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Frequently Asked Questions on Low-Power FM Broadcasting

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Canada

Preface

Radiocommunication Information Circulars are issued for the guidance of those engaged in radiocommunications in 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.

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

In the past few years, Industry Canada has received many inquiries regarding low-power FM broadcasting. With this increased interest, coupled with new developments in broadcasting technologies and standards, Industry Canada is publishing this circular to clarify a few important points.

Q. Who regulates FM broadcasting in Canada?

A. Broadcasting is regulated by two government organizations, Industry Canada and the Canadian Radio-television and Telecommunications Commission (CRTC). To operate an FM broadcasting transmitter, one must apply for a broadcasting certificate from Industry Canada and a broadcasting licence from the CRTC. As the radio frequency spectrum manager, Industry Canada determines if the proposed transmission is compatible with other broadcasting transmissions, as well as non-broadcasting transmissions. The CRTC regulates, among other aspects, the programming content and ownership issues of the proposed undertaking (http://www.crtc.gc.ca). The procedure to apply for an FM broadcasting certificate from Industry Canada can be found in the Broadcasting Procedures and Rules, Parts 1 and 3 (BPR-1 and BPR-3), available on Industry Canada's website at http://ic.gc.ca/spectrum.

Q. What are considered low-power FMs in Canada?

A. In Canada, there are two classes of low-power FM broadcasting stations: very low-power FM (VLPFM), which normally allows up to 10 W effective radiated power (ERP) in any direction; and low-power FM (LPFM), which normally allows up to 50 W ERP. The ERP is equal to the transmitter power supplied to the antenna multiplied by the relative gain (dipole) of the antenna in a given direction in consideration of the transmission line losses. Generally, VLPFMs are only allowed in remote areas.

Q. I heard that certain 5 W FM broadcasting transmitters are exempted from Industry Canada's authorization and CRTC's licensing requirements. Is that right?

A. Industry Canada has not exempted **any** 5 W FM broadcasting transmitters from authorization requirements, regardless of the equipment manufacturer, purpose of the transmission or the affiliation of the operator. The FM broadcasting radio frequency spectrum, at 88-108 MHz, is adjacent to the aeronautical navigation and communications (NAV/COM) spectrum at 108-137 MHz. The navigational frequencies include those for the instrument landing system (ILS) localizer and the very-high frequency, omni-directional beacon (VOR). Given the demonstrated potential for interference from FM broadcasting transmissions into the NAV/COM frequency band, Industry Canada is understandably cautious about authorizing FM broadcasting undertakings (both Canada and other countries have seen actual cases of interference). In Canada, NAV CANADA (www.navcanada.ca) is the agency responsible for aeronautical safety. Industry Canada and NAV CANADA have a working arrangement that all FM broadcasting applications will be studied for possible interference to NAV/COM frequencies.

BPR-3 provides a short explanation of the interference mechanisms from FM broadcasting signals to aeronautical frequencies. For a more in-depth look and explanation, refer to Recommendations by the International Telecommunications Union (ITU), ITU-R SM.1009-1, *Compatibility Between the Sound-Broadcasting Service in the Band of About 87-108 MHz and the Aeronautical Services in the Band 108-137 MHz* (available for a fee from the ITU website at www.itu.int).

Industry Canada has no plan to exempt 5 W FM broadcasting transmitters from authorization requirements, as such an exemption would open the FM broadcasting band to all users, resulting in substantial increase in interference to both the aeronautical and the FM broadcasting bands. Anyone who installs, possesses or operates an unauthorized transmitter that is otherwise not exempted by Industry Canada, is subject to sanction under the *Radiocommunication Act*.

The CRTC has exempted from licensing certain low-power AM and FM broadcasting undertakings, for example, Limited Duration Special Event Facilitating Undertakings and Public Emergency Radio Undertakings, provided that certain conditions are met. For information on the CRTC Exemption Orders, please contact your local CRTC office or visit the CRTC's website at http://www.crtc.gc.ca.

It should be noted that because Industry Canada and the CRTC are responsible for different aspects of broadcasting, the two organizations have each established exemption criteria in their respective area of responsibility. A broadcasting transmitter exempted from the CRTC's licensing is not automatically exempted from Industry Canada's authorization requirement and vice versa. A VLPFM or LPFM exempted from licensing requirement from the CRTC would still be required to meet all authorization requirements from Industry Canada.

Q. Are there any FM broadcasting transmitters exempted from Industry Canada's authorization requirements?

A. Currently, the only FM broadcasting transmitters that Industry Canada exempts from authorization are those that meet the requirement of Broadcasting Equipment Technical Standards 1 (BETS-1). These transmitters, commonly called Low-Power Announcement Radios or alternatively Real Estate Radios, have very small coverage areas. According to BETS-1, "*The maximum power output of the transmitter into its antenna, with no modulation, shall not produce a field strength level of more than 100 μV/m as measured at a distance of 30 metres,*" which corresponds to a transmitter power output of less than 1 microwatt (μW). **CRTC licence exempt or not, any broadcasting transmitter not meeting the technical standard specified in BETS-1 will require authorization from Industry Canada for its installation and operation**, regardless of the identity of the equipment manufacturer, purpose of the broadcasting transmission or the affiliation of the operator.

Q. What is Industry Canada's view on using LPFM for emergency broadcasting purposes?

A. As the radio frequency spectrum manager, Industry Canada has a role to play in facilitating emergency telecommunications and is prepared to work with emergency organizations during an emergency to streamline authorization and give access to radio spectrum as soon as possible. However, Industry Canada is not prepared to give blanket exemption to VLPFM or LPFM broadcasting transmitters for the reasons given above. The conditions under which public emergency radio undertakings are exempted by the CRTC are listed in the CRTC Broadcasting Exemption Order 2000-11.

Industry Canada encourages emergency broadcasting in cooperation with local broadcasters wherever they are present, from both the spectrum management and the emergency preparedness perspectives. Local broadcast stations have large coverage areas, available expertise, and the general public expects to obtain information from them when an emergency situation occurs. Built-in redundancy is ensured by the fact that there are multiple broadcast stations, many of which also have alternate and/or emergency standby transmitters.

For further information on Industry Canada's role in emergency telecommunications, including emergency broadcasting, visit the departmental website at http://ic.gc.ca/epic/site/et-tdu.nsf/Intro.

Q. Is it possible to network several LPFMs on the same frequency to serve a larger area?

A. In general, networking several LPFM broadcasting transmitters together will not increase effective coverage. The receivers, bombarded by signals from the multiple FM transmitters, will be unlikely to lock in on a usable signal, and will produce poor quality audio. Currently, only digital radio broadcasting (DRB) is designed to operate multiple transmitters on a single frequency, called a single-frequency network (SFN), to increase the effective coverage area.

Q. The CRTC has exempted several types of LPFM stations. Should I expect any technical problem in implementing LPFM stations in urban areas?

A. In addition to the CRTC-licensed LPFM stations, the CRTC Exemption Orders for several types of LPFM stations have generated considerable interest among clients to provide LPFM service to rural areas, as well as urban centres. Applicants wishing to serve urban centres have to take into account that the FM broadcasting spectrum is congested in most Canadian urban centres, and should expect a more complex application filing process, as well as longer processing time.

In all cases, the LPFM applicant must demonstrate that its application meets the applicable broadcasting procedures and rules, including the criteria to protect existing FM assignments from interference. If the proposed LPFM may affect one or more FM assignments, Industry Canada requires the applicant to retain a broadcasting consulting engineer to make the technical submission. In addition, Industry Canada requires the applicant to coordinate with stations that it may affect.

In rural areas, it is much easier for an applicant to find an FM frequency that does not affect any FM assignments, and the application process is straightforward and simple. In urban centres, it is difficult to find useable FM frequencies, and it is difficult to design an LPFM undertaking which does not affect one or more FM assignments. The applicant must therefore expect to retain a consultant and coordinate with affected stations, incurring considerable time and expense.

Accordingly, Industry Canada recommends that applicants for LPFM stations in congested areas consider alternative solutions such as low-power AM stations, programming agreements with existing stations, use of FM subcarriers, etc.

Q. Can I operate a transmitter in the FM band for other usage than broadcasting?

A. Yes. Low-power transmitters certified under RSS-123, such as wireless microphones and FM transmitters for public information services, may be authorized with a radio licence under the operating conditions described in CPC-2-1-11. Other FM transmitters certified under RSS-210 and RSS-310, such as personal radiocommunication transmitters providing short range transmissions to nearby FM receivers (e.g. FM transmitters integrated in MP3 players) may be used without a radio licence.

For additional information on the Department's rules on LPFMs, please contact your local Industry Canada district office. Publications on Industry Canada's rules and the database for broadcasting stations in Canada can be downloaded from the following website: http://ic.gc.ca/spectrum.