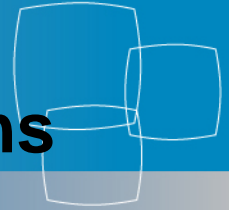




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Canadian Regulatory Requirements for Radio Frequency Exposure Compliance of Radiocommunication Apparatus and Installations



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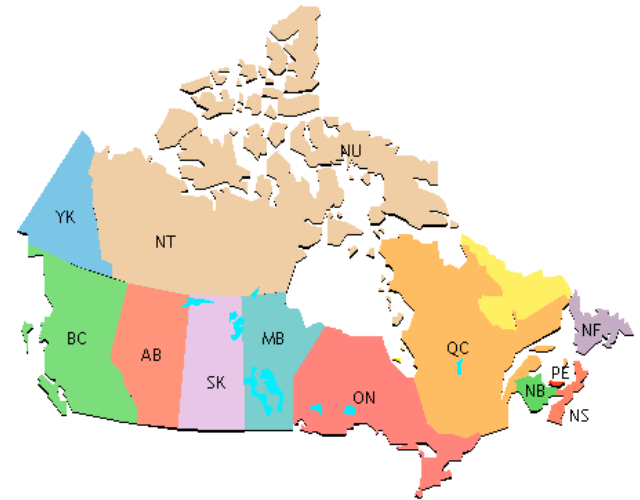
17th Day Dedicated to EMF
Paris, France
December 16, 2010

Canada 

Overview



- **Role of Industry Canada related to RF exposure**
- **Radiocommunication Apparatus (RSS-102)**
 - Scope
 - RF Exposure Limits
 - SAR/RF Exposure Evaluation
 - Measurements and Computational Procedures
 - Other requirements under RSS-102
 - Information related to Quality Control
- **Market Surveillance related to radiocommunication apparatus**



Overview (continue)



- **Radiocommunication and Broadcasting Antenna Systems (CPC-2-0-03)**
 - Scope
 - Clause on Compliance to RF Exposure Limits
- **Site Audits**
- **Risk Communication Package**
- **International Standard Development Committees related to RF Exposure**





Role of Industry Canada related to RF exposure



Role of Industry Canada related to RF exposure



- Radiocommunication, including technical aspects related to broadcasting, falls under the responsibility of Industry Canada, which has the power to establish
 - Standards
 - Rules
 - Policies and
 - Procedures



- Industry Canada, under this authority, has adopted Health Canada's Safety Code 6 for the purpose of protecting the **general public** from RF overexposure.



Role of Industry Canada related to RF exposure



- **Industry Canada's basic role is to ensure that *Safety Code 6* levels are respected with regard to:**
 - mobile, portable and fixed radiocommunication apparatus (such as cellphones, Wi-Fi); and



- antenna towers and their surroundings.

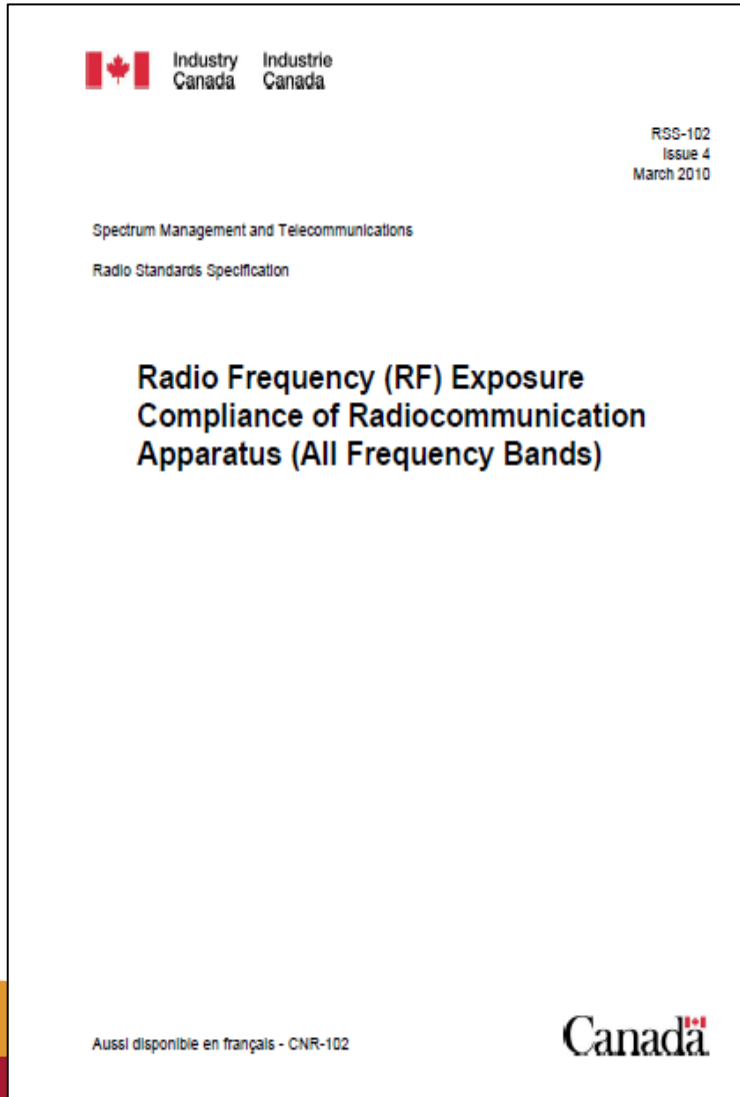




RF Exposure Compliance of Radiocommunication Apparatus (RSS-102)



Industry Canada's RSS-102



- **Title:** *Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)*
- RSS-102 Issue 4 published in March 2010.
- Must be use in conjunction with other RSS standards.



Scope:

- This Radio Standards Specification (RSS) sets out the requirements and measurement techniques used to evaluate RF exposure compliance of radiocommunication apparatus designed to be used within the vicinity of the human body. This includes:

Mobile, portable, fixed Tx with integral antenna	Licensed systems with detachable antennas sold with Tx	Licence-exempt Tx with detachable antennas
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Industry Canada's RSS-102



- Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, *Safety Code 6* within this standard.



SAR Limits for Uncontrolled Environment

Body Region	Average SAR (W/kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head and Trunk	1.6	6	1
Localized Limbs	4	6	10



SAR Limits for Controlled Environment

Body Region	Average SAR (W/kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.4	6	Whole Body
Localized Head and Trunk	8	6	1
Localized Limbs	20	6	10

Industry Canada's RSS-102



Field Strength/Power Density for Uncontrolled Environment



Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time (minutes)
0.003-1	280	2.19	-	6
1-10	280/ <i>f</i>	2.19/ <i>f</i>	-	6
10-30	28	2.19/ <i>f</i>	-	6
30-300	28	0.073	2*	6
300-1500	1,585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

* Power density limit is applicable at frequencies greater than 100 MHz.

Field Strength/Power Density for Controlled Environment



Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time (minutes)
0.003-1	600	4.9	-	6
1-10	600/ <i>f</i>	4.9/ <i>f</i>	-	6
10-30	60	4.9/ <i>f</i>	-	6
30-300	60	0.163	10*	6
300-1500	3.54 <i>f</i> ^{0.5}	0.0094 <i>f</i> ^{0.5}	<i>f</i> /30	6
1500-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ <i>f</i> ^{1.2}
150000-300000	0.354 <i>f</i> ^{0.5}	9.4 x 10 ⁻⁴ <i>f</i> ^{0.5}	3.33 x 10 ⁻⁴ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

*Power density limit is applicable at frequencies greater than 100 MHz.



Industry Canada's RSS-102



- **Specific absorption rate (SAR) evaluation** is the method used to evaluate the SAR levels from a device by physical measurement or computational modelling techniques. SAR evaluation is required if:

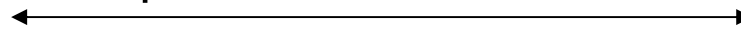
Device



User/Bystander

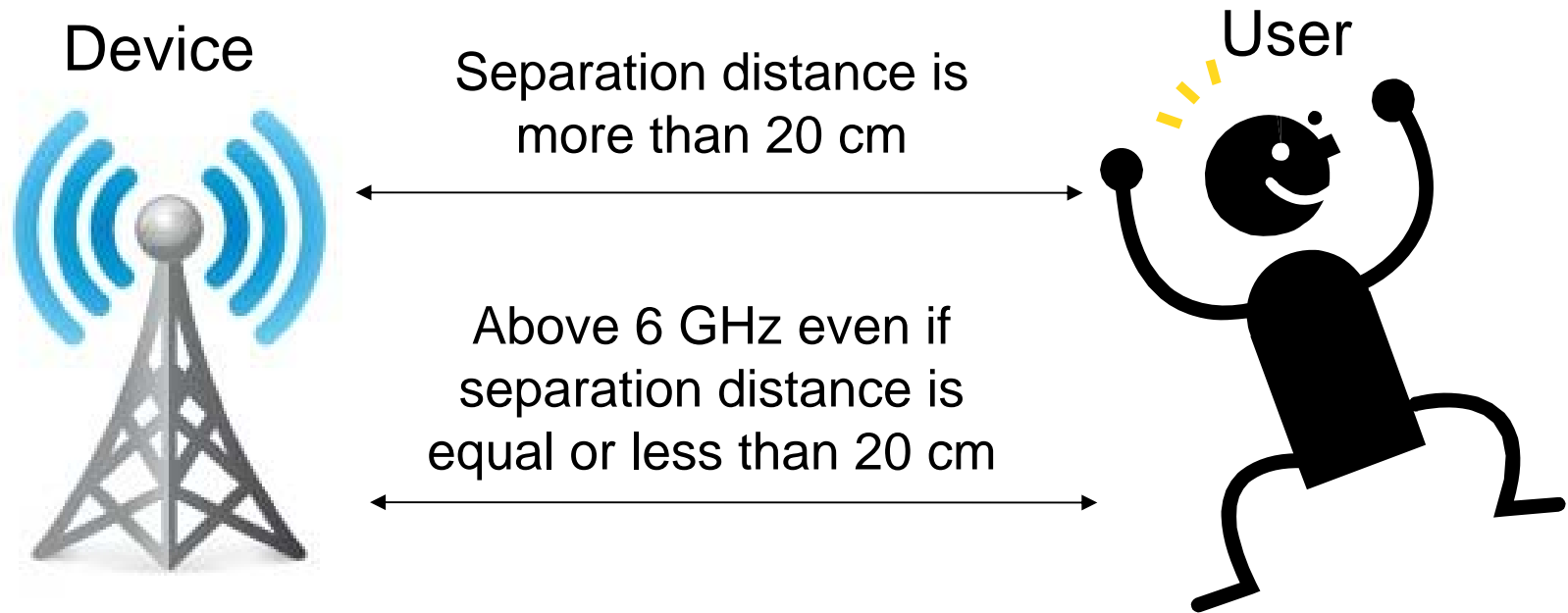


Separation distance is
equal or less than 20 cm





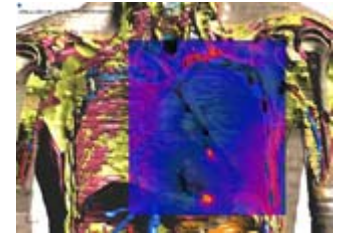
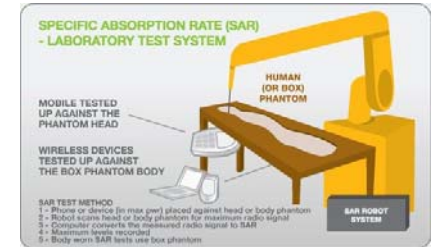
- **RF exposure evaluation** is the method used to evaluate the RF field strength levels generated by a device. RF exposure evaluation is required if:





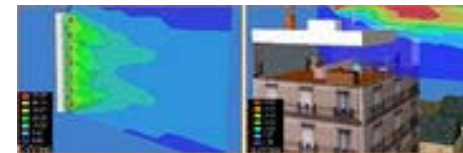
SAR Evaluation based on:

- IEC 62209 Part 1 and Part 2
- IEEE 1528-2003
- FCC Knowledge Database (KDB) Procedures
- IEEE C95.3 (for computational)



RF Exposure Evaluation based on:

- IEEE C95.3 (measurement and computation)





Other regulatory requirements for certification

- Submission of the RF exposure technical brief
- User manual requirements (e.g. compliance distance)



Information related to QC and Post-Certification Investigations/Audits within RSS-102

- Certificate holder will be asked to provide to the Department records of the quality control process and any relevant information that would help identify issues related to compliance.





Market Surveillance of Radiocommunication Apparatus



Market Surveillance



- Market surveillance is conducted to promote continued compliance of telecommunications equipment with applicable IC regulatory standards, in order to prevent:
 - radiocommunication interference,
 - harm to the Canadian public telecommunication networks and
 - to ensure the safety of telecommunications personnel and users.



Market Surveillance



- Radiocommunication apparatus requiring certification, Certification Bodies (CBs) are required to conduct market surveillance on
 - at least 5% of the equipment they certify
 - at least 1% must be related to the regulatory requirements of RSS-102
- If a device fails to comply with the applicable regulatory requirements, CBs must notify IC immediately and take all possible actions to resolve the issue.



Market Surveillance



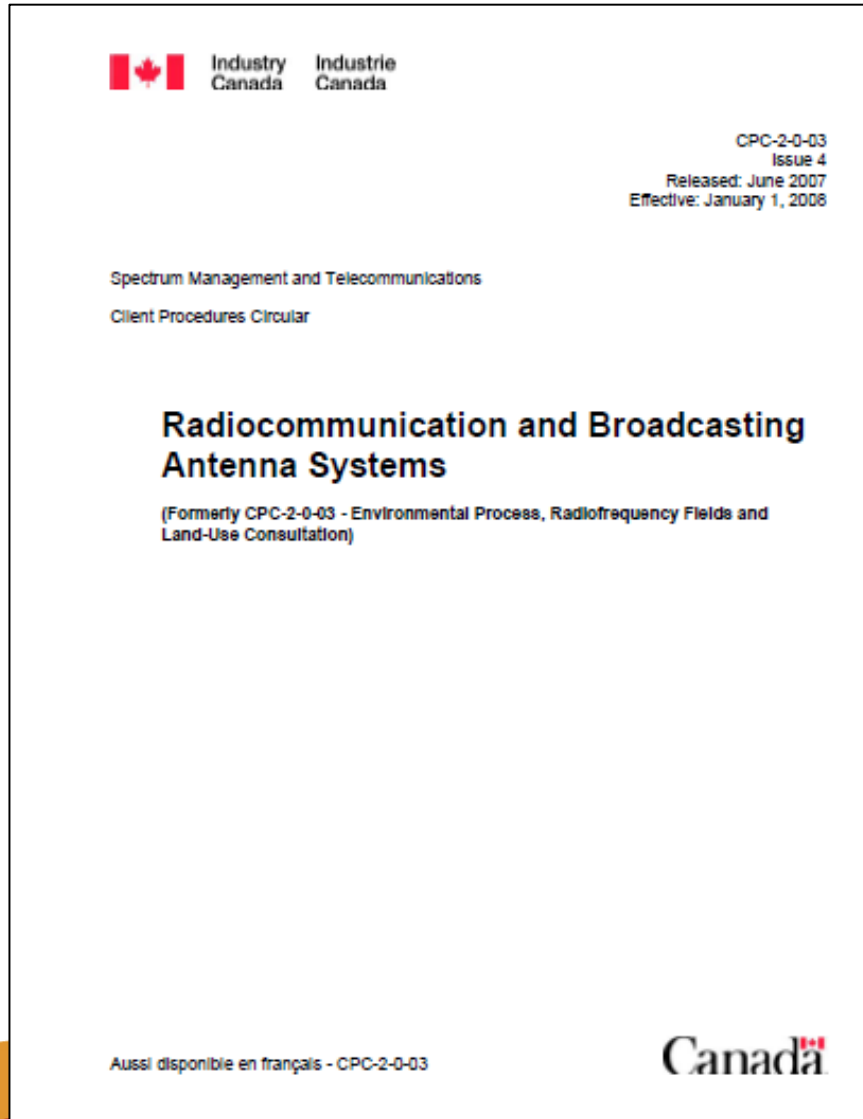
- As an additional verification of the integrity of the process as well as to promote continued compliance, Industry Canada also conducts audits on radiocommunication apparatus being sold on the Canadian market on a yearly basis.
- IC also conducts market surveillance activities on telecommunication equipment that doesn't require certification (DoC).





RF Exposure Compliance of Radiocommunication and Broadcasting Antenna Installations (CPC-2-0-03)





- **Title:**
Radiocommunication and Broadcasting Antenna Systems
- CPC-2-0-03 Issue 4 effective on January 1, 2008.





Scope:

Outlines the process that must be followed by proponents seeking to install or modify antenna systems. The broad elements of the process are:

- Investigating sharing or using existing infrastructure before proposing new antenna-supporting structures.



- Contacting the land-use authority (LUA) to determine local requirements regarding antenna systems.





- Undertaking public notification and addressing relevant concerns.



- Satisfying Industry Canada's general and technical requirements
 - Radio Frequency Exposure Limits
 - Radio Frequency Immunity
 - Proximity of Broadcasting Undertakings
 - Canadian Environmental Assessment Act
 - Aeronautical Safety



CPC-2-0-03 Section 7.1 – Radio Frequency Exposure Limits



Excerpts:

" It is the responsibility of proponents and operators of installations to ensure that all radiocommunication and broadcasting installations comply with Safety Code 6 at all times, including the consideration of combined effects of nearby installations within the local radio environment. "

"Compliance with Safety Code 6 is an ongoing obligation. At any time, antenna system operators may be required, as directed by Industry Canada, to demonstrate compliance with Safety Code 6 by (i) providing detailed calculations, and/or (ii) conducting site surveys and, where necessary, by implementing corrective measures. "





Sites Audits of Radiocommunication and Broadcasting Antenna Installation

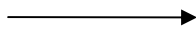


Site Audits



- IC also conducts audits to ensure compliance.
 - IC's experience from field measurements has demonstrated that RF field levels are at a very small fraction of the regulatory limits for the vast majority of radiocom and broadcasting installations in areas accessible to the general public.
 - IC concentrates auditing efforts in ensuring compliance at:
 - **congested sites with multiple antennas and**
 - **sites with 1 or more high-power Tx**
- } proximity to publicly accessible areas

Mont Royal
in Montreal





Risk Communication Packages



Frequency Asked Questions (FAQ) on Radiofrequency (RF) Energy and Health

FAQ has been jointly developed by Health Canada and Industry Canada in order to address various questions related to RF exposure of the general public.



The screenshot shows the Industry Canada website interface. At the top, there are logos for Industry Canada and the Government of Canada. The main navigation bar includes links for Français, Home, Contact Us, Help, Search, and canada.gc.ca. The breadcrumb trail indicates the path: Industry Canada > Radio, Spectrum and Telecommunications > Spectrum Management and Telecommunications > Radiocom > Antenna Structures. The page title is "Spectrum Management and Telecommunications" and the main heading is "Frequently Asked Questions (FAQ) on Radiofrequency (RF) Energy and Health". A link is provided for the PDF document: "Frequently Asked Questions (FAQ) on Radiofrequency (RF) Energy and Health (PDF, 233 KB, 16 pages)". The main text states that the FAQ was jointly developed by Health Canada and Industry Canada to address questions about RF exposure. It mentions that Health Canada is responsible for research and investigation to determine health protection limits for exposure to RF electromagnetic energy, and that Industry Canada has adopted this guideline for regulatory purposes. A section titled "Radiofrequency (RF) Energy" lists three questions: (1) What is radiofrequency (RF) energy?, (2) Why is radiofrequency (RF) energy important and what are the benefits?, and (3) What can I find at radiocommunication and broadcasting installations? A section titled "Radiofrequency (RF) Exposure Limits" lists a fourth question: (4) How is the general public protected from overexposure to radiofrequency (RF)?

Industry Canada
ic.gc.ca

Industry Canada > Radio, Spectrum and Telecommunications > Spectrum Management and Telecommunications > Radiocom > Antenna Structures

Spectrum Management and Telecommunications

Frequently Asked Questions (FAQ) on Radiofrequency (RF) Energy and Health

[Frequently Asked Questions \(FAQ\) on Radiofrequency \(RF\) Energy and Health \(PDF, 233 KB, 16 pages\)](#)

The following FAQ has been jointly developed by Health Canada and Industry Canada in order to address various questions related to RF exposure of the general public. Health Canada, in its mandate to protect the health of Canadians, is responsible for research and investigation to determine and recommend the health protection limits for exposure to RF electromagnetic energy. Accordingly, Health Canada regularly updates its guideline document entitled *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz*, commonly known as Safety Code 6.

As the regulator of radiocommunication and broadcasting installations and apparatus, Industry Canada has adopted this guideline for the purpose of protecting the general public. As such, Industry Canada requires all radiocommunications installations and apparatus to comply with these regulatory limits.

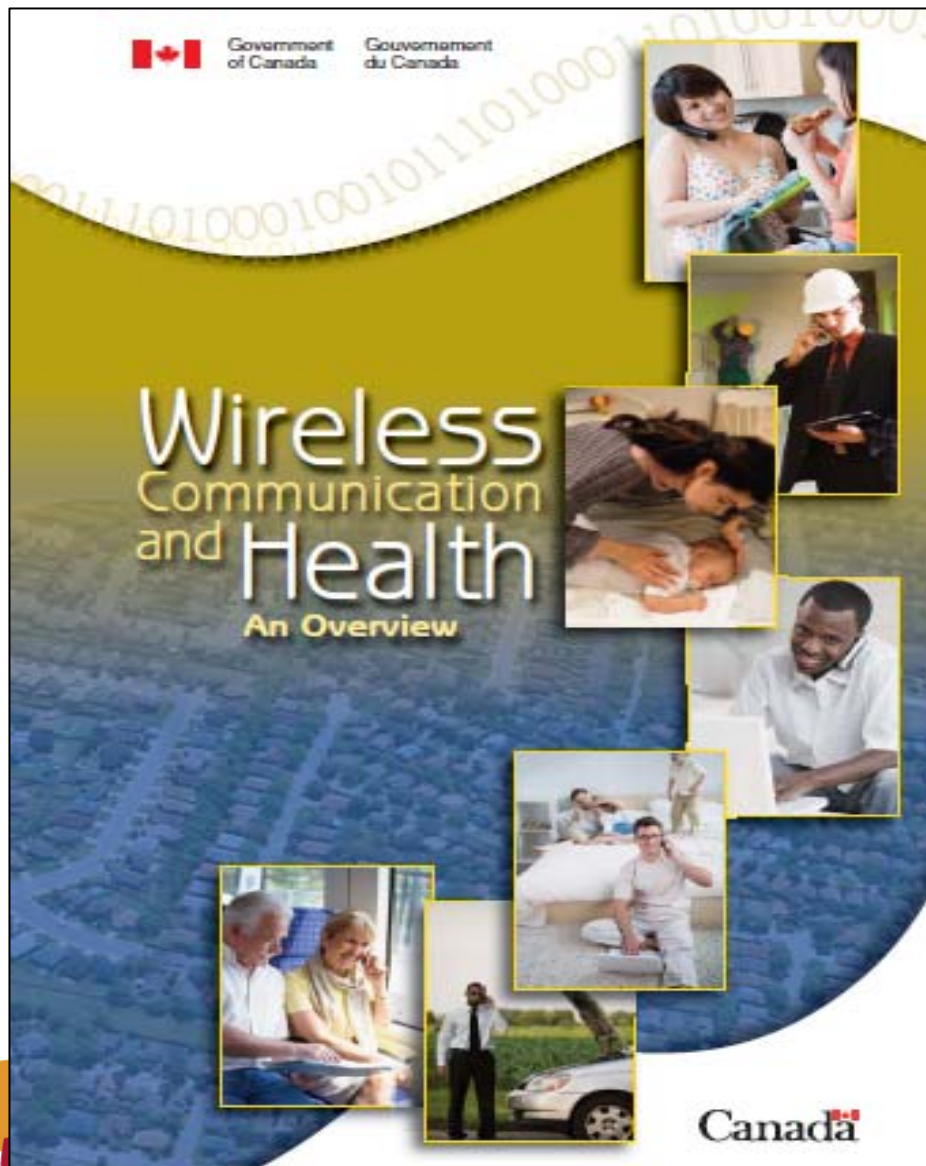
Radiofrequency (RF) Energy

- (1) [What is radiofrequency \(RF\) energy?](#)
- (2) [Why is radiofrequency \(RF\) energy important and what are the benefits?](#)
- (3) [What can I find at radiocommunication and broadcasting installations?](#)

Radiofrequency (RF) Exposure Limits

- (4) [How is the general public protected from overexposure to radiofrequency \(RF\)](#)

Handbook



Handbook describes what is known about the potential health risks from these fields. It also describes how the Government of Canada protects Canadians from excessive RF exposure.

Information Sheets



 Government of Canada / Gouvernement du Canada

Wireless: How am I exposed to radiofrequency fields?

The evolution in wireless technologies has seen the widespread use of consumer products that emit radiofrequency (RF) fields. Wireless technologies, such as cellphones, offer significant societal benefits, including the improvement of personal safety and convenience. As these products have become more commonplace, Canadians may have questions about their exposure to RF fields.

What are some sources of exposure to radiofrequency fields?

RF fields are produced by various sources and we have always been exposed to them. Natural sources, like the sun and the earth, emit low-level RF fields. In addition to cellphones, RF fields come from baby monitors, cordless phones and various other consumer items in your home, including certain non-wireless devices, such as computers and other digital devices.

What do Canadian exposure standards mean for me?

For Canadians to benefit from wireless technologies, including television and radio that entertain and inform us, society experiences low levels of exposure to RF fields.

The Government of Canada regulates public exposure to RF fields from wireless devices and maintains guidelines that establish exposure limits. Current scientific consensus is that, provided Canadian exposure standards are met, the use of wireless communications devices is safe.



Can. No. 1464-58/5-2009E-PDF
ISBN: 978-1-100-15043-0
60630



Information sheets on:

- How am I exposed to RF fields?
- How does a cellphone work?
- Radiofrequency fields and me
- Are all Canadians protected?
- What does current research say?
- Can I reduce my exposure to radiofrequency fields?
- What's in it for me?



International Standard Development Committees Related to RF Exposure





Industry Canada participates in:

- IEC Technical Committee (TC)-106
- (e.g. IEC 62209-MT and IEC 62232-PT)



- IEEE International Committee on Electromagnetic Safety (ICES) TC-34 and TC-95





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