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Client Procedures Circular

Licensing Procedure for Differential Global Positioning System (DGPS) Stations

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Canada

Preface

Client Procedures Circulars describe the various procedures or processes to be followed by the public when dealing with Industry Canada. The information contained in these circulars is subject to change without notice. It is therefore suggested that interested persons consult the nearest district office of Industry Canada for additional details. While every reasonable effort has been made to ensure accuracy, no warranty is expressed or implied. As well, these circulars have no status in law.

Comments and suggestions may be directed to the following address:

Industry Canada
Spectrum Management Operations Branch
300 Slater Street
Ottawa, Ontario K1A 0C8

Attention: Spectrum Management Operations

E-mail: spectrum_pubs@ic.gc.ca

All Spectrum Management and Telecommunications publications are available on the following website: http://www.ic.gc.ca/spectrum.

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1. Principle

The Minister of Industry, through the *Department of Industry Act*, the *Radiocommunication Act* and the *Radiocommunication Regulations*, with due regard to the objectives of the *Telecommunications Act*, is responsible for radio frequency spectrum management in Canada. As such, the Minister is responsible for developing national policies and goals for spectrum resource use and ensuring the effective management of the radio frequency spectrum.

2. Mandate

Section 5 of the *Radiocommunication Act* states that the Minister may issue radio licences in respect of radio apparatus, and may also fix the terms and conditions of any such licence. Furthermore, when exercising these powers, the Minister is subject to the regulations made by the Governor in Council under section 6 of the Act.

3. Background

To determine their geographic position, conventional global positioning system (GPS) receivers must acquire radio signals from at least three of 24 active GPS satellites currently in orbit around the Earth. Each satellite emits a unique signal, and the GPS receiver matches these signals to their respective satellites in order to calculate the relative distance from each, and determine the receiver's actual position on the ground. The accuracy of this positioning information can vary due to various factors, including satellite positions, radio signal interference, atmospheric conditions and ground-based barriers. Consequently, accuracy of conventional GPS positioning information can vary by as much as 30 metres.

In the early 1990s, Industry Canada recognized a need to provide domestic seismic and survey industries with the authority to use a new type of radiolocation[1] technology, capable of providing precise ground-based positioning information for its users.

Differential Global Positioning Systems (DGPS) are comprised of fixed or transportable radio stations that receive conventional GPS satellite signals, and then transmit corrective radiotelemetry positioning data on non-GPS frequencies to authorized users within a specific geographic area.

Since their introduction in Canada, Industry Canada has provided specific VHF and UHF frequencies that may be used for DGPS purposes.

[1] The *Canadian Table of Frequency Allocations 9 kHz to 275 GHz (2009 Edition)* defines radiolocation as a radiodetermination service for purposes other than those of radionavigation.

4. DGPS Licensing Principles

4.1 General Principles

All DGPS radio station authorizations are to be issued on a shared, no-interference, no-protection basis to other licensed radio users.

Frequencies available for DGPS are only to be used for the transmission of differential correction information. Accessorial applications (i.e. guidance systems, automatic vehicle location, etc.) must be accommodated by other means.

4.2 DGPS Frequencies and Operating Conditions

Table 1 below specifies frequencies that may be used for DGPS and applicable operating conditions:

Table 1 - DGPS Frequencies and Operating Conditions

Frequencies (MHz)	Conditions
43.900, 43.980, 44.140, 44.240, 44.260	High and low power, Canada-wide
172.725	Low power, Canada-wide
463.750 and/or 468.750	High and low power in Alberta, Saskatchewan, Manitoba, Northwest Territories, Nunavut and northeastern British Columbia
464.6375	Low power, Canada-wide
469.9625	Low power, Alberta-wide
440.2875/445.2875, 440.3125/445.3125, 440.3375/445.3375, 440.3500/445.3500, 440.3750/445.3750, 440.4000/445.4000, 440.4250/445.4250, 440.4500,445.4500, 440.4750/445.4750, 440.5000/445.5000	High and low power, transmission via extended-range repeaters, Canada-wide

Note: In this document, low power is considered to be an effective radiated power (ERP) of 5 W or less, and high power is considered be an ERP of up to 30 W.

4.3 Department of National Defence and DGPS Issues

The *Canadian Table of Frequency Allocations 9 kHz to 275 GHz (2009 Edition)* currently indicates that the band 430-450 MHz is primarily allocated to the radiolocation service, and to the amateur and Earth exploration-satellite services on a secondary basis. DGPS operation within the 430-450 MHz frequency band is also permitted, on a no-interference, no-protection basis to other licensed radio users.

Industry Canada has also recently granted authority for the Department of National Defence (DND) to use specific portions of the 430-450 MHz band for its own position reporting systems, Canada-wide, on a no-interference, no-protection basis.

In order to minimize potential interference within the 430-450 MHz band, Industry Canada strongly encourages future DGPS licensees to operate within the 440-445 MHz band segment only. It should also be noted that although paired 440/445 MHz extended-range repeater frequencies shown in Table 1 seem to fall within the preferred 440-445 MHz DGPS sub-band, in actuality, the 445 MHz group of frequencies extend beyond it. Consequently, although use of extended-range frequencies in the 445 MHz band may still be permitted, DGPS licensees must accept possible interference from DND.

Applications for DGPS operation beyond the 440-445 MHz sub-band, or on frequencies other than those shown in Table 1, will be considered on a case-by-case basis by Industry Canada.

5. Licensing Procedure and Considerations

Fixed, transportable and mobile DGPS stations are to be licensed as radiodetermination service stations in accordance with the *Radiocommunication Regulations*.

Fixed and transportable DGPS stations may be authorized as multi-channel units, although only a single fee will apply to all authorized frequencies. Associated mobiles may also be licensed as multi-channel stations.

In addition, all requirements noted in Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems*, must be respected by DGPS licensees.

5.1 Eligibility

Licensees operating as radiocommunication users must comply on an ongoing basis with eligibility criteria set out in subsection 9(1) of the *Radiocommunication Regulations*. Licensees must provide advance notice to the Minister of Industry of any change that would have a material effect on such eligibility.

5.2 Licensing Issues

Licence applications for DGPS radio stations may be submitted directly to Industry Canada online via Spectrum Direct, accessible through Industry Canada's website at http://www.ic.gc.ca/eic/site/sd-sd.nsf/eng/home.

Alternatively, applicants may also choose to submit their applications to the nearest Industry Canada Spectrum Management office.[2] Regardless, applicants are encouraged to consult with their local office prior to submitting applications to ensure that frequencies requested are appropriate to meet their needs.

[2] A list of Spectrum Management offices is provided in Radiocommunication Information Circular RIC-66, available at the following departmental website: http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01742.html.

5.3 Licence Term

DGPS radio licences will expire on March 31 of each year. Licensees must pay the annual licence renewal fee before March 31 of each year for the subsequent year (April 1 to March 31).

5.4 Licence Fees

Licence fees for mobile and fixed or transportable stations will be charged in accordance with the *Radiocommunication Regulations* Schedules applicable to the radiodetermination service, as noted in subsections 60(3) and 62(1) respectively.

5.5 Service Standards

DGPS systems typically operate on a point-area basis. Consequently, the current departmental service standard for issuance of land mobile service licences apply. This standard allows up to seven weeks for the issuance of a radio station licence, effective the date that a complete application has been received, and for which coordination with a foreign administration or other agency is not required.

5.6 International Coordination

DGPS licensees must comply with current and future requirements of applicable cross-border frequency sharing and coordination arrangements established between Canada and other countries, as amended from time to time.

6. Technical Considerations

Licensees are required to comply with all existing and future Radio Standard Specifications (RSS), Standard Radio System Plans (SRSP) and other technical specifications relevant to their intended frequency band of operation.

7. Related Documents

Canadian Table of Frequency Allocations 9 kHz to 275 GHz (2009 Edition)
Client Procedures Circular CPC-2-0-03, *Radiocommunication and Broadcasting Antenna Systems*
Radiocommunication Information Circular RIC-66, *Addresses and Telephone Numbers of Regional and District Offices*
SRSP-500 - *Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 138-144 MHz and 148-174 MHz*
SRSP-501 - *Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 406.1-430 MHz and 450-470 MHz*
RSS-119 - *Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.41-960 MHz*