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Spectrum Management and Telecommunications

Interference-Causing Equipment Standard

# **Information Technology Equipment (ITE) – Limits and methods of measurement**

## Preface

This Interference-Causing Equipment Standard ICES-003, Issue 5 sets out standard requirements for Information Technology Equipment (ITE).

This document will be in force as of the publication date of Notice SMSE-013-12 in Canada Gazette, Part I.

A transition period ending August, 31, 2013, is provided, within which compliance with ICES-003, Issue 5, or ICES-003, Issue 4, will be accepted. After this date, only compliance with ICES-003, Issue 5, will be accepted. The requirements in ICES-003 Issue 5 apply to new models. Existing models in compliance with a previous issue of ICES-003 shall remain compliant under the requirements of that previous issue or may adopt the requirements in Issue 5.

### List of Changes:

- (1) The title of the document has been changed from ICES-003 *Digital Apparatus*, to ICES-003 *Information Technology Equipment (ITE) – Limits and methods of measurement*.
- (2) EMCAB-3 guidance document has been merged into ICES-003.
- (3) Note that Issue 5 of ICES-003 has been entirely modified. Consequently the numerous changes are too extensive to list.

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

Issued under the authority of  
the Minister of Industry

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## 1. Scope

This Interference-Causing Equipment Standard – 003 (ICES-003) sets out the technical requirements relative to radio noise generated by Information Technology Equipment (ITE).

## 2. Purpose and Applications

### 2.1 Information Technology Equipment (ITE)

Information Technology Equipment (ITE) is defined as devices or systems that use digital techniques for purposes such as data processing and computation. ITE is any unintentional radiator (device or system) that generates and/or uses timing signals or pulses having a rate of at least 9 kHz and employs digital techniques for purposes such as computation, display, data processing and storage, and control.

ITE is designated Category II Equipment<sup>1</sup>, meaning that a Technical Acceptability Certificate (TAC), or equipment certification, is not required. ITE subject to ICES-003 is approved through the method of Self-Declaration of Compliance (SDoC) by the manufacturer, importer or distributor of ITE who shall ensure that compliance with all technical requirements prescribed by ICES-003 has been demonstrated and the results compiled into a test report. The test report shall clearly state which test method was used to determine compliance. The methods of measurement are set out in the standards incorporated by reference in ICES-003 that are specified in section 3.

### 2.2 Classes of limits for ITE

ICES-003 prescribes two Classes of limits of radio noise for ITE: Class A limits for non-residential operation and the more stringent Class B limits for residential operation, as set out in Section 5.

Only ITE intended strictly for non-residential use in commercial, industrial or business environments, and whose design or other characteristics strongly preclude the possibility of its use in a residential environment, shall be permitted to comply with the less stringent Class A limits.

All ITE that cannot meet the conditions for Class A operation shall comply with the Class B limits.

**Note:** The ITE shall comply with both the power line – conducted and the radiated emissions limits within the same Class, with no intermixing.

### 2.3 ITE Peripheral Devices

A peripheral device is any device that feeds input data to and/or receives output data from an ITE. Peripherals include any device externally connected to the ITE, any device internal to the ITE that connects it to an external device by wire or cable, and any device designed for external or internal connection to the ITE for increasing the operating or processing speed of the ITE (e.g., turbo cards, enhancement boards). Examples of peripherals include printers, external disk drives, monitors, keyboards, external memory cards and other input/output devices that may or may not contain digital circuitry.

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<sup>1</sup> See *Radiocommunication Regulations (SOR/96-484)* - December 11, 2011

Peripheral devices are themselves considered ITE and shall comply with ICES-003, subject to the following provisions:

Peripheral devices that are marketed as separate items shall be tested for compliance with ICES-003 while connected to an ITE system in an intended configuration and normal modes of operation, and shall also comply with the reporting and labelling requirements of ICES-003.

For peripheral devices that are only available as part of an ITE system, the ITE system shall be tested for compliance with the included peripheral devices connected in their intended configuration and in normal modes of operation.

For peripheral devices that are supplied exclusively to equipment manufacturers for further fabrication or for inclusion in an ITE system, compliance of the peripheral device on the part of the original supplier is not required. Rather, responsibility for compliance of the peripheral device shall rest with the equipment manufacturer or importer of the final product.

## **2.4 Radio Apparatus and Broadcasting Equipment**

A radio apparatus that is specifically subject to an Industry Canada Radio Standard Specification (RSS) and which contains an ITE is not subject to ICES-003 provided the ITE is used only to enable operation of the radio apparatus and the ITE does not control additional functions or capabilities.

ICES-003 does not apply to broadcasting equipment including broadcasting receivers and broadcast satellite receivers.

## **2.5 ISM Radio Frequency Generators**

ISM (Industrial, Scientific or Medical) radio frequency generators, though they may contain ITE, are excluded from the definition of ITE and are not subject to ICES-003. They are instead subject to the Interference-Causing Equipment Standard ICES-001, which specifically addresses ISM radio frequency generators.

## **2.6 AC Adapters, Battery Eliminators and Battery Chargers**

ITE employing only battery power and having no provision for operation while connected, directly or indirectly, to the AC power lines is not required to meet the power line conducted limits.

ITE that include or make provision for the use of AC adapters, battery eliminators or battery chargers that permit operation while charging, or that are connected to the AC power lines indirectly while obtaining their power through another device that is connected to the AC power lines, shall be tested for compliance with the power line conducted limits.

## 2.7 Determination of Interference

The following applies to all interference-causing equipment whether or not the equipment complies with applicable standards, or whether or not applicable standards exist for the equipment.

Where the Department determines that a model or several models of equipment cause or are likely to cause interference to radiocommunication, the Department shall give notice of the determination to the responsible parties. No person shall manufacture, import, distribute, lease, offer for sale, sell, install or use such equipment where a notice has been given.

Where the Department determines that a unit of equipment causes interference, the Department shall order the persons in possession or control of the equipment to cease, until such time as it can be operated without causing interference or such adverse effects.

## 3. Normative Reference Publications

This regulatory standard (ICES-003) refers to the following publication, and where such reference is made, it shall be to the edition listed below. Where there may be discrepancies between the requirements as stated in ICES-003 text and the relevant text of the publications referenced in this section, the ICES-003 text shall take precedence.

- (a) **Canadian Standards Association Standard CAN/CSA-CISPR 22-10**, *Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement*

This is an adoption with Canadian deviations of the identically titled IEC (International Electrotechnical Commission) Standard CISPR (International Special Committee on Radio Interference) 22, Sixth edition, 2008-09.

A copy of this standard can be purchased online at: [www.csa.ca](http://www.csa.ca)

- (b) **ANSI C63.4**, *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz<sup>2</sup>* (latest published edition)

A copy of this standard can be purchased online at: <http://www.ieee.org>

## 4. Exemptions

The following ITE are exempt from all requirements set out in this Standard:

- (a) ITE used exclusively in any vehicle including motor vehicle and aircraft.

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<sup>2</sup> Until further notice the use of ANSI C63.4-2003 is permitted in lieu of the latest edition of ANSI C63.4.

- (b) ITE used exclusively as an electronic control or in a power system, either by a public utility or in an industrial plant/factory;
- (c) ITE used exclusively as industrial, commercial, or medical test equipment;
- (d) ITE used exclusively in an appliance or electrical machinery, e.g., dishwasher, clothes dryer, air conditioner (central or window), power tools, electric motors and generators, etc.;
- (e) Specialized medical ITE, used under the direction of a licensed health care practitioner, whether in a domestic environment or a health care facility. Non-specialized medical ITE retailed to the general public and ITE used by health care practitioners for purposes other than medical treatment, do not qualify for this exemption;
- (f) ITE having a power consumption not exceeding 6 nW;
- (g) Joystick controllers or similar devices, such as a mouse, used with ITE but which contain only non-digital circuitry or a simple circuit to convert the signal to the format required are viewed as passive add-on devices;
- (h) ITE in which both the highest frequency generated and the highest frequency used are less than 1.705 MHz and which neither operates from, nor contains provision for operation while directly or indirectly connected to the AC power lines;
- (i) ITE used exclusively in central office telephone equipment operated by a telecommunications common carrier in a central office.
- (j) ITE used exclusively in broadcasting equipment.

## 5. Technical Requirements

The technical requirements prescribed by this standard comprise methods of measurement and limits for ac power line conducted and radiated noise emissions. Within the routes to compliance described in this Section, no intermixing is permitted between the two publications referenced in Section 3 for the methods of measurement; that is, whichever of the two publications referenced in Section 3 is chosen for methods of measurement of conducted and radiated emissions below 1 GHz, that same reference publication shall be used for the methods of measurement of (radiated) emissions above 1 GHz.

### (a) Below 1 GHz

For power line conducted emissions and radiated emissions measurements below 1 GHz, compliance with ICES-003, Issue 5 can be demonstrated in one of three ways:

- (i) by complying with the powerline conducted and radiated emissions limits and employing the methods of measurement contained in the publication referenced in Section 3(a) (CAN/CSA-CISPR 22-10);
- (ii) by complying with the powerline conducted and radiated emissions limits shown in Section 6 of this ICES-003, and employing the methods of measurement described in the publication referenced in Section 3(b) (ANSI C63.4); or

- (iii) by complying with the powerline conducted emissions limits in Section 6 of ICES-003 and the radiated emissions limits contained in the publications referenced in Section 3(a) (CAN/CSA-CISPR 22-10), while employing the methods of measurement contained in the publication referenced in Section 3(b) (ANSI C63.4).

**Note:** If as per Section 5(a)iii), ANSI C63.4 is used for the methods of measurement and compliance with the radiated limits below 1 GHz contained in CAN/CSA-CISPR 22-10 is chosen, then Table 3 for determining the frequency range of measurement applies.

#### **(b) Above 1 GHz**

For radiated emissions measurement above 1 GHz, if applicable, compliance may be demonstrated in one of two ways:

- (i) by complying with the limits and methods of measurement above 1 GHz contained in CAN/CSA CISPR 22-10, or
- (ii) by complying with the limits above 1 GHz shown in Section 6 and employing the methods of measurement for above 1 GHz contained in ANSI C63.4.

### **5.1 Use of Normative Reference Publications (Test Method)**

Only one of the publications referenced in Section 3, CAN/CSA CISPR 22-10 or ANSI C63.4, may be used for methods of measurement, in accordance with the provisions of paragraphs (a) and (b) of Section 5. If one referenced publication is chosen to be used for methods of measurement below 1GHz, the same publication shall be used for methods of measurement above 1 GHz.

### **5.2 Test Facilities**

Test facilities performing measurements on ITE do not need to be registered on the IC website as a recognized test facility. The test site shall comply with the requirements in CISPR 16-1-4:2007 referenced in CAN/CSA-CISPR 22-10 or with ANSI C63.4 depending on which test method was followed.

## **6. Limits using ANSI C63.4**

Compliance with the limits set out in this Section shall be demonstrated using only the method of measurement described in the publication referenced in Section 3(b) ANSI C63.4.



## 6.1 AC Power Line Conducted Emissions Limits

**Class A:** An ITE meeting the conditions for Class A operation defined in Section 2.2 shall comply with the Class A conducted limits set out in Table 1.

**Table 1 – Class A Conducted Limits**

Frequency (MHz)	Class A Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.5	79	66
0.5 to 30	73	60

**Class B:** An ITE that does not meet the conditions for Class A operation shall comply with the Class B conducted limits set out in Table 2.

**Table 2 – Class B Conducted Limits**

Frequency (MHz)	Class B Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

\* Decreases with the logarithm of the frequency.

## 6.2 Radiated Emissions Limits

Radiated emissions from an ITE shall be measured from the lowest frequency generated, or used, in the device or 30 MHz, whichever is higher, up to the frequency determined in accordance with Table 3.

**Table 3 – Frequency Range of Measurement**

<b>Highest Frequency Generated or Used in Device</b>	<b>Upper Frequency of Radiated Measurement</b>
Below 1.705 MHz	No radiated testing required
1.705 MHz – 108 MHz	1 GHz
108 MHz – 500 MHz	2 GHz
500 MHz – 1 GHz	5 GHz
Above 1 GHz	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified in this Section. Measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be demonstrated that measurements at a distance of 30 meters or less are not practical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements).

### 6.2.1 Radiated Emissions Limits below 1 GHz

**Class A:** An ITE meeting the conditions for Class A operation defined in Section 2.2 shall comply with the Class A radiated limits set out in Table 4 determined at a distance of 10 meters.

**Table 4 – Class A Radiated Limits below 1 GHz**

<b>Frequency (MHz)</b>	<b>Class A Radiated Limit (dB<math>\mu</math>V/m)</b>
	Quasi-peak
30 to 88	39
88 to 216	43.5
216 to 960	46.4
960 to 1000	49.5

**Class B:** An ITE that does not meet the conditions for Class A operation shall comply with the Class B radiated limits set out in Table 5 determined at a distance of 3 meters.

**Table 5 – Class B Radiated Limits below 1 GHz**

Frequency (MHz)	Class B Radiated Limit (dB $\mu$ V/m)
	Quasi-peak
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54

### 6.2.2 Radiated Emissions Limits above 1 GHz

Radiated disturbance measurements above 1 GHz shall be performed over the frequency range determined from Table 3. The appropriate average detector to carry out radiated disturbance measurements above 1 GHz shall be the linear average detector as defined in CISPR 16-1-1.

**Class A:** An ITE meeting the conditions for Class A equipment shall comply with the Class A radiated limits set out in Table 6 determined at a distance of 10 meters.

**Table 6 – Class A Radiated Limits above 1 GHz**

Frequency (MHz)	Class A Radiated Limit (dB $\mu$ V/m)	
	Linear Average Detector	Peak Detector
> 1000	49.5	69.5

**Class B:** An ITE that does not meet the conditions for Class A equipment shall comply with the Class B radiated limits set out in Table 7 determined at a distance of 3 meters.

**Table 7 – Class B Radiated Limits above 1 GHz**

Frequency (MHz)	Class B Radiated Limit (dB $\mu$ V/m)	
	Linear Average Detector	Peak Detector
> 1000	54	74

## 7. Test Report

A test report shall be compiled providing a record of the tests and results demonstrating compliance with the ICES-003 technical requirements. The test report shall indicate the date the tests were completed.

The test report shall clearly identify the Class of Limits, A or B, that the ITE was tested for compliance with, and shall clearly state which reference publication from Section 3 that was used for methods of measurement. The test report contents shall be in accordance with the reference publication used from Section 3.

The test report shall be retained by the manufacturer or importer for a minimum period of five years from the date the model of ITE is first offered for sale, distributed and/or leased in Canada, and shall be made available to Industry Canada upon request.

## 8. Labelling Requirements

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit<sup>3</sup>:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Industry Canada ICES-003. Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

### Industry Canada ICES-003 Compliance Label:

*CAN ICES-3 (\*)/NMB-3(\*)*

\* Insert either "A" or "B" but not both to identify the applicable Class of ITE.

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<sup>3</sup> The labelling requirements apply to new models. Existing models may continue with the requirements in Issue 4 or adopt the requirements in Issue 5.