

Regulations & Policies 001- series questions, Part 1

1. radio authorizations, applicability, eligibility

(In these notes: the term “ISED” refers “Innovation, Science and Economic Development” Canada, the Federal Department responsible for radio regulations in Canada and formally known as Industry Canada)

There are 4 possible exam questions in the section:

- key word: AUTHORITY. *Countries administer radio within their borders and territorial waters. The Canadian parliament enacted the **'Radiocommunication Act'** (a law). This law grants authority to ISED to regulate radio communications. That department then issues **'Radiocommunication Regulations'** where services such as the "maritime service", the "aeronautical service", the broadcast service and the "amateur radio service" are defined.*

2. authorization fee, term, posting requirements, change of address

Key points of knowledge in this section are:

- ***There is no fee** for a regular amateur radio certificate and call sign or associated with a change of address or upgrade of qualification. There is a fee for applying for a Special Event call sign.*
- *Your Amateur Radio Certificate is issued for **life**.*
- ***Your amateur radio certificate must be retained at the station**. The certificate comes in two parts, one part is a wall certificate you may wish to frame and retain at your home station. There is also a small wallet size certificate that you can keep on your person along with portable or mobile equipment to demonstrate you are legally authorized to use it. The holder of an amateur radio certificate must show same, if requested by a radio inspector from Industry Canada **within 48 hours** (section 38 of Radiocommunications Regs)*
- ***You must notify ISED of a change of address (within 30 days)**; this is done by contacting Amateur Radio Service Centre in Sault St Marie, ON with on-line reporting or email or by phone. (RBR-4 , section 15)*

3. suspension or revocation, powers of radio inspectors, offences and punishments

There are 6 possible exam questions in this section.

Key elements of knowledge are:

- *There may be suspension or revocation (**with notice**) of your amateur radio certificate, call sign, and authorization to transmit radio for offences that include:*
 1. *Making out-of-amateur-band transmissions of any type or duration*
 2. *Transmitting False or deceptive signals such as a non-emergency MAYDAY or SOS*
 3. *Intentional causing of interference or obstructing communications to other stations without lawful cause that may be subject to a penalty up to \$5000 or 1 yr imprisonment or both (see Radiocommunications Act, section 10)*
- *According to the Radiocommunications Act, a Radio Inspector (an agent of ISED) may not enter a dwelling without the occupant's consent or failing that, without a warrant.*

4. operator certificates, applicability, eligibility, equivalents, reciprocal recognition

There are 7 possible exam questions in this section.

The key elements of knowledge are:

- *A Basic Certificate examination must be taken and **passed first** before any Amateur Radio certificate can be issued.*
- *Holding an Amateur Radio Certificate only qualifies you to operate a radio station in the Amateur Radio Service and does not qualify you to operate in any other radio services such as aeronautical, land or maritime.*
- *Following the scoring and passing of the Basic examination, the candidate can only then be given the other Amateur Radio qualification examinations for Advanced or Morse Code at any time or in any order. This may be arranged at the same sitting with the examiner.*
- *The Morse Code qualification examination is offered to candidates at a sending and receiving speed of 5 words per minute (WPM). Reference RIC-1, section 6.*
- ***Anyone with a valid Canadian address** independent of nationality or age may take the examination(s) and upon passing obtain an Amateur Radio Certificate and call sign.*
- *A person already holding a **Canadian Radiocommunications Operator General Certificate Maritime (RGMC)** qualifies without re-examination to be issued a Amateur Radio Certificate and call sign. Any of the **Restricted Operator***

Certificates (ROCs) do not qualify for equivalency. (see Radiocommunications Regs, Section 42)

5. operation, repair and maintenance of radio apparatus on behalf of other

There are 4 possible exam questions in this section.

The key elements of knowledge are:

- *As an Amateur Radio Operator with Advanced qualification, you are only allowed to install, place in operation, repair or maintain amateur radio equipment on behalf of another person provided the other person is already a holder of an Amateur Radio Certificate and call sign.*
- *As a Amateur Radio Operator with Basic qualification with or without Honours or Morse (**not including Advanced**, you may install **but not maintain** amateur radio equipment on behalf of another person holding an Amateur Radio Certificate and call sign. To maintain amateur radio equipment, you must have an Advanced (amateur) qualification certificate.*

6. operation of radio apparatus, terms of authorization, applicable standards, exempt apparatus

There are 6 exam questions from this section.

The key elements of knowledge are:

- *Amateur Radio apparatus operating in the amateur service in Canada on any of the amateur radio band allocations must only be operated or directly supervised by a person holding an Amateur Radio Certificate.*
- *Amateur Radio service communications in designated amateur frequency allocations is only allowed with other stations also communicating in the amateur service nationally or internationally. In some instances, amateur band allocations are shared with other non-amateur services; in such cases Amateur radio operators are not allowed to communicate with stations in other services.*
- *A courteous Amateur Radio Station operator will not make offensive or superfluous transmissions.*
- *A radio amateur will not use an RF amplifier on license-exempt equipment outside an amateur frequency allocation (such a CB equipment).*
- *Equipment that covers a range of frequencies including an amateur allocation as well as non-amateur allocations can only be used in non-amateur allocations providing the equipment is certified under the proper Radio Standard*

Specification (RSS) issued by ISED and it is licensed by the Department on specified frequencies or service.

7. content restrictions, superfluous, profanity, secret code, music, non-commercial

There are 11 possible exam questions from this section

The key elements of knowledge are:

- *There are content restrictions governing amateur radio communications.*
- *Amateur radio communication should be non-superfluous (Section 32 repealed)*
- *Profanity or content of an obscene nature is not accepted in amateur radio communications. This was expressly prohibited in Section 32 of the Radiocommunications Regulations but was repealed in 2011.*
- *It is prohibited to use amateur radio communication for any industrial, business or professional purpose.*
- *Music or commercially recorded material cannot be broadcast over the airwaves using Amateur Radio Service frequency allocations. (Radiocom Regs, Section 47)*
- *Transmission of Programming from a broadcasting undertaking is prohibited by Radio Amateurs. (Radiocom Regs, Section 47)*
- *Encoding and cipher code may be used in the amateur service provided they are in the public domain and not kept secret. (Radiocom Regs, Section 47)*

8. installations and operating restrictions, number of stations, repeaters, home-built, club stations

There are 4 possible exam questions from this section.

The key elements of knowledge are:

- *Amateur radio operators may install or operate amateur radio apparatus **at any location in Canada.***
- *A Basic and Advanced Amateur qualification are necessary for a radio amateur operator to install and operate an automatic repeater station (a station designed to operate unattended receiving and re-transmitting signals in the same frequency band). (Radiocom Regs section 44)*
- *A Basic with Advanced Amateur qualification are also necessary for a radio amateur to hold a separate certificate and call sign for a club amateur radio station. (Radiocom Regs section 44)*
- *A Basic with Advanced Amateur qualification are also necessary for a radio amateur operator to install and operate radio transmitting equipment for the amateur service that is self designed and built. (Radiocom Regs section 44)*

9. participation in communications by visitors, use of stations by others

There are 9 possible exam questions from this section.

The key elements of knowledge are: (Radiocom Regs section 46)

- *Both the owner and a visiting control operator of an amateur radio station, both being holders of an Amateur Radio Certificate, are equally responsible for proper operation of the station.*
- *The privileges while using an amateur station by a visiting control operator with an Amateur Certificate will be governed by his/her qualifications above Basic qualification, but shall not exceed the privileges of the owner of the station.*
- *The owner of an Amateur Radio Station may allow a visiting person who does not have an Amateur Radio Certificate to communicate over the owner's station provided the owner maintains presence and direct supervision of the visitor's use of the station.*
- *The call sign used at an amateur radio station should be that assigned to the station owner.*

10. interference, determination, protection from interference

There are 11 possible exam questions from this section.

The key elements of knowledge are:

- **Harmful interference** is that which disturbs other communications.
- As a Radio Amateur, you may **Never** deliberately cause interference.
- Where the regulations specify a frequency allocation as having **Secondary Status for the Amateur Service**, the Amateur Radio user may **share the allocation** provided no interference is caused to Primary Status users of the allocation.
- No amateur station has a right to a particular frequency over another amateur station.
- The **Amateur Radio Service has secondary status in the 430 to 450 MHz allocation (70 cm band)** and therefore must not cause interference to the **Radio Location Service which has primary status** in the same band according to the Canadian Table of Frequency Allocations.
- **The amateur radio service has Secondary Status in the 902 to 928 MHz band** and therefore must not interfere with Primary Status users in the Fixed and Radio Location services. This band is also an **ISM (Industrial, Scientific and Medical)** band and has many low power unlicensed devices sharing the same frequency allocation such as Hydro Ottawa

*"Smart" power meters. These devices are **NOT PROTECTED from interference** caused by amateur transmissions or from other sources.*

- *There is an **Amateur secondary allocation from 2300 to 2450 MHz (2.3 to 2.45 GHz)**. Primary services in this range are Fixed, Mobile and Radio Location according to the Canadian Table of Frequency Allocations. This band overlaps with the license free **ISM band from 2400 to 2500 MHz**. **Many consumer devices such as computers and routers using "WIFI" operate in this frequency range.** These operate with no protection from amateur use of the band nor can Amateurs operating in this band claim interference protection from these devices.*

**11. emergency communications, (real & simulated)
communications with non-amateur stations**

There are 9 possible exam questions from this section.

The key elements of knowledge are:

- *Only amateur stations can communication with other stations in the amateur service even during "relief operations"*
- *An amateur station can **Never** communicate with radio stations outside the amateur service.*
- *Even if you do not have the proper privileges to operate in HF allocations but hear a distress call, you should offer assistance.*
- *It is permissible to "Broadcast" (on amateur frequencies) communications required for immediate safety of life and protection of property.*
- *An amateur radio station during distress should use any means of radiocommunications.*
- *Amateurs radio stations may provide disaster and relief communications when normal communications systems overloaded, damaged or disrupted.*
- *During a **distress**, there are no power limitations that an amateur station my need to sustain effective communications.*
- *Amateur communication not involved with emergency or disaster relief communication must be cautious to avoid*

causing interference to frequencies used for such communications.

12. non-remuneration, privacy of communications

There are 4 possible exam questions from this section.

The key elements of knowledge are:

- *No gifts or remuneration can be asked or accepted for communication services using the amateur radio service. (Radiocom Regs, Section 49)*
- *Radiocommunications intercepted while listening to the airwaves must be kept private and not divulged or used; this does not apply to listening to the Broadcasting or Amateur Services. (Radiocom Act, section 9. (1.1))*

13. station identification, call signs, prefixes

There are 11 possible exam questions from this section.

The key elements of knowledge are:

- **An Amateur station must be identified (in English or French) by call sign at least every 30 minutes and at the beginning and end of a contact.** (RBR-3) (RBR-4 , section 9.3)
- *The only exception to call sign identification is for the remote control of a model craft.*

- *The Standard issue of Canadian amateur radio call sign prefixes are as follows: (from RBR-4, Schedule IV)*

Prefix	Province or Territory
<i>VE1/VA1</i>	<i>Nova Scotia</i>
<i>VE2/VA2</i>	<i>Quebec</i>
<i>VE3/VA3</i>	<i>Ontario</i>
<i>VE4/VA4</i>	<i>Manitoba</i>
<i>VE5/VA5</i>	<i>Saskatchewan</i>
<i>VE6/VA6</i>	<i>Alberta</i>
<i>VE7/VA7</i>	<i>British Columbia</i>
<i>VE8</i>	<i>Northwest Territory</i>
<i>VE9</i>	<i>New Brunswick</i>
<i>VO1</i>	<i>Newfoundland</i>
<i>VO2</i>	<i>Labrador</i>
<i>VY0</i>	<i>Nunavut Territory</i>
<i>VY1</i>	<i>Yukon Territory</i>
<i>VY2</i>	<i>Prince Edward Island</i>
<i>VE0</i>	<i>On board a vessel in International Waters</i>

14. **foreign amateur operation in Canada, banned countries, third-party messages**

There are 11 possible exam questions from this section.

The key elements of knowledge relative to the amateur radio service and 3rd party “traffic” are:

- **A third-party message is communications using amateur radio service on behalf (or by) other persons.** No remuneration by a amateur radio operator can be accepted for third-party communications.
- Within Canada, amateur radio third-party message handling is allowed.
- Routine international third-party amateur communication from Canada is permissible if authorized by the other country involved.
- An amateur station operator must monitor and directly supervise the station operation during all communications between the third party(s). This may involve telephone patching over amateur radio.
- Third-party messages are expressly permitted to handle humanitarian and disaster relief communications unless specifically prohibited by the administration involved.
- Country administrations can register with **the International Telecommunications Union (ITU)** to ban Amateur communications with their country. At present, there are

no countries on a banned country list even though some countries in practice prohibit such activity by their citizens.

15. frequency bands and amateur qualification requirements

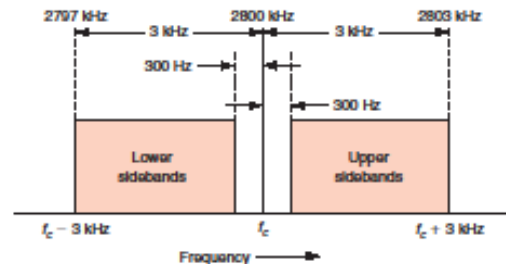
There are 11 possible exam questions from this section.

The key elements of knowledge are:

- *Know the amateur band allocations with respect bottom and top frequency edges from 1.8 to 450 MHz. See RBR-4, Schedule I, page 5.*
- *Specifically know that to permit operating privileges below 30 MHz (all HF and MF and LF allocations), the amateur operator must hold additional qualifications greater than just Basic, that is Basic with Honours, or Basic with Advanced, or Basic with 5 wpm Morse code.*
- *Know that you must operate on frequency allocations within the privileges of your qualification even if you are a guest operator of a friends station who has high qualification.*
- *Know that remote control of model crafts must be carried out of allocations 50 MHz and above. (RBR-4, section 5).*
- *Also refer to RIC 9 "Call Sign Policy and Special Event Prefixes"*

- *Know to be cautious close to band edges that your emission bandwidth may result in your signal being "out of band".*

Out of Band illustration



f_c is radio dial frequency

You may have set your radio having a dialed frequency within the band edge but the width of the modulation (for instance when using Upper Side Band) pushes the emissions out of the top edge of the band).

16. maximum bandwidth by frequency bands (This is given in RBR-4, Schedule I, Column II, page 5)

There are 11 possible exam questions from this section.

The key elements of knowledge are:

- *Know that the maximum emission bandwidth (the amount of bandwidth your signal occupies) on the bands **50 to 54 MHz and 144 to 148 MHz** is **30 kHz**. This bandwidth also supports narrow band FM (frequency modulation).*
- *Know that the maximum emission bandwidth on the **10 metre band (28 to 29.7 MHz)** is **20 kHz**. This bandwidth also supports narrow band FM (frequency modulation).*

- Know that many of the common HF bands have a maximum emission bandwidth of 6 kHz supporting AM (amplitude modulation).
- Know that the **30 metre band (10.100 to 10.150) only allows 1 kHz emission bandwidth** and therefore will not support AM or SSB modulations and therefore is restricted to CW (Morse code) and narrow digital modes.
- Know that conventional fast scan TV (either digital or analogue) requires considerable emission bandwidth of several mega Hertz. Fast scan analogue and high definition digital TV is therefore only allowed on amateur bands 420 MHz and above. Note that **the 430 - 450 and 902 - 928 MHz bands allow up to 12 MHz bandwidth** and above that, it is not specified.

**17. restrictions on capacity and power output by qualifications
(see RBR-4, section 10)**

There are 10 possible exam questions from this section.

The key elements of knowledge are:

- Amateur radio operators "should" use as little radio transmitter power as necessary for good reliable communications.
- **The Basic qualification certificate holder is limited to 250 watts transmit power as expressed as DC input power . DC input power is the product of the DC volts multiplied the DC amperes as applied to the output (amplifier) stage of the transmitter.**

- Alternately, *for single side band voice (SSB), the Basic qualification holder is limited to 560 watts Peak Envelope Power (PEP) as expressed as RF output to the antenna.*
- Alternately, *the Basic qualification holder is limited to 190 watts as expressed as Radio Frequency (RF) output power to the antenna for all emission modes except single side band voice (SSB).*
- For the **Advanced qualification** holder, the above power limits for DC input power, RF out power for all modes except SSB and RF output power for SSB are 1000, and 750 watts respectively. For **SSB voice, the Advanced holder can use a maximum RF output allowed is 2250 watts PEP.** Refer to RBR-4, section 10.2
- With respect to maximum transmitter equipment capacity, (the maximum amount of power it would be able to handle) is restricted to **3 dB (decibel) above the restrictions given above.** 3 dB is equivalent to doubling (or halving) the power. As an example, this means that based on measuring RF output power and having an Advanced Qualification and while using SSB voice mode of modulation, your transmitting amplifier capacity must have no more than a reserve capacity of $2 \times 2250 = 4500$ watts PEP, notwithstanding, you are still allowed to transmit no more than 2250 watts PEP RF power output and should have the metering to ensure this is not exceeded. Refer to RBR-4, section 10.

Note:

Ndb is the ratio of the two power levels expressed in decibels. (dB)

P2 is the output power level, P1 is the input power level

$$N_{dB} = 10 \log_{10} \left(\frac{P_2}{P_1} \right)$$

More on dB later in the course.