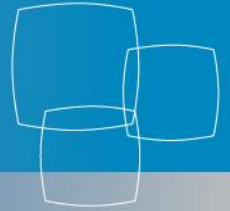




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# Update of Industry Canada's RF exposure requirements related to radiocommunication apparatus



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**RABC**  
**April 28, 2015**



# Presentation Overview



- Highlights relevant to new SC-6 (2015)
- RF Exposure related to Equipment Certification
- Changes to RSS-102 Issue 5 versus RSS-102 Issue 4
  - SAR
    - SAR Exemption Limits for Routine Evaluation
  - RF Exposure
    - RF Exposure Limits for Routine Evaluation
  - Nerve Stimulation (NS) (< 10MHz)
- Impact on certification
  - SAR
  - RF Exposure
  - NS
- Acceptable Knowledge DataBase, Other Supplementary Procedures and Notices



# SC6 (2015)- Highlights relevant to Radio Apparatus



- IC has incorporated official Safety Code 6 limits in RSS-102 Issue 5.
- IC is currently using RSS-102 Issue 5 for the purposes of certifying new equipment.
- RSS-102 Issue 5 will take full effect 180 days from the date of publication for compliance to SAR and RF Evaluation limits.
  - An official notice will be published to inform the industry of the coming into force of the Nerve Stimulation (NS) requirements.
- After the transition period, all devices manufactured, imported or sold in Canada must be in compliance with the revised standard no matter when they were originally certified.





- **No change to Specific Absorption Rate (SAR) limits**

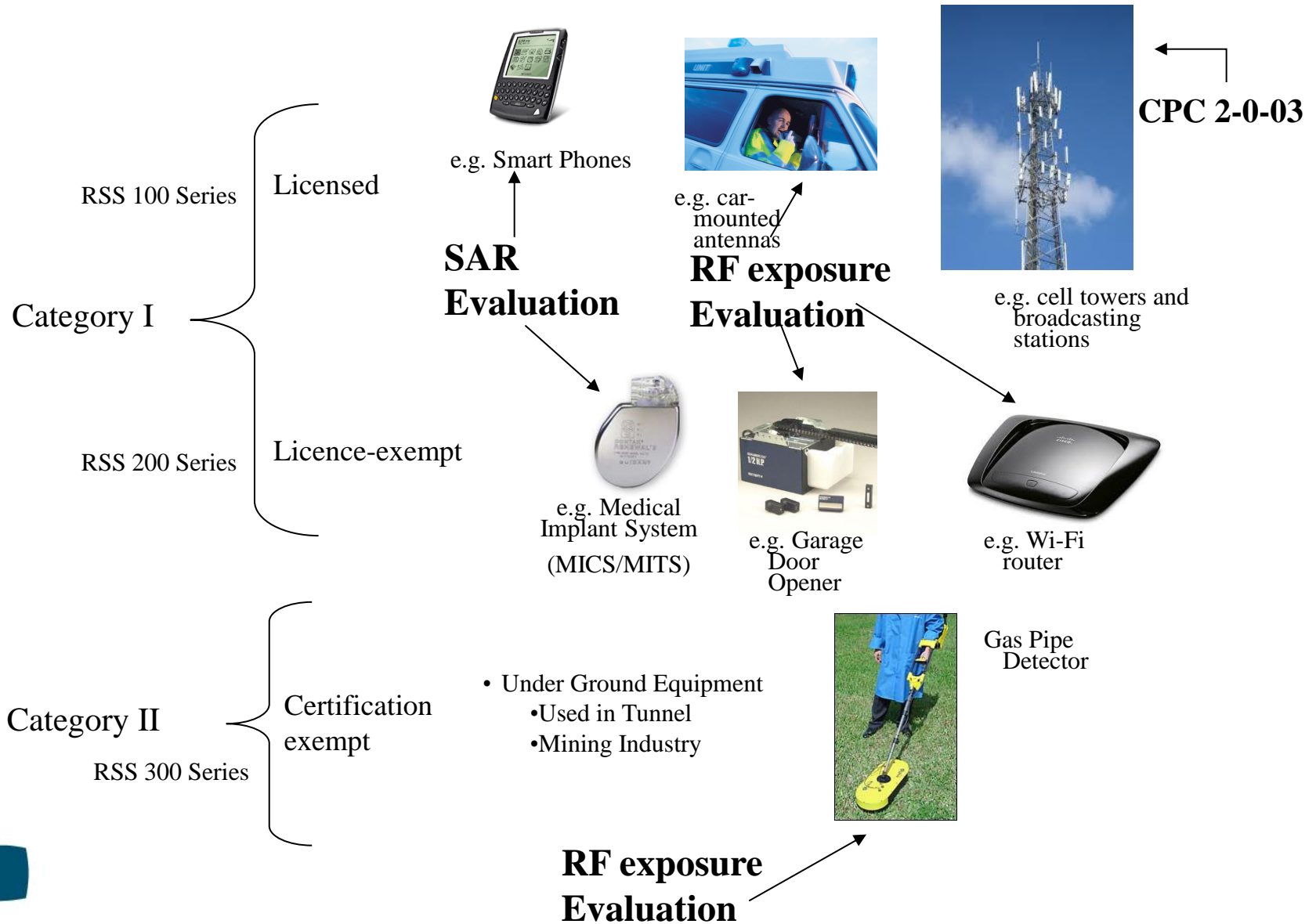
No impact on devices held close to the body **where compliances have been demonstrated through SAR routine evaluation** (e.g. cellphone, tablets, laptops with Wi-Fi module)

- **Changes to electric and magnetic field strength limits from 3 kHz to 6 GHz - more stringent**

Impact antenna installations and devices not meant to be used close to the user/bystander (more than 20 cm).

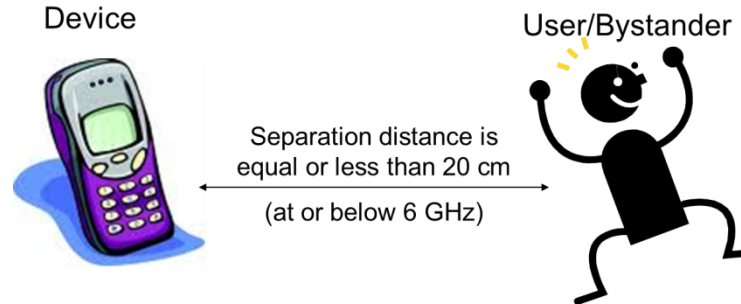


# Radio Standards Specifications (RSSs): RF Exposure related to Equipment Certification





**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:



**SAR Limits (RSS-102 Issue 5) Same as SAR Limits (RSS-102 Issue 4)**

**Table 3: SAR Limits for Devices Used by the General Public (Uncontrolled Environment)**

Body Region	Average SAR (W/kg)	Averaging Time (minutes) <sup>20</sup>	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

There is no change to the safety limits that apply to handsets - Known as Specific Absorption Rate (SAR) limits

No impact on devices held close to the body **where compliances have been demonstrated through SAR routine evaluation** (e.g. cellphone, tablets, laptops with Wi-Fi module)





## (RSS-102 Issue 5) New

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of $\leq 5$ mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
$\leq 300$	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

## (RSS-102 Issue 4)

- from 3 kHz up to 1 GHz inclusively, and with output power (i.e. the higher of the conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 200 mW for general public use and 1000 mW for controlled use;
- above 1 GHz and up to 2.2 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 100 mW for general public use and 500 mW for controlled use;
- above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use;
- above 3 GHz and up to 6 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 10 mW for general public use and 50 mW for controlled use.





- SAR evaluation is required, except when the device operates at lower or equal power found in the table below. This power exemption limits can also be used to reduce the number of SAR measurements (test reduction)

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

***The exemption from routine evaluation is not an exemption from compliance.***

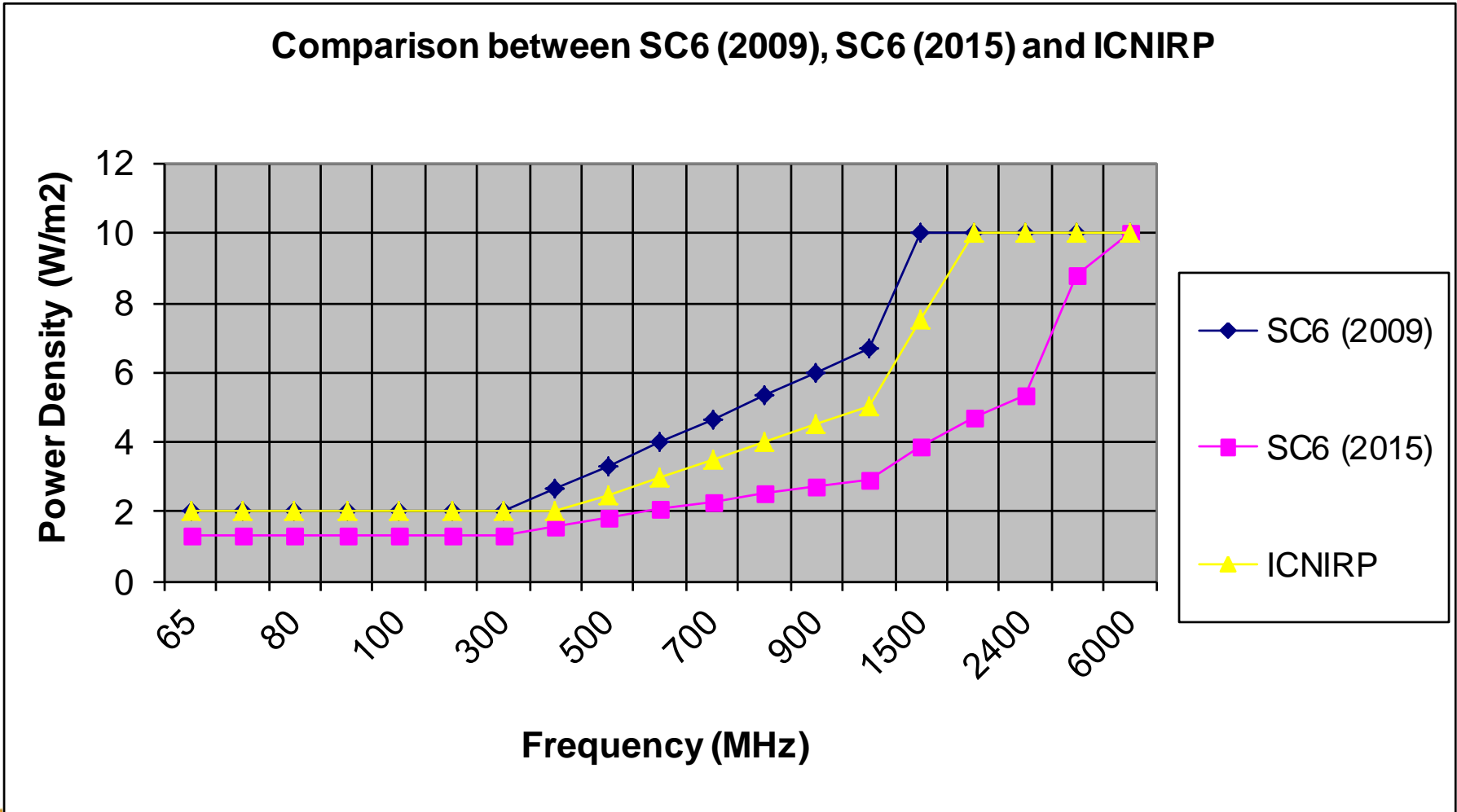




# Power Density Limits (Uncontrolled)



Comparison between SC6 (2009), SC6 (2015) and ICNIRP



# Exemption Limits for Routine Evaluation – RF Evaluation



RF exposure evaluation is required, except when the device operates at lower or equal power found in the table below

(RSS-102 Issue 5) **New**

Frequency	Maximum e.i.r.p
< 20 MHz	1 W
From $\leq 20$ MHz to < 48 MHz	$4.49/f^{0.5}$ W ( $f$ in MHz)
From $\leq 48$ MHz to < 300 MHz	0.6 W
From $\leq 300$ MHz to < 6 GHz	$1.31 \times 10^{-2} f^{0.6834}$ W ( $f$ in MHz)
$\leq 6$ GHz	5 W

(RSS-102 Issue 4)

Frequency	Maximum e.i.r.p
< 1.5 GHz	2.5 W
$\leq 1.5$ GHz	5 W



***The exemption from routine evaluation is not an exemption from compliance.***



## Electric Field (RSS-102 Issue 5)

New

Frequency (MHz)	Reference Level Basis	Reference Level ( $E_{RL}$ ), (V/m, RMS)		Reference Period
		Uncontrolled Environment	Controlled Environment	
0.003 – 10	NS	83	170	Instantaneous*
1.1/1.29 – 10	SAR	$87 / f^{0.5}$	$193 / f^{0.5}$	6 minutes**

## Electric Field (RSS-102 Issue 4)

Frequency (MHz)	Reference Level Basis	Reference Level ( $E_{RL}$ ), (V/m, RMS)		Reference Period
		Uncontrolled Environment	Controlled Environment	
0.003 – 1	SAR	280	600	6 minutes**
1 – 10	SAR	$280 / f$	$600 / f$	6 minutes**

**Note:**

Frequency,  $f$ , is in MHz.

\* Based on nerve stimulation (NS)

\*\* Based on specific absorption rate (SAR)





## Magnetic Field (RSS-102 Issue 5) New

Frequency (MHz)	Reference Level Basis	Reference Level ( $H_{RL}$ ), (A/m, RMS)		Reference Period
		Uncontrolled Environment	Controlled Environment	
0.003 – 10	NS	90	180	Instantaneous*
0.1 – 10	SAR	$0.73 / f$	$1.6 / f$	6 minutes**

## Magnetic Field (RSS-102 Issue 4)

Frequency (MHz)	Reference Level Basis	Reference Level ( $H_{RL}$ ), (A/m, RMS)		Reference Period
		Uncontrolled Environment	Controlled Environment	
0.003 – 1	SAR	2.19	4.9	6 minutes**
1 – 10	SAR	$2.19 / f$	$4.9 / f$	6 minutes**

**Note:**

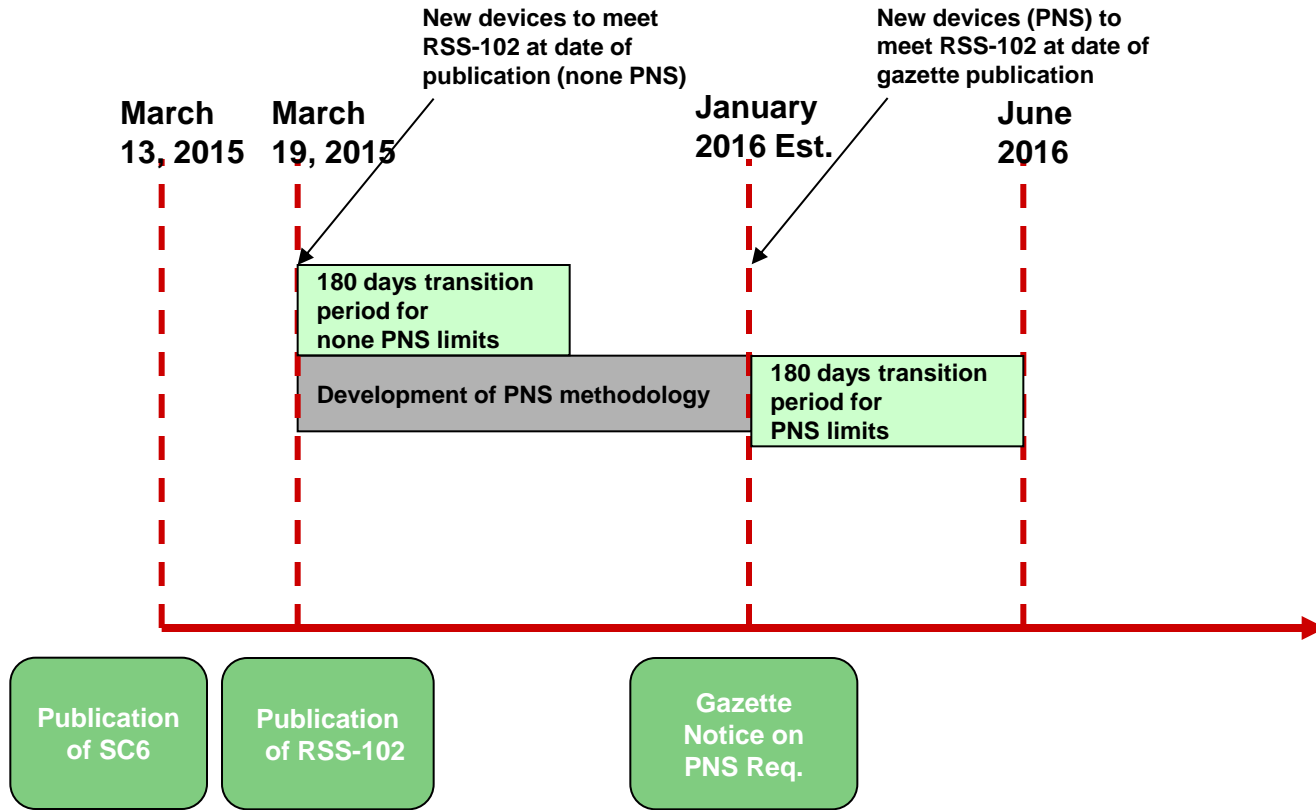
Frequency,  $f$ , is in MHz.

\* Based on nerve stimulation (NS)

\*\* Based on specific absorption rate (SAR)



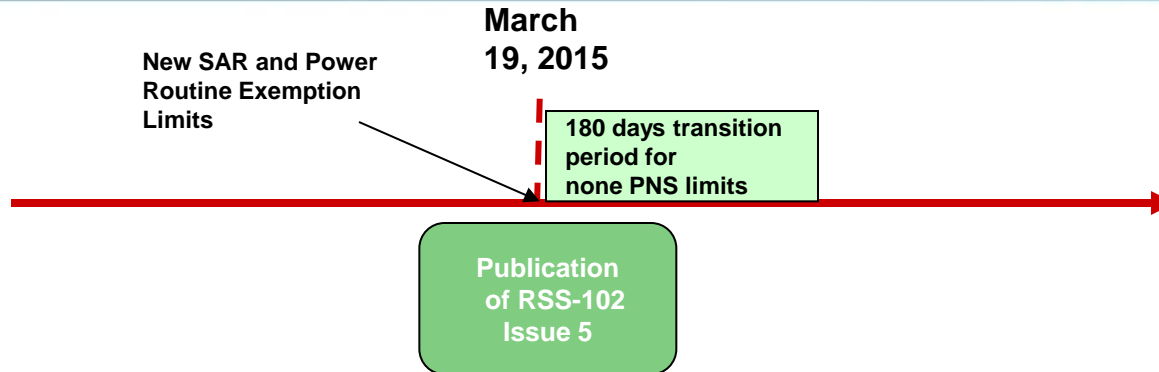
# Timeline



PNS: Peripheral nerve stimulation  
SC6: Safety Code 6 from Health Canada  
RSS: Radio Standards Specification



# Scenario 1 – SAR/MPE Routine Exemption



My device has been granted Canadian certification under SAR/MPE Routine Exemption prior the publication of RSS-102 Issue 5

Under RSS-102 Issue 5:

**NO need to move forward with a reassessment due to changes made to the SAR or Power exemption limits for devices that have already been granted Canadian certification prior to the publication of RSS-102 Issue 5.**

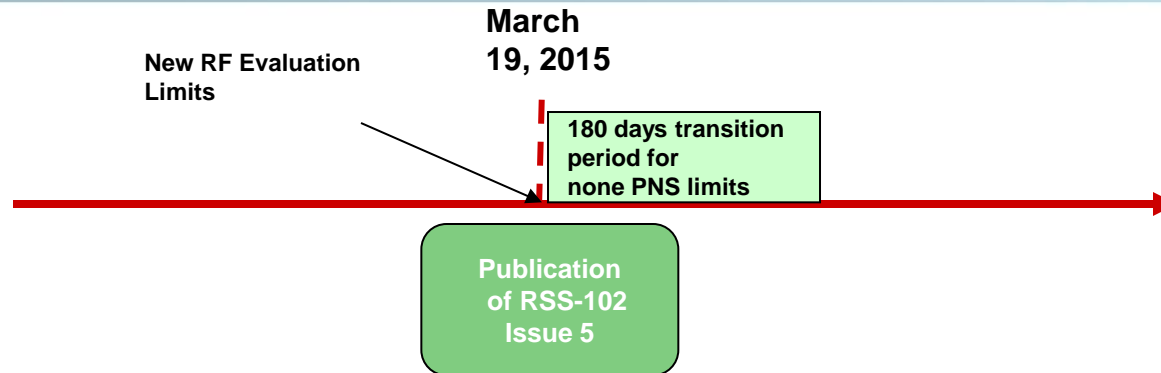
However, all necessary steps must be taken to ensure these devices still comply with the latest version of RSS-102, including Safety Code 6 limits. Compliance with Safety Code 6 is an ongoing obligation.

It is therefore the responsibility of the manufacturers to ensure that devices being manufactured, imported or sold in Canada comply with Safety Code 6 limits, at all times.

Please note that for all new equipment certifications, compliance shall be demonstrate based on the requirements outlined in RSS-102 Issue 5 including family certifications etc requested after the date of publication of RSS-102 Issue 5.



# Scenario 2 – RF Evaluation Limits



My device has been granted Canadian certification under the RF Evaluation Limits prior the publication of RSS-102 Issue 5

Under RSS-102 Issue 5:

NO need to move forward with a reassessment due to changes made to the RF Evaluation Limits. **However, Compliance Distance in User Manual may need to be re-visited.**

However, all necessary steps must be taken to ensure these devices still comply with the latest version of RSS-102, including Safety Code 6 limits. Compliance with Safety Code 6 is an ongoing obligation.

It is therefore the responsibility of the manufacturers to ensure that devices being manufactured, imported or sold in Canada comply with Safety Code 6 limits, at all times.

Please note that for all new equipment certifications, compliance shall be demonstrate based on the requirements outlined in RSS-102 Issue 5 including family certifications etc requested after the date of publication of RSS-102 Issue 5.





# RSS 100 Series – Licensed Devices

Low or no impact for vast majority of RSSs under 100 Series due to one or many of the following reasons:

- Devices need SAR **routine** evaluation (Status quo for SAR limits)
- Condition of licence (CPC-2-0-03) address operation of transmitter
- Minimum change in field strength limits in applicable frequency range.
- Most compliance distance in User Manual still applicable with new limits. (Some may need to be re-visited)

However, medium impact for e.g: RSS-119 (Public Safety Devices), RSS-141 (Aeronautical Devices) and RSS-182 (Maritime Devices)...

- Compliance Distance in User Manual may need to be re-visited.





# RSS 200 Series: Licence-Exempt Devices



**No impact** for vast majority of RSSs under 200 Series due to following reasons:

- SAR **routine** evaluation (Status quo for SAR limits)
- Very low power levels

## **Low impact** for RSS-200 Series (Consumer Devices)

- Most devices (e.g. Wi-Fi routers, smart meters) are well below the allowable power. The distance of 20 cm in the user manual would still be applicable even with the new limits.



WiFi  
Routers

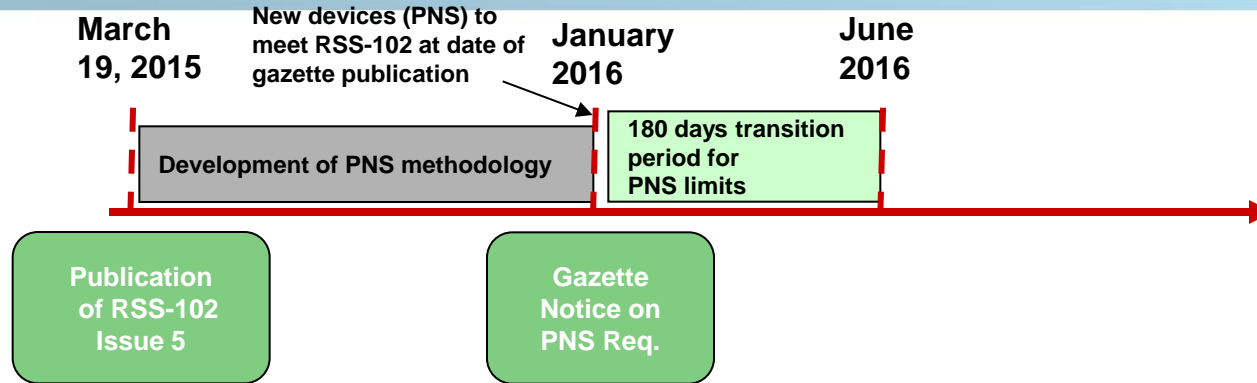


Smart  
Meters

**Note:** Future devices shall carefully calculate the separation distance to confirm if 20 cm is still applicable. **Separation distance more than 20 cm may be required in the user manual.**



# Scenario 3 – PNS or NS Limits



My device falls under the new PNS requirement and has been granted Canadian certification prior the publication of RSS-102 Issue 5

NS requirement under RSS-102 Issue 5:

**No need** to move forward with a reassessment and/or attestation due to changes made to the PNS requirements for devices that have already been granted Canadian certification **prior to the publication of PNS Notice.**

Industry Canada will put in force all SC6 requirements except for the PNS ones, 180 days after the publication of its standard.

Industry Canada will work with the industry and international standards and regulatory bodies to develop the required testing methodologies for PNS requirements. **Once the testing methodologies will be ready, an official notice will be published to inform the industry of the coming into force of the PNS requirements after 180 days.**





- **SAR test reduction procedure for module** or device with combined Bluetooth and RLAN technology operating in the 2402 MHz to 2483.5 MHz frequency band.
- **Notice 2015-DRS0001** Information related to the application of the requirements associated to Nerve Stimulation (NS)
- **Industry Canada accepts 248227 D01 802.11 Wi-Fi SAR v02**
  - *SAR Measurement Procedures for 802.11 a/b/g/n and IEEE Std 802.11ac Transmitters*



[http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h\\_tt00080.html](http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00080.html)



# Other related documents:

## RSS-102 — Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

### Issue 5

Posted on Industry Canada website: March 19, 2015

### Preface

Radio Standards Specification 102, *Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)*, sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radiocommunication apparatus designed to be used within the vicinity of the human body.

RSS 102, Issue 5, will be in force immediately for the purposes of certifying new equipment. All devices currently certified that are manufactured, imported or sold in Canada must be in compliance with the revised standard 180 days after its publication on the Industry Canada website — no matter when they were originally certified. Some requirements will not be in force immediately as outlined in [Notice 2015-DRS001](http://www.ic.gc.ca/cic/site/ceb_bhst.nsf/eng/h_tt00080.html) available at [www.ic.gc.ca/cic/site/ceb\\_bhst.nsf/eng/h\\_tt00080.html](http://www.ic.gc.ca/cic/site/ceb_bhst.nsf/eng/h_tt00080.html).

### Changes:

Industry Canada Procedures & Notices

- Section 1:** Clarification related to the scope of the standard has been made.
- Section 1.1:** The definitions of *limb-worn devices* and *separation distance* have been added, and the definition of *RF exposure evaluation* and *controlled use* has been revised.
- Section 2.2:** Clarification related to the RF exposure technical brief has been made.

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

[PDF Version](#)  
(212 KB, 26 pages)

[PDF Readers](#)

### Related Documents

[Gazette Notice SMSE-005-15](#)

TN-261 — [Safety Code 6 \(SC6\) Radio Frequency Exposure Compliance Evaluation Template \(Uncontrolled Environment Exposure Limits\)](#)

GL-01 — [Guidelines for the Measurement of Radio Frequency Fields at Frequencies from 3 kHz to 300 GHz](#)

BPR-1 — [General Rules](#)





## For any enquiries:

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- **Certification Engineering Bureau**
- Inquiries to be sent to: [certification.bureau@ic.gc.ca](mailto:certification.bureau@ic.gc.ca)

**Thank you !**



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