the total power output of a transmitter under defined conditions of modulation, which falls within a specified passband centred on the nominal frequency of either of the adjacent channels.

1.4.2 Artificial load

A non-reactive, non-radiating load whose impedance, as presented to the transmitter output, corresponds to the terminal impedance of the antenna normally connected to the transmitter (this is usually 50 Ω).

1.4.3 Average radiofrequency (RF) output power

The average RF power supplied to a transmission line—

- (a) measured as a continuous power when the data modulation is continuous; or
- (b) measured during the time of the data modulation.

1.4.4 Base station

A radiocommunications transmitter, receiver or transceiver fitted with an antenna connector, for use with an external antenna and intended for use at a fixed location.