

Spectrum Management

Broadcasting Circular

AM, FM and TV Broadcasting Undertakings Inspection Procedures

NOTICE

Broadcasting circulars are issued for the guidance of Departmental staff and are complementary to **Broadcasting Procedures and Rules.**

Foreword

As part of its Broadcast Standards and Regulations Program, the Department has enacted an inspection procedure for AM, FM and TV broadcasting undertakings.

Purpose

The purpose of this document is to explain the inspection procedures which the Department will undertake to carry out the inspections of AM, FM and TV undertakings.

Procedure

The details of the procedure are provided on the following pages.

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1. General

- 1.1 This document presents the procedures for inspecting AM, FM and TV broadcasting undertakings. The program will permit a unified approach for the inspection of the undertaking and for the technical evaluation of its performance. Broadcasting undertaking inspections consist of three parts: off-air, on-site and client interface.
- 1.2 Off-air inspections evaluate the performance and operation of an undertaking by measurement of the broadcast signal at a location remote from the undertaking, with an appropriate antenna, receiver, and test equipment; on-site inspections evaluate the performance and operation by observing actual operation and maintenance of the undertaking and recording of measurements taken at the transmitter location.
- 1.3 A client interface is also included as a portion of the on-site inspection in order to allow the departmental representative(s) and the broadcaster or his representative an opportunity to review the technical operation of the undertaking and to have a general discussion on policies, rules and responsibilities.
- 1.4 This document replaces IPC-3-16-01, IPC-3-16-02 and IPC-3-16-03.

2. Purpose of Inspections

Broadcast inspections verify that undertakings are constructed, operated and maintained in accordance with Broadcasting Certificates, BPRs, Broadcast Transmission Standards, as well as Canadian and international radio regulations. Broadcast inspections also are a means of recommending the renewal, conditional renewal or non renewal of Broadcasting Certificates.

3. Frequency of Inspections

- 3.1 The frequency of inspections of broadcasting undertakings shall be related to the period of the Broadcasting Certificate, and shall be at least once every seven years.
- 3.2 Regional or district offices may decide that:
 - inspections of remote area low-power undertakings (LPs) may be performed less frequently than specified;
 - any inspection may be undertaken more frequently than specified, e.g. for staff training or in support of a directed investigation;
 - the measurement of off-air technical parameters may be conducted more frequently than specified.
- 3.3 The frequency of inspections specified in section 3.1 constitutes a minimum requirement.

4. Off-Air Inspection Procedure

4.1 Preparation

The inspector shall review the documentation on file for the station to be monitored. Particular attention should be given to previous test results if available and the operating parameters detailed on the Broadcasting Certificate.

4.2 Selection of Measurement Points

- 4.2.1 The inspector shall select a location suitable for the field strength and other off-air measurements.
- 4.2.2 Measurement points should be accessible, clear of obstacles, free of sources of interference and be referenced to landmarks in order that they can be readily located during subsequent inspections. Unusually high or low places and heavily foliated areas should be avoided.
- 4.2.3 Proximity to vehicles, wire fences, tall trees, telephone or hydro lines and steel towers should be avoided. A good rule of thumb is to stay clear of such obstacles by at least ten times the obstruction height. Care should be taken to avoid having such objects between the field-strength meter and the transmitting antenna when making measurements.

- 4.2.4 Measurements should be made in the far-field of antenna installations.
- 4.2.5 For TV and FM, the distance for measurement should be $>0.5 a^2/\lambda$, where:
 a = largest dimension of antennas
 λ = wavelength of signal
- 4.2.6 For AM, the distance should be at 1 km or beyond from the nearest transmitting tower of the array.

4.3 Scope of Inspections

An off-air inspection shall include a measurement and an evaluation of the following technical aspects of the broadcast undertaking:

- (a) Carrier frequency:
- AM: Carrier
 - FM: Main and SCMO carriers¹
 - TV: Video and Aural
- (b) Deviation:
- FM: Main carrier with stereo and SCMO sub-carriers and consult Table 1 for maximum modulation levels²
 - TV: Aural sub-carrier
- (c) Number and type of programming carried on SCMO subcarriers (FM). Since SCMO's may carry non-broadcast material, the intent of the check is to ensure that the broadcaster is not infringing upon the rights of other radio users, i.e. common carriers.
- (d) Percentage modulation (AM):
 Measure the maximum modulation level taken at three intervals of two minutes each.
- (e) RF emission limits (including spurious and harmonics):
- For AM, consult BTS1-2
 - For FM, (only Tx specs. available for now - ref.: RSS-153)
 - For TV, (only Tx specs. available for now - ref.: RSS-154)
- (f) IM products within the NAV-COM 108 - 137 MHz band from FM transmitters.
- (g) Spectrum signature (AM, FM, TV).

5. On-Site Inspection Procedure

5.1 Scope of On-Site Inspections

5.1.1 An on-site inspection shall include the following:

- (a) Visual verification of the Broadcasting Certificate
- (b) Verification of authorized power and ERP

5.1.2 For FM and TV, ERP should be determined from reading the power level at the monitoring point of the transmitter taking into account the coupling loss of the test point, the antenna line loss and antenna gain. This may be physically difficult or impractical for LP and VLP undertakings.

¹ For FM, determine the number of carriers preferably above and below 76 kHz.

² Temporary Note: Measurement of the deviation of a complex FM signal is difficult. A report on measurement methodology has been submitted for approval by SMBC. Upon approval, this report would form the basis of a document similar to BTS1-2.

5.1.3 For AM only:

- (a) Obtain the following transmitter readings for day and night operations:
 - output line impedance
 - output current
 - output power
- (b) Obtain current and impedance readings (if possible) at the input of each antenna tower for omni-antennas.
- (c) Obtain current, phase and impedance readings (if possible) at the input of each antenna tower for directional antennas.

5.1.4 For AM, FM and TV:

- (a) Verification of transmitter type approval or type acceptability. If sticker is unavailable, check the current *Radio Equipment List* (REL) on the LAN.
- (b) Verify that control and monitoring equipment are properly functioning.
- (c) Note condition of tower huts, fences, tower structures, transmitter building, warning signs, painting and lighting. Safety-related aspects should be noted.
- (d) Note any new development taking place or being planned, and any new structure within 1 km, which could cause multi-path, re-radiation, or public safety concerns e.g. *Safety Code 6* guidelines.
- (e) For FM and TV, note any change in antenna type, number of bays, make and model.
- (f) For AM, note any significant physical departure of the antenna array layout from what has been approved (number of towers, orientation, etc.).
- (g) Note the type of signal feed, STL or other, for licensing compliance check.
- (h) Record any other technical change which occurred since the last visit.

5.2 Client Interface

- 5.2.1 The client interface portion of the on-site inspection normally consists of a pre-arranged meeting between the broadcaster or his representative and a departmental representative, usually an inspector.
- 5.2.2 The departmental representative should discuss any problems associated with the operation of the undertaking and, at the same time, bring the broadcaster or his representative up to date on regulations, standards, procedures and policies which may affect the operation.
- 5.2.3 Broadcasters should be reminded that they are expected to take immediate corrective action in the event of valid complaints from the public, another broadcaster or a radio service licensee concerning interference which is caused by the broadcast signal. Note that the departmental representative should have a thorough understanding of broadcast operations and related problems which may be discussed.
- 5.2.4 The departmental representative should also discuss the responsibilities of the broadcaster under the *Canadian Environmental Assessment Act*. In addition, various safety aspects at the site should be discussed, e.g. the condition of the safety interlocks, the fencing, the warning signs for exposure to RF energy and the obstruction painting and lighting. Where a structural problem is suspected which could relate to the safety of a tower, the inspector should inform the responsible party for the structure.
- 5.2.5 Finally, the meeting also provides an opportunity to discuss:
 - whether the client has any outstanding problems that the Department should be dealing with;
 - whether the department is meeting the broadcaster's needs in a satisfactory manner, and vice versa.

6. Forms

Until a final form is developed, the existing inspection report form and the electronic version used by SCOMS will continue to be in force.

Table 1

**Maximum Modulation Levels in FM
Using Additional Baseband Sub-Carriers³**

Number of Sub-Carriers below 76 kHz	Number of Sub-Carriers above 76 kHz	Maximum Deviation of Main Carrier in kHz
No sub-carrier	No sub-carrier	75
One sub-carrier	No sub-carrier	75
No sub-carrier	One sub-carrier	75
Two or more sub-carriers	No sub-carrier	78.75
No sub-carrier	Two or more sub-carriers	78.75
One sub-carrier	One sub-carrier	82.5
Two or more sub-carriers	One sub-carrier	82.5
One sub-carrier	Two or more sub-carriers	82.5
Two or more sub-carriers	Two or more sub-carriers	82.5

³ 100% modulation is equivalent to 75 kHz carrier deviation.