



SOUTH AFRICAN RADIO LEAGUE

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PROCEDURES FOR CLASS A1 (ZS) LICENSE ASSESSMENTS

The Radio Regulations specify that in order to be awarded a Class A1 (ZS) License, the applicant must satisfactorily complete an assessment or criterion prescribed by the SARL. This document specifies the assessment procedures to be used to assess a candidate's submissions for all assessments other than Morse code. The procedures for the Morse code assessment are documented elsewhere.

Assessments may only be conducted by an assessor who has been officially appointed by the SARL for this purpose, and whose appointment is valid at the time when the assessment is conducted. All applications for assessment must be made on the official SARL form.

1. Operating Achievement

The candidate must submit evidence that he or she has made confirmed contacts with at least 100 different amateur radio stations. Any combination of bands and modes is permitted, with the exception that contacts made using terrestrial repeaters or Internet linking may not be counted. Contacts made through earth-orbiting satellites are permitted.

Note that each station contacted may only be counted once. Multiple contacts with the same station on different bands and/or modes do not count as additional contacts.

The evidence submitted by the candidate must consist of QSL cards or any other evidence that is accepted for DXCC submissions. A DXCC or Worked All ZS certificate may also be accepted as evidence, provided that the assessor sees an original or certified copy of the certificate, and submits a copy of the certificate with the application. Note that an extract from the applicant's logbook is not sufficient.

Where QSL cards are submitted as evidence of contacts, the assessors must check every card and ensure that:

- It is properly made out, signed by the operator of the station contacted, and does not appear to have been altered in any way.
- The callsign on the card corresponds to a callsign issued to the applicant. Note that cards made out to a club or special event callsign may not be accepted.
- The band and mode of the contact are legal given the class of license held by the applicant when the contact was made.

Once any unacceptable cards have been discarded, the assessors must count the acceptable cards and ensure that there are at least 100.

2. Electronics Construction

The candidate must submit a project that he or she has constructed. The project must be either:

- ❑ A working direct conversion or superheterodyne radio receiver that can receive and demodulate transmissions on any frequency allocated to the amateur service in any mode used by the amateur service; or
- ❑ A working transmitter that can transmit modulated signals with a power of at least 1 watt on a frequency allocated to the amateur service using any modulation method used by the amateur service. The frequency of the transmitter must be controlled by a quartz crystal or ceramic resonator.

In order to be considered, the project must have been constructed entirely by the applicant. It is acceptable for the applicant to have received advice from another person, but all physical construction work must have been performed by the applicant him or her-self. The project may have been constructed from a kit, provided that the contents of the kit are discrete individual electronic components, rather than pre-constructed modules (the use of a passive balanced mixer module shall not be considered a violation of this requirement).

The applicant is expected to show at least a basic understanding of the functioning of the project, and the assessors should conduct a brief oral question and answer session with the candidate to check this. In general, understanding at a functional block level is required, so suitable questions might consider the architecture of the receiver, the choice of IF frequency or the operating class of the output stage of the transmitter.

Note the requirement for receivers that only Direct Conversion and Superheterodyne architectures are permitted. This is intended to prevent the submission of a crystal set or very simple TRF receiver as a project. The assessors must ensure that the project meets this requirement.

The quality of construction must be assessed on the basis of generally acceptable amateur standards and practise. This is difficult to quantify. Perhaps the best guide is to ask yourself whether you would be proud to show the project off as an example of what a member of your club has built; and whether you think that the end result will survive the usual wear and tear of day-to-day operation.

Performance testing will depend on the type of project constructed.

2.1 Testing a Receiver

Connect the receiver to a suitable antenna and listen for signals at a time when you expect there to be signals on the band in question. (If there are no signals present, then you will need a suitable RF signal generator, or you will have to get another amateur to transmit a test signal to permit evaluation of the receiver. You may not pass a receiver without having used it to receive a signal of some sort.

You should test the following:

- Correct and intelligible demodulation of a suitably modulated signal. For example, an SSB receiver must be able to render SSB signals intelligible. If for any reason it cannot, then it must not be passed. The signal should also be free from mains hum, microphonics, excessive distortion or other undesirable artefacts.
- Sensitivity and selectivity that make it suitable for general amateur use on the bands and modes that it operates on. Find a fairly weak signal using your station receiver, and then see whether the receiver under test can detect this signal. Find a weak signal near a stronger one, and see whether the receiver is able to recover the weak signal without undue interference from the strong one. Note that ultimate receiver performance is not required – the project is not expected to compete with high-end commercial radios. However receiver performance must be such that it can successfully be used to listen to the usual amateur signals on that band and mode.

2.2 Testing a Transmitter

The following tests should be performed.

- Frequency stability. Measure the frequency of the transmitter when it is initially switched on using a frequency counter or your station receiver (*do not* connect the antenna output of the transmitter to the antenna of your receiver). Measure the frequency again at the end of the test session (at least 15 minutes after switching the transmitter on). If the frequency has varied by more than 100 Hz then the transmitter fails.
- Power output. Connect the transmitter to a suitable RF power meter and dummy load. Measure the output power, which must be at least 1 W.
- Modulation quality. Receive a signal transmitted by the transmitter using a suitable receiver. Voice modulation should be “communications quality” and not overly broad; CW modulation should not have any detectable chirp or key clicks.
- Spurious outputs. Tune your station receiver to a frequency twice and three times that of the transmitter, and ensure that there are no detectable harmonics.

Note that the project must pass on all criteria in order to be accepted.

3. Public Service and Emergency Communications

The candidate must provide proof that he or she has spent at least 50 hours providing communications services for one or more of the following public service events:

- Sports events, including motor racing;
- Disaster preparedness exercises run under the auspices of Hamnet;
- Actual assistance rendered during a real emergency or disaster;
- The operation of educational stations registered with the League for events such as Kid’s Day, JOTA and CQ Houkoers.

The time spent providing communication services shall include only the time spent operating, or supervising the operation of, an amateur transceiver as reasonably required by the event concerned and under the direction of the chief radio marshal or event organizer.

The proof must consist of attendance sheets signed by the event organizer or chief radio marshal that state the following information:

- The date of the event
- The nature of the event
- The name of the applicant
- The callsign of the applicant
- The number of hours spent by the applicant providing communications services.

The assessors should ensure that the attendance sheets are in order and do not appear to have been altered in any way; that they are signed by the organizer or chief radio marshal; that they are all made out in favour of the applicant and that the times on all the sheets submitted add up to a total of at least 50 hours.

The signed attendance sheets (or certified copies thereof) must be sent with the candidate's application to the SARL.

4. Recognition of Professional Qualifications

The candidate must provide proof that he or she has been awarded any of the following qualifications:

- A nationally recognized tertiary degree, diploma or trade certificate in electronics or radio that would ordinarily require at least two years of study to complete; or
- A Maritime Radio Communications General Certificate (MRGC). Note that this is a qualification that is issued to professional commercial radio operators and is not the same as the maritime radiotelephony license.

Candidates who wish to qualify for this assessment must present a certified copy of their qualification to the assessors along with the application form. The assessors should complete the relevant section of the application form and submit it along with the certified copy of the qualification to the SARL.

5. Morse Code

The candidate must be able to send by hand and receive by ear Morse code at a rate of at least five words per minute. Procedures for the Morse code assessment are specified in a separate document.