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Spectrum Management and Telecommunications

Client Procedures Circular

Determinations of Harmful Interference with Respect to Radio-Sensitive Equipment

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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.

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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 is responsible for developing national policies and goals for spectrum resource use and ensuring effective management of the radio frequency spectrum.

2. Mandate

Paragraph 5(1)(*l*) of the *Radiocommunication Act* states that:

> "... the Minister may ... make determinations as to the existence of harmful interference and issue orders to persons in possession or control of radio apparatus, interference-causing equipment or radio-sensitive equipment that the Minister determines to be responsible for the harmful interference to cease or modify operation of the apparatus or equipment until such time as it can be operated without causing or being affected by harmful interference;"

3. Definitions

"Radio-sensitive" equipment is defined in the *Radiocommunication Act* as:

> "... any device, machinery or equipment, other than radio apparatus, the use or functioning of which is or can be adversely affected by radiocommunication emissions".

Section 2 of the *Radiocommunication Act* defines "harmful interference" as:

> "... an adverse effect of electromagnetic energy from any emission, radiation or induction that
>
> (a) endangers the use or functioning of a safety-related radiocommunications system, or
>
> (b) significantly degrades or obstructs, or repeatedly interrupts, the use or functioning of radio apparatus or radio-sensitive equipment."

Table 1 describes three types of equipment. For the application of the values in that table, and *for only that table*, Industry Canada has developed the following definitions:

> "broadcasting receivers" means equipment for the reception of broadcast sound and television signals, e.g. stereo receivers/tuners, clock radios, televisions, etc.;
>
> "associated equipment" means devices associated with broadcasting receivers, e.g. audio/video recorders and playback devices;

"radio-sensitive equipment" means all other non-radio electronic equipment, e.g. baby monitors, telephones, electric organs, home security systems, computers, guitar amplifiers, etc.

4. Background

Canadians' ever-increasing demand for commercial wireless services and licence-exempt radio equipment has led to elevated levels of radio frequency energy in urban areas.

When consumer electronic products malfunction in the presence of radio signal energy, the problem is often assumed to be entirely the fault of the radio transmitter. Although possible, it is often more likely that the consumer device is inadequately designed to operate properly in the presence of radio signals or other sources of electromagnetic energy. Consumer devices that are affected by other electrical equipment or sources of electromagnetic energy generally lack immunity protection, whereas devices that are affected by radio signals for which they are not intended to receive are described as being "radio-sensitive."

Consumer electronic products and radio transmitters are all required to meet applicable Industry Canada technical standards to ensure that they perform their intended functions without causing interference. There are few potential defects that would cause a normally operating radio transmitter to adversely affect consumer electronic equipment, and in most cases, only other radio receivers would be impacted.

To assist in making determinations to resolve immunity complaints, the Department has produced Electromagnetic Compatibility Advisory Bulletin 2 (EMCAB-2), *Criteria for Resolution of Immunity Complaints involving Fundamental Emissions of Radiocommunications Transmitters*. EMCAB-2 sets out field strength values (see Table 1 below), that may be used by the Department to help to determine if a problem results from a radio transmitter's usage or from the consumer equipment's lack of immunity. The Minister's determination will be based upon the measured levels of radio frequency energy at the site concerned and whether they exceed the values shown in Table 1.

Table 1

Type of Equipment	**Field Strength Criterion**	
	dbuv/m	**V/m**
Broadcasting Receivers	125	1.83
Associated Equipment	125	1.83
Radio-Sensitive Equipment	130	3.16

5. Areas of Responsibility

To effectively resolve electromagnetic immunity problems, the cooperation of Industry Canada, radio operators, manufacturers, dealers and consumers is required. General responsibilities for each stakeholder involved in this resolution process are outlined below.

5.1 Industry Canada

The Department provides technical information and advice to consumers who possess electronic equipment adversely affected by radio signals. Based upon field strength values identified in EMCAB-2 (see Table 1), the Department may also make determinations as to the cause of immunity-related problems and will advise the appropriate stakeholders.

The Department will not normally respond to requests from the public to make a formal determination of harmful interference unless it can be demonstrated that all other reasonable courses of action to resolve the problem have been explored.

Industry Canada fully expects complainants and operators of radio transmitters to cooperate with each other to resolve radio-sensitive equipment problems. Failure to cooperate may result in the imposition of operating restrictions for the use of the transmitter, a requirement that radio-sensitive equipment be modified to improve its electromagnetic immunity, or both.

As a last resort, the Department may decide to make a determination of harmful interference. This determination may result in the imposition of new terms and conditions for the operation of a radio transmitter, or an assessment that the complainant's electronic equipment lacks sufficient immunity protection to operate properly in the presence of radio signals or other types of electromagnetic energy.

5.2 Operators of Radio Transmitters

Operators of radio transmitters should be aware that even when they comply with all requirements of the *Radiocommunication Act*, the *Radiocommunication Regulations*, applicable technical standards and specific licence conditions, they should take all practical steps to minimize the likelihood of interference from occurring. EMCAB-2 (see Table 1) further identifies field strength levels on the premises of affected equipment owners above which radio operators must act to resolve immunity problems.

Radio operators are encouraged to work with complainants in resolving problems without recourse to the Department. Failure by radio users to provide such cooperation may result in the Department imposing additional terms and conditions upon the user's authorization to operate the radio apparatus. Such terms and conditions may include, but are not limited to, limiting the user's radiated power, hours of operation or choice of operating frequencies. In extreme cases, it may result in suspension or revocation of the user's authorization.

If the Department agrees to make a determination of harmful interference and it is found that measured field strength levels on the premises of the complainant exceed those shown in Table 1, the Department will require the operator of the transmitting station to reduce the station's radiated field strength, at the measurement point, to those levels. Radio operators will normally decide how best to reduce the station's field strength level as required; however, the Department can provide direction on how this can be achieved.

5.3 The Consumer

Consumers should also be aware that electronic manufacturers can incorporate varying degrees of electromagnetic immunity into their product's design, and that the inclusion of such protection measures is wholly voluntary. Consequently, due to a lack of sufficient inherent electromagnetic immunity, consumer electronic equipment may malfunction in the presence of radio (electromagnetic) signals.

Consumers, particularly in areas where radio frequency spectrum usage is high, should therefore insist, through the marketplace, that manufacturers design consumer goods that provide sufficient electromagnetic immunity appropriate for the radio frequency environment in which they will be used. Furthermore, consumers must ensure that their equipment is installed and used is accordance with the manufacturer's specifications.

Prior to requesting that the Department make a determination of harmful interference, complainants should discuss the problem with the operator of the radio apparatus (if known) suspected of causing interference. Many radio operators are quite knowledgeable in resolving such problems, and will offer their services freely to assist complainants in improving the immunity protection of affected equipment.

Should Industry Canada agree to make a determination of harmful interference and it is found that the measured field strength of radio signals on the complainant's premises do not exceed levels shown in Table 1, or if problems persist after required changes have been made to a radio transmitter (see section 5.2), the onus of responsibility to improve the immunity of affected equipment will shift to the complainant.

Complainants whose equipment does not meet the immunity levels described in Table 1 should report such problems to the customer service department of an appropriate equipment manufacturer or dealer, who may be able to provide assistance or offer interference control information. Electronic equipment manufacturers and dealers can usually be contacted via telephone, mail or through their website.

5.4 Electronic Equipment Manufacturers/Dealers

Manufacturers and dealers should take an interest in the field performance of their products in order to ensure customer satisfaction. To facilitate this goal, electronic products must be certified for use in Canada, and manufacturers/dealers should ensure that their products are installed and operated in accordance with applicable Industry Canada technical standards. As well, manufacturers should consider the electromagnetic environment in which their products may be operated, and incorporate sufficient immunity measures into their design.

When manufacturers or dealers are notified of an immunity problem with their product, they should consider repairing, modifying or replacing affected equipment. If unable to effect a suitable repair or replacement, a refund of the equipment's purchase price may also be offered.

In order to distinguish between a mere technical problem, and an equipment design prone to inadequate immunity protection, manufacturers and dealers should ensure that their service personnel are sufficiently trained to understand basic electromagnetic principles and implement interference-suppression techniques.