Voluntary Licensing of Licence-Exempt Low-Power Radio Apparatus in the TV Bands
Preface

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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 spectrum management in Canada. As such, the Minister oversees the development of national policies and goals for spectrum resource use and ensures effective management of the radio frequency spectrum.

2. **Mandate**

Section 5 of the *Radiocommunication Act* specifies that the Minister may issue radio licences in respect of radio apparatus. Further, section 6 of the *Act* states that the Governor in Council may exempt radio apparatus from the requirement to be licensed.

3. **Background and Scope**

In October 2012, Industry Canada released decision paper SMSE-012-12 *Framework for the Use of Certain Non-broadcasting Applications in the Television Broadcasting Bands Below 698 MHz*. This decision paper was the result of a public consultation initiated in August 2011 regarding the use of television (TV) band frequencies below 698 MHz.

Among key decisions noted in SMSE-012-12 was the approval of a new type of licence-exempt radio service designed to operate on unassigned TV broadcast channels. These unassigned channels, also known as TV “white space,” can be used by this new radio service on a no-interference, no-protection basis with respect to licensed radio systems operating within the same TV bands.

More specifically, white spaces are unused portions of the TV broadcast spectrum in the VHF and UHF bands that are left vacant in order to prevent interference between broadcast stations, or because there is limited demand for over-the-air TV stations in certain geographic locations. For the purposes of this document, TV “white space” will hereafter be referred to as white space (WS) where applicable.

This document focuses on voluntary licensing of licence-exempt low-power radiocommunication apparatus (LPA), specifically, wireless microphones and cameras, remote cue and control communications equipment and equipment that synchronizes video camera signals, operating within the VHF and UHF TV broadcast bands.

4. **Related Documents**

RSS-Gen *General Requirements for Compliance of Radio Apparatus*

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1 Refer to SMSE-012-11 *Consultation on a Policy and Technical Framework for the Use of Non-Broadcasting Applications in the Television Broadcasting Bands Below 698 MHz*. 
5. Policy

5.1 General

The requirement to obtain a radio licence for an LPA depends upon the Radio Standards Specification (RSS) under which the LPA has been approved for use in Canada. For example, apparatus approved under RSS-210 or RSS-310 do not require a radio licence to operate in Canada, whereas a licence is required for those approved under RSS-123 (refer to CPC-2-1-11). Although LPA approved under RSS-210 and operating within TV broadcast bands do not require a radio licence, users of such LPA systems may still wish to voluntarily obtain a licence in order to minimize the likelihood of radio interference from other services operating within the same TV bands. For further information, refer to Section 6.

Note that licensing requirements do not apply to transmitters used for broadcasting.

5.2 Permissible TV Bands

Table 1 lists the TV frequency bands and bandwidths permitted for use by wireless microphones and cameras that have been certified under RSS-210.
Table 1: Frequency Bands for Wireless LPA Certified Under RSS-210

<table>
<thead>
<tr>
<th>Frequency Band (MHz)</th>
<th>Maximum Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>Microphones</td>
</tr>
<tr>
<td>VHF TV Band 54–72, 76–88, 174–216</td>
<td>200 kHz</td>
</tr>
<tr>
<td>UHF TV Band 470–608, 614–698</td>
<td>200 kHz</td>
</tr>
</tbody>
</table>

**Note 1**: The maximum transmit power for such LPA operating in the VHF TV bands is limited to 50 mW, whereas for those operating in the UHF TV bands, the transmit power is limited to 250 mW.

6. **Operational Requirements and Licensing**

6.1 **General**

As indicated earlier, TV-band LPA certified under [RSS-210](#) may operate in Canada without a licence. However, users of such equipment should be aware that TV frequency bands are shared with primary (i.e. TV broadcasting, remote rural broadband systems) and non-primary radio systems, including white space devices (WSDs).

WSDs need to be registered with an Industry Canada–designated white space database (WSDB)\(^2\) in order to be able to operate. A WSDB is a database system that provides lists of available TV channels to WSDs, while ensuring the protection of all licensed services operating within the same WS bands, including wireless microphone systems. Without registration, WSDs cannot obtain this technical information and therefore cannot operate. (Note that this information is provided automatically by the WSDB whenever registration of a WSD is performed.)

**Consequently, if protection from potential interference caused by WSDs is desired, users of licence-exempt LPA should voluntarily obtain radio licences.** Questions regarding licensing requirements should be directed to the nearest Industry Canada Spectrum Management office. Refer to [Radiocommunication Information Circular 66](http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sfi10498.html) (RIC-66) for contact information. In addition, users of such voluntarily licensed LPA must register their geographic coordinates, operating parameters and intended period(s) of operation with an Industry Canada–designated WSDB. Section 6.5 provides further details.

The registration information will then be shared among all designated WSDBs,\(^3\) and WSD users will be notified of the existence of voluntarily licensed LPA. This would in turn reduce the likelihood of

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\(^2\) A complete list of Industry Canada–designated TV White Space (TVWS) databases can be found at [http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sfi10498.html](http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sfi10498.html).

\(^3\) For technical parameters related to the sharing of registration information among designated WSDBs, refer to [DBS-01](#).
harmful interference caused by WSDs. Note that, conversely, WSDs cannot claim protection from radio interference caused by any licensed radio systems (including voluntarily licensed LPA).

### 6.2 Licensing

In the case of voluntary licensing, a single mobile radio station licence will be issued for all mobile LPA associated with the system and will specify the authorized transmit frequencies. A single land radio station licence will be issued for all fixed receivers and will specify the authorized receive frequencies. However, all licence fees will be charged to a single radio station channel.

The area of operation for most voluntarily licensed LPA will be limited to the actual geographical coordinates or area(s) of operation where associated mobile or land stations will be used. Normally, the licences will also specify a particular frequency of operation for the LPA. This requirement will be most relevant for voluntarily licensed LPA used on a regular basis at specific addresses or locations (churches, theatres, fixed entertainment venues, annual music events, etc.).

For certain “roaming” voluntarily licensed LPA, associated areas of operation may be indicated as being within a defined metropolitan area, “province-wide” or even “Canada-wide.” Associated radio licences may also list multiple TV-band frequencies for potential use. Except as noted in Section 6.4, requests for such licences will be assessed on a case-by-case basis where a licensee can demonstrate a justifiable need to use the LPA at a sequence of locations across a wide area (e.g. travelling concerts and shows), and knows in advance where and when the LPA will be operated.

As noted in Table 1, RSS-210 permits the operation of voice and data LPA in the VHF and UHF TV bands. Operators who wish to voluntary license wireless microphones and cameras operating within these bands must apply the maximum bandwidths for these devices, i.e. 200 kHz and 6 MHz, respectively.

Furthermore, frequencies for voluntarily licensed LPA operating in the TV bands must be carefully selected so that they are not too close to the visual, colour and sound carrier frequencies of analog television broadcast channels. These frequencies are respectively 1.25 MHz, 4.829545 MHz and 5.75 MHz away from the lower band edge of each television broadcast channel.

Authorization for voluntarily licensed wireless cameras will only be granted to security, public safety, broadcasting or arts and entertainment organizations.

### 6.3 Licence Conditions

The maximum service radius of voluntarily licensed LPA operating in a fixed location (church, concert hall, etc.) is typically 500 metres. However, some licensees (e.g. those associated with outdoor music festivals and sporting events) may provide multiple geographical coordinate points to form extended, polygon-shaped venues of operation. Moreover, broadcasters and other program producers may be authorized to operate LPA that roam within metropolitan areas, a province or even across the country — for news gathering purposes, for instance. Refer to Section 6.4.

In addition, all LPA licences will indicate that as a condition of licence:
(a) authorization is granted on a no-interference, no-protection basis with respect to primary services;

(b) All licensees, except for those operating ENG systems (as indicated in Section 6.4), must register their LPA stations’ actual geographical coordinates, operating parameters and intended period(s) of operation with an Industry Canada–designated WSDB. Otherwise, the licensee must accept any potential interference problems caused by WSDs; and

(c) it is the licensee’s responsibility to resolve any radio interference problems caused to primary service users. For example, the following statement could also be added to the licence: “Should interference be caused to other primary spectrum users, the licensee will be required to take whatever steps are necessary to reduce the interference, including immediate cessation of station operation.”

6.4 Licensing and Registration of Roaming Electronic News Gathering LPA

Electronic news gathering (ENG) systems are a special category of LPA, where licensing and WSDB registration requirements can differ from those for typical LPA. Whereas many LPA licences indicate the use of only a specific frequency at a defined location on a permanent basis, ENG licences often include authorization to use multiple frequencies over large areas (e.g. province-wide, Canada-wide).

As well, due to the “short-notice” nature of their business, it is often difficult to know in advance specifically when, where or for how long ENG systems may need to operate, or which of their assigned TV band frequencies are most suitable in a given area.

Regardless of these factors, ENG-type LPA licences may continue to indicate metropolitan, provincial or Canada-wide areas of operation, as appropriate, and authority to operate on allocated TV-band frequencies and/or frequency ranges in the VHF and/or UHF bands may remain.

In order to minimize the likelihood of receiving interference, however, licensed ENG-type LPA systems are encouraged to register their actual location and operational frequency parameters in advance with an Industry Canada–designated WSDB. Note that, as with other types of voluntarily licensed LPA, only prior registration can ensure that interference is not caused to ENG operations by WSDs.

Despite this, due to the short-notice situations that ENG operations often face, prior registration of licensed ENG system parameters may not always be feasible. To address this issue, voluntarily licensed ENG operators may also consider other frequency use alternatives, as appropriate, including those proposed below:

- Use frequencies in TV channels first-adjacent to local TV broadcast stations. First-adjacent channels may not be used by WSDs within the protected contours of any TV station in the 54–72 MHz, 76–88 MHz, 174–216 MHz and 470–512 MHz bands. Note that first-adjacent channels in the 512–608 MHz and 614–698 MHz bands may be used by low-power personal/portable WSDs.

- Use frequencies in TV channels immediately above and below TV channel 37 (608–614 MHz) that are unused by TV broadcasters in the same area. Although not mandatory, WSDB registration of ENG
operations on these channels is still encouraged, as these channels may also be used by personal/portable WSDs. Should short-notice ENG operations be registered, no new WSDs within the ENG system’s intended area of operation will be permitted within approximately 15 minutes of registration, and existing personal/portable WSDs operating on these channels will be required to change to another frequency within approximately 30 minutes of ENG registration.

In addition to the above alternatives, Industry Canada–designated WSDBs may also be consulted to help identify other TV channels that may meet short-notice ENG operational criteria.

It is important to remember that in all cases where short-notice frequency use alternatives are pursued by voluntarily licensed ENG operators, interference must not be caused to other licensed radio systems. As well, since such short-notice operations often use frequencies not listed on an ENG’s radio licence, protection from other radio services and WSDs alike cannot be assured.

Whether licensed/registered frequency parameters or short-notice options are utilized, in all cases, same-site frequency coordination by multiple ENG operators will be solely the responsibility of the ENG community.

### 6.5 Industry Canada–Designated WSDB Registration Information

As noted above, except in ENG-type LPA cases, voluntarily licensed LPA service areas and information regarding intended periods of operation must be registered with an Industry Canada–designated WSDB.\(^4\)

That way, WSDBs will know when and where licensed LPA will be operating and, thereby, the likelihood of radio interference can be minimized. Without registration of licensed LPA, protection from potential interference caused by WSDs on shared frequencies cannot be assured.

The following voluntarily licensed LPA information shall be provided to Industry Canada–designated WSDBs:

(i) Name of the individual or business responsible for the LPA;
(ii) Contact address;
(iii) Email address for contact person;
(iv) Phone number for contact person;
(v) Geographical coordinates (NAD83) of the location or area(s) of operation where the LPA will be used;
(vi) TV channel(s) and frequencies to be used by the LPA at the indicated site(s);\(^5\)

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\(^4\) Registration only needs to be done once, and may be done with any Industry Canada–designated WSDB since the WSDBs will synchronize this data among themselves.

\(^5\) Since protection is based on TV channel use, this level of precision is required. The WSDB will only permit registration of LPAs for the frequency (typical for LPA operating in a fixed location) or frequency range (typical for ENG systems that may operate within a wider area) specified on the LPA licence.
(vii) Specific hours, days, weeks and/or months when the LPA will be used (note that on dates and times when LPAs are not in use, the site will not be protected from WSDs); and
(viii) LPA licence number.

With regard to item (v) above, the following parameters should be noted:

(a) The area of operation for an LPA may be defined as a point and radius area, or as a quadrilateral. Multiple registrations that specify more than one point in the facility may be entered for very large sites.

(b) Under the point and radius option, the operational location(s) of the LPA can be defined using up to 25 geographical points at any one time, with a maximum radius of operation of 500 metres around each point; or

(c) Under the quadrilateral option, the operational location(s) of the LPA can be defined based on the edges of straight lines connecting the vertices (geographic points) of the quadrilateral.

   (i) Each quadrilateral must be specified with four geographic points and the distance between any two adjacent points must not exceed 3 km.

   (ii) For LPAs that may occupy a larger area, up to four non-contiguous quadrilaterals may be registered.

Registration of voluntarily licensed LPA can be done by directly accessing any one of the designated WSDBs provided in the List of Designated White Space Databases at: http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf10498.html.

6.6 Scheduling

It should be noted that in order to adequately facilitate WSDB information update functions, a minimum 24-hour advance notice for voluntarily licensed LPA registration is recommended. Conversely, where it is anticipated that licensed LPA operations in a specific area will take place at regular intervals (e.g. annual music festivals), pre-registration cannot be made more than one year in advance.

Operators of fixed-venue or extended-venue LPA, used on a routine basis at permanent addresses or locations may, if applicable, register their related hours of operation as “continuous” or may indicate a regular, ongoing schedule. If no specific period of operation is indicated by the LPA licensee, 24-hour, seven-day-per-week operation at the licensee’s indicated area/location of operation will be presumed.

With regard to voluntarily licensed ENG systems, interference protection from WSDs is only afforded during the period for which such ENG operations are actually registered.

To ensure that specified areas of operation are not inadvertently rendered unavailable for use by WSDs for extended periods of time, licensed/registered ENG operations can use a frequency (or set of frequencies) at a stated location (or given set of geographical coordinates) for a maximum 10-day period.
Should further ENG operation at the area(s) be required, subsequent re-registrations for the exact same site and frequency(ies) would be permitted for a maximum of two additional 10-day intervals (i.e. 30 days in total). Should operation still be required beyond these stated periods, other locations and/or frequency alternatives should be pursued.