

We've made it easier for you to give your MP another chance to understand risks posed by wireless radiation and to show they care about our health.

## Engaging Your Member of Parliament (MP) about 5G:

### C4ST's Suggestions & Facts You Can Use to Reply to Your MP Regarding the *Urgent Appeal to Suspend the 5G Rollout*

(January 2021)

On May 14th, 2020, Canadians for Safe Technology (C4ST) and groups across Canada launched the “**Urgent Appeal to the Government of Canada to Suspend the 5G Rollout and to Choose Safe and Reliable Fibre Connections.**” Signing the Appeal includes an option to email the signer's Member of Parliament (MP), informing the MP about the signature and the Appeal, and asking for the MP's position on the issue.

Whether your MP replied to you about the Appeal, or not, this document contains well-researched material that you can use to follow up.

Send a letter or email based on one of the examples in Appendix A of this document. Postage is free for letters sent by regular mail to:

Name of your Member of Parliament  
House of Commons, Ottawa, Ontario, Canada K1A 0A6

To find your MP's name and contact information, including the email address, enter your postal code here: <https://www.ourcommons.ca/Members/en>.

The following pages contain some of the most common statements made by MPs to their constituents, organized by topic to help you to find what you need. For each statement, we propose a possible reply, as well as questions that you could ask.

To search for a specific statement that your MP made to you, enter at least two words or a portion of the statement here: \_\_\_\_\_

If this document does not include statements you received from your MP, please email us a copy of his or her response to [info@appel5Gappeal.ca](mailto:info@appel5Gappeal.ca). We will be updating this resource and will be glad to suggest a response.

**Internet access is a government priority, so this is the time to act!**

Get a conversation going with your MP about the health risks from exposure to 5G and other sources of wireless radiation.

**The goal is to get your MP engaged and educated on this important issue so he or she will take positive, decisive action.  
See Appendix B for suggested actions your MP can take.**

For more information, see C4ST's report:  
“Stop Wireless 5G until Health Canada's Safety Code 6 is Fixed: A Guide to Why and How”

# TABLE OF CONTENTS & STATEMENTS MADE BY MEMBERS OF PARLIAMENT (MPs) IN THEIR RESPONSES TO CONSTITUENTS

Member of Parliament (MP) statements are grouped into categories that match sections in the [“Urgent Appeal to the Government of Canada to Suspend the 5G Rollout and to Choose Safe and Reliable Fibre Connections”](#) and are numbered #A01 to #C53.

Following each set of statements are C4ST’s suggested replies and questions.

Many of the statements made by our MPs seem to have been taken directly from the websites of **Health Canada** and **Innovation, Science and Economic Development (ISED)**. These websites themselves contain inaccurate and misleading information. For more information, see

**“C4ST Fact-checks Government of Canada Webpages Regarding Health Risks and Wireless Technologies, including 5G.”**

Sources to support C4ST’s suggested replies and questions are in the “References” section. Simply double-click on the superscript (small) number to view that item in the list of references, and then to return to the main text click the reference number.

A) APPEAL ITEM: FIBRE-OPTIC INFRASTRUCTURE .....	4
Fibre-optic cable .....	4
B) APPEAL ITEM: CANADIANS’ HEALTH AND THE ENVIRONMENT .....	5
CANADIANS’ HEALTH .....	5
SAFETY CODE 6 AND SAFETY MARGINS .....	5
HEALTH CANADA’S MONITORING OF THE SCIENTIFIC LITERATURE .....	9
HEALTH CANADA’S RESEARCH AND LONG-TERM STUDIES.....	11
HOW CANADA COMPARES TO THE REST OF THE WORLD .....	13
GOVERNMENT OF CANADA WEBSITE .....	14
THE ENVIRONMENT .....	15
C) APPEAL ITEM: PROCESS FOR CANADIANS TO HAVE A DECISIVE SAY IN CELL ANTENNA INSTALLATIONS .....	16
CONSULTATIONS WITH THE PUBLIC ABOUT SMALL ANTENNA AND LARGE CELL TOWER INSTALLATIONS .....	16
MONITORING OF EMISSIONS.....	20
REFERENCES.....	25
<b>APPENDIX A: Example letters</b>	
SHORTER LETTER.....	35
LONGER LETTER.....	36
<b>APPENDIX B: Possible actions your Member of Parliament (MP) can take on your behalf. ....</b>	<b>38</b>
<b>APPENDIX C: List of publications of research conducted by Health Canada on radiofrequency radiation-electromagnetic fields, since 1983.....</b>	<b>40</b>



## A) APPEAL ITEM: FIBRE-OPTIC INFRASTRUCTURE

### FIBRE-OPTIC CABLE

#### If your MP said:

**#A01** *Fibre-optic cable is the best and most reliable way to get high speed internet.*

#### Your possible reply

If your MP supported fibre-optics and other wired connections, congratulate him or her.

#### Ask your MP

How will you work to support fibre and wired solutions instead of wireless technologies?

#### **If your MP did not mention fibre-optic connections:**

Let him or her know that fibre-optic connections have been shown to be superior to wireless connections and should be used as an alternative to the tens of thousands of cell network antennas and millions of fixed wireless devices planned to be installed across Canada. Anything stationary should be connected with wires so that there are no emissions of harmful radiofrequency radiation. Wired connections are safer, faster, more reliable, more energy efficient, more secure and in the long term more economical.

#### Ask your MP

Would you please comment on why fibre-optic and other wired connections to the premises (FTTP) were not included in your reply?

#### Ask your MP

There is an urgent need to bridge the digital divide. There are real long-term benefits of using fibre instead of wireless in remote regions. This paper shows how this could work:

**“Fiber optic breakthrough could beat 5G for rural internet access”** <https://www.inverse.com/article/61909-a-fiber-optic-breakthrough-could-bring-superfast-internet-to-remote-areas>.

How can the significant funding being made available to improve rural connectivity be directed to extend Internet fibre cable access?

## B) APPEAL ITEM: CANADIANS' HEALTH AND THE ENVIRONMENT

### CANADIANS' HEALTH

#### SAFETY CODE 6 AND SAFETY MARGINS

##### Background information:

Limits called “*Safety Code 6*” are set by Health Canada for radiofrequency (RF) radiation exposures of federal workers and other people in federally controlled facilities.<sup>1</sup>

The federal ministry Innovation, Science and Economic Development (ISED) has adopted Safety Code 6 limits for compliance for all RF radiation-emitting devices commercially available in Canada, including cell network antennas (attached to towers and elsewhere), cell phones, Wi-Fi equipment, smart utility meters, baby monitors, cordless phones and other wireless devices.

More stringent guidelines are nevertheless in place. For example, the City of Toronto Board of Health adopted a *Prudent Avoidance Policy on Siting Telecommunication Towers and Antennas* - at levels 100 times more protective than Safety Code 6.<sup>2</sup> School boards, municipalities, hospitals and privately owned buildings may also designate *WiFi-free zones* and *PDO areas (Personal Devices Off)* in order to protect their students, staff, patients and clientele.

There are two main limits (guidelines) in Safety Code 6 (2015):

1) Power Density:

For emissions from:

- a) equipment at a distance of more than 0.2 metres (8 inches), such as Wi-Fi routers, antennas on cell towers and on non-tower structures, or
  - b) equipment and devices operating at frequencies above 6 GHz, such as 5G technologies that use millimetre waves, both at a distance and close to the body.
- Power density can be measured with special meters as Watts per square metre (W/m<sup>2</sup>).

2) Specific Absorption Rate (SAR):

For emissions below 6 GHz, from devices used close to the body (less than 0.2 metres or 8 inches).

SAR is the energy absorbed by a cube of tissue 1 cm x 1 cm x 1 cm,<sup>3</sup> expressed in Watts/kilogram (W/kg). SAR applies to emissions from cell phones, tablets and wearables such as smart watches. SAR levels for commercially available devices can be found in the “*fine print*” of the user’s instruction manual, and online.

To understand how Health Canada can claim that Safety Code 6 is protective, even for children exposed to wireless radiation 24/7, it is critical to know that:

- **Health Canada's guidelines are based only on heating/thermal effects\***. As long as tissue does not experience elevated temperatures and heating can be dissipated by the body within 6 minutes, Health Canada says it is “*safe*.” All other adverse effects documented by hundreds of high-quality studies under non-heating conditions are not taken into account.
- **Health Canada uses averaging, so “*peaks*” or “*spikes*” are diluted over a time span.**  
All wireless communication devices, including cell phones, cordless phones, Wi-Fi,

most smart meters and cell antennas, emit **pulsed RF radiation**. Pulsed fields have been found to be more biologically active than non-pulsed fields in many studies.

\* Health Canada acknowledges two types of adverse effects: **tissue heating** for frequencies used by wireless communication devices and antennas, and **nerve stimulation** for very low radiofrequencies (below 10 MHz) which are not generally used for telecommunications devices. Devices that fall into the latter category include some wireless charging devices and metal detectors.

### If your MP said:

**#B01** *Rest assured that our regulatory framework provides safeguards for the health of Canadians. Innovation, Science and Economic Development Canada (ISED) has adopted Health Canada's Safety Code 6 as the Canadian radiofrequency exposure limits for wireless devices and their associated infrastructure.*

#### Your possible reply

There are two main reasons why a moratorium on 5G rollout is needed:

- 5G technologies have not been tested for health safety for long-term exposures.
- Safety Code 6 (2015) is outdated and inadequate.

Scientists, medical doctors and other experts are repeatedly warning us that the scientific evidence indicates harms (cancer, sperm damage, reproductive harms, learning and memory deficits, and neurodegenerative, cellular and genetic damage) from exposure to radiofrequency radiation.<sup>4,5</sup>

Further rollout should be halted until scientists independent of industry influence recommend that these technologies are safe for the public.<sup>6</sup>

### If your MP said:

**#B02** *Many international studies on this issue have concluded that effects associated with exposure to RF energy depend on the frequency range. Our government is committed to protecting the health and safety of Canadians from environmental risks, including those posed by overexposure to RF energy. As such, we have established RF exposure limits to prevent frequency side effects from occurring.*

#### Your possible reply

- The consensus reached by medical doctors and scientists independent of industry influence is that there should be a moratorium on 5G deployment.<sup>7,8</sup>
- Health Canada's Safety Code 6 (the exposure guidelines for human exposure to RF radiation) does not protect Canadians' health<sup>9,10,11,12</sup> nor does it address environmental safety. Canada's guidelines for exposure to cell network antenna emissions lag behind those of many other countries.<sup>13</sup> Health Canada's process to update Safety Code 6 (2015) was deeply flawed,<sup>14,15</sup> and exposure limits are based on the now disproven premise from the 1920s<sup>16</sup> that RF radiation causes harm only at exposure levels that result in heating that cannot be dissipated within 6 minutes (see Safety Code 6 for details about the heating criteria<sup>17</sup>). Hundreds of high-quality peer-reviewed scientific publications describe biological effects and harms with exposures far below Canada's limits—in humans, plants, laboratory animals and tissues, and wildlife such as birds and pollinators.<sup>18,19,20,21,22,23</sup>
- The World Health Organization's International Agency for Research on Cancer (IARC) classified radiofrequency radiation as a "possible" human carcinogen in 2011. Since that time, more high-quality, peer-reviewed, published studies in both animals and humans support a re-classification as a "known" human

carcinogen.<sup>24,25</sup> Tobacco smoke and asbestos are in this category. A 2019 IARC report summarizes this evidence and states that RF radiation is a high priority for re-evaluation of its classification.<sup>26</sup>

- Major insurance bodies, such as Swiss RE and Lloyd's (formerly Lloyd's of London), will not provide insurance against health effects of radiation from wireless telecommunications. They have done their own monitoring of the scientific evidence and have concluded that insuring against damages from electromagnetic fields, including RF radiation, is too high a risk.<sup>27</sup>

### If your MP said:

**#B03** *To protect the public, these limits, which also cover the frequency ranges that will be used by 5G devices and associated infrastructure, are set far below the threshold—an at least 50 fold safety margin—for all known established adverse health effects.*

#### Your possible reply

Safety Code 6 limits for RF radiation are designed to avoid excessive heating of tissue (thermal effects). A 50-fold safety margin is a low margin of exposure compared with 300-fold or much greater margins of exposure set for chemicals. Furthermore, biological effects from RF radiation that are associated with adverse outcomes, e.g., DNA damage and oxidative stress, occur at much lower exposure levels, some lower by hundreds- or thousands-fold, without significant heating. DNA damage and oxidative stress can lead to a wide range of adverse health outcomes, including cancer and neurological disorders such as Alzheimer's.

### If your MP said:

**#B04** *They [Safety Code 6 guidance levels] provide protection for all age groups, including children, 24 hours a day, 7 days a week.*

#### Your possible reply

Extensive scientific evidence shows harm from 2G, 3G and 4G technologies. 5G uses these as well as additional frequencies called millimetre wave technology. There has been no testing to ensure that 5G technologies are safe for humans and the environment.<sup>28,29</sup>

To meet SAR compliance requirements, all manufacturers test their devices on a model that is based on a 200 pound (91 kilogram) male that does not take into account that children are more vulnerable to RF radiation.<sup>30,31</sup> Each device is tested individually, i.e., regardless that real-world exposure is often simultaneously to emissions from more than one device. There is no evaluation of the effects on health when several devices are in a classroom, lecture hall, home or office setting (for example: cell phone, Wi-Fi router and cordless phone, or living near a cell tower or across from a small cell antenna on a utility pole). The last published report of measurements of power levels by the federal government in a simulated (empty) classroom-type setting was in 2012.<sup>32</sup> Technologies and use behaviours have since changed.

## If your MP said:

**#B05** *The limits set out in Safety Code 6 are designed to protect people from all forms of exposure including continuous exposure.*

### Your possible reply

In addition to the scientific evidence showing harm from 2G, 3G and 4G technologies, 5G uses millimetre wave technology. There has been no testing to ensure that 5G technologies are safe for humans and the environment.<sup>33,34</sup>

To meet SAR compliance requirements, all manufacturers test their devices on a model that is based on a 200 pound (91 kilogram) male that does not take into account that children are more impacted by RF radiation.<sup>35,36</sup> Each device is tested individually, although real-world exposure is often to simultaneous emissions from more than one device. There is no evaluation of the effects on health when several devices are in a classroom, lecture hall, home or office setting (for example: cell phone, Wi-Fi router, cordless phone, tablets and computers for various family members, or living near a cell tower or adjacent to a small cell antenna on a utility pole). The last published report of measurements of power levels by the federal government in a simulated (empty) classroom-type setting was in 2012.<sup>37</sup> Technologies and uses have since changed.

## If your MP said:

**#B06** *Safety Code 6 is reviewed on a regular basis in order to ensure that it continues to provide protection against all known adverse human health effects of radiofrequency fields.*

### Your possible reply

Safety Code 6 (2015), updated from Safety Code 6 (2009), is overdue for revision. The scientific evidence upon which Safety Code 6 (2015) was based covered a few publications from 2013 with the majority having been published before 2012.<sup>38</sup> There have been a number of significant scientific findings since then. Prominent Canadian MD, cancer epidemiologist and former advisor to the World Health Organization Dr. Anthony B. Miller has outlined the evidence for classifying radiofrequency radiation, including 5G frequencies, as a “known” human carcinogen<sup>39</sup> based on newer studies. Tobacco smoke and asbestos are classified as “known” human carcinogens.

Safety Code 6 was first published in 1979 and limits have not undergone any substantial changes since then. It was, and still is, based on the now disproven premise from the 1920s<sup>40</sup> that tissue cannot be harmed without heating.

### Ask your MP

Given that there is much scientific evidence that limits on cell phone emissions levels are outdated and inadequate, as laid out in the lawsuit launched in the USA against the Federal Communications Commission,<sup>41</sup> and that Canadian and USA safety limits for cell phone exposures are similar, will you please find out why Safety Code 6 (2015) has not been revised based on effects that occur at non-heating levels well below Health Canada’s safety limits? Also, please advocate for Safety Code 6 (2015) to be revised.



### Ask your MP

Given that the current version of Safety Code 6 (2015) was largely based on science published before 2013, when is the next planned update for Safety Code 6? Will Health Canada commit, for the first time, to meet the international standards for review of scientific evidence? This requires rigorous scientific methods, transparency, full public consultation from initial scoping throughout the process and health-protective precautionary interpretation of findings.<sup>42</sup>

### Ask your MP

Health Canada claims to use a “*weight of evidence*” approach. This approach entails several steps. Where can Canadians view the systematic compilation of evidence tables, with the grading, meta-analyses and weighing of the evidence?

### Ask your MP

In the absence of Health Canada’s systematic review of the evidence, will Health Canada take action on the basis of up-to-date independent systematic reviews by academic experts, published in the peer-reviewed literature? If Health Canada will not take action, what are the reasons for not doing so?

### Ask your MP

What response, if any, did Health Canada provide to the more than 50 Canadian medical doctors<sup>43</sup> and more than 50 international scientists<sup>44</sup> who have written to Canada's Minister of Health calling for more protective wireless radiation limits, especially for children?

### C4ST’s supporting information

Health Canada is well aware that there is substantial, strong scientific evidence that radiofrequency/microwave radiation can cause harm even when there is no heating of tissue.<sup>45</sup> Neither Health Canada nor any of the authorities it looks to for guidance have provided any studies showing safety of exposure to 5G technology emissions over the long term.<sup>46,47</sup>

## HEALTH CANADA’S MONITORING OF THE SCIENTIFIC LITERATURE

### If your MP said:

**#B20** *Our government continuously monitors the research and scientific literature on the health effects of RF exposure to ensure that Canadian limits are consistent with the current scientific consensus to prevent potential adverse health effects.*

### Your possible reply

Canadian limits are not consistent with the current scientific consensus regarding health effects of RF exposure.<sup>48</sup> Canadian and USA limits are similar. According to Joel Moskowitz, Ph.D., Director, Center for Family and Community Health, School of Public Health, University of California, Berkeley, “*The majority of scientists who study RF radiation effects now believe that current RF radiation national [USA] and international safety standards are inadequate to protect our health. More than 240 scientists from 44 countries who have published over 2,000 papers in professional journals on electromagnetic fields (EMF) and biology or health have signed the International EMF Scientist Appeal<sup>49</sup> which calls for stronger safety standards and health warnings.*”<sup>50</sup>

Contrary to its website statement, Health Canada’s process to “*continuously monitor the research and scientific literature on the health effects of RF exposure*” fails to meet the test of international standards.<sup>51</sup> This requires rigorous scientific methods, transparency, full public consultation from initial scoping throughout the process and health-protective precautionary interpretation of findings. Health Canada has never completed a proper review of the scientific evidence that meets international standards, nor has it published any of its analyses.

#### Ask your MP

Please provide a list of studies Health Canada is using to justify that Safety Code 6 protects us from emissions from 5G technologies. Please provide the author, title and scientific journal where this information is provided. Please do not refer me to the World Health Organization’s EMF-Project or the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These agencies are heavily influenced by industry.<sup>52,53,54,55</sup>

#### Ask your MP

We know that some of the largest re-insurance companies, such as Lloyd’s and Swiss Re, are averse to insuring for damages as a result of wireless radiation exposures. As the impacts of the radiation from wireless technology become manifest, who will be liable for increased healthcare costs, lost productivity arising from adverse health effects, security and privacy breaches, damage to the environment and risks to safety and property including those resulting from degraded weather forecast accuracy?

#### Ask your MP

Given the assumption Health Canada and ISED make that Safety Code 6 covers 5G, is Health Canada currently collecting and reviewing scientific data with respect to the higher frequencies to be used for 5G? Would you please ask the Minister of Health for a list of these studies and send me a copy? Please specify that it is the original scientific studies you would like to see and not links to other agencies or to the World Health Organization’s EMF-Project.

#### Ask your MP

There have been numerous studies showing adverse impacts on the health of people living near cell network antennas.<sup>56,57,58</sup> Would you please ask that studies (radiation surveys) be conducted before antennas are installed in neighbourhoods so that, if and when antennas are installed, scientifically sound comparisons can be made?

#### C4ST’s supporting information

Industry-funded studies find harm less frequently than non-industry-funded studies<sup>59</sup> and in some cases can suppress results from studies showing harm.<sup>60,61</sup> Adverse effects were summarized by Levitt and Lai in 2010.<sup>62</sup> Neither Health Canada nor any “*authoritative body*” that it looks to for guidance has addressed this in a meaningful way. A study conducted in 2017, after the latest revision of Safety Code 6 (2015), found blood abnormalities and DNA damage in people living close to cell network antennas (base stations).<sup>63</sup>

## HEALTH CANADA'S RESEARCH AND LONG-TERM STUDIES

### If your MP said:

**#B30** *Health Canada administers the Radiation Emitting Devices Act, which governs the sale, lease and importation of radiation emitting devices in Canada.*

#### Your possible reply

There are no standards applicable to cell phones or other wireless communication devices under the Radiation Emitting Devices Regulations.<sup>64,65</sup> In Canada, the regulation of cell phones and other wireless communication devices is the responsibility of Innovation, Science and Economic Development Canada (ISED), under the *Radiocommunication Act*.<sup>66</sup>

Health Canada's Safety Code 6<sup>67</sup> (the exposure guidelines for human exposure to RF radiation) does not protect Canadians' health<sup>68,69,70,71</sup> nor does it address environmental safety. Canada's guidelines for cell antenna emissions lag behind those of many other countries.<sup>72</sup> Health Canada's process to update Safety Code 6 (2015) was deeply flawed,<sup>73,74</sup> and exposure limits are based on the now disproven premise from the 1920s<sup>75</sup> that RF radiation causes harm only at exposure levels that result in heating. Hundreds of peer-reviewed scientific publications describe biological effects and harms with exposures far below Canada's limits—in humans, plants, laboratory animals and wildlife such as birds and pollinators.<sup>76,77,78,79,80</sup>

Health Canada's process to monitor "*scientific literature on the health effects*" fails to meet the test of international standards.<sup>81</sup> This requires rigorous scientific methods, transparency, full public consultation from initial scoping throughout the process and health-protective precautionary interpretation of findings. Health Canada has never completed a proper systematic review of the scientific evidence that meets international standards.

### If your MP said:

**#B31** *In addition, the Department's mandate regarding human exposure to radiofrequency (RF) electromagnetic energy from wireless devices includes carrying out research into possible health effects, monitoring the scientific literature related to such effects on an ongoing basis, and developing RF exposure guidelines, commonly referred to as Safety Code 6. Safety Code 6 sets recommended limits for safe human exposure to electromagnetic fields in federally regulated industries and workplaces.*

#### Your possible reply

Health Canada's Safety Code 6<sup>82</sup> (the exposure guidelines for human exposure to RF radiation) does not protect Canadians' health<sup>83,84,85,86</sup> nor does it address environmental safety. Canada's guidelines for cell antenna emissions lag behind those of many other countries.<sup>87</sup> Health Canada's process to update Safety Code 6 (2015) was deeply flawed,<sup>88,89</sup> and exposure limits are based on the now disproven premise from the 1920s<sup>90</sup> that RF radiation causes harm only at exposure levels that result in heating. Hundreds of peer-reviewed scientific publications describe biological effects and harms with exposures far below Canada's limits—in humans, plants, laboratory animals and wildlife such as birds and pollinators.<sup>91,92,93,94,95</sup>

Health Canada's process to monitor "*scientific literature on the health effects*" fails to meet the test of international standards.<sup>96</sup> This requires rigorous scientific methods, transparency, full public consultation from initial scoping throughout the process and health-protective precautionary interpretation of findings. Health Canada has never completed a proper review of the scientific evidence that meets international standards.

#### Ask your MP

Please provide a list of studies Health Canada is using to justify that Safety Code 6 protects us from 5G technology. Please provide the author, title and scientific journal where this information is provided. Please do not refer me to the World Health Organization's EMF-Project or the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These agencies are heavily influenced by industry.<sup>97,98,99,100</sup>

#### Ask your MP

Given the assumption Health Canada and ISED make that Safety Code 6 covers 5G, is Health Canada currently collecting and reviewing scientific data with respect to the higher frequencies to be used by 5G? Are there any plans to do so; and if not, why?

#### Ask your MP

If Health Canada has the necessary skills (epidemiology, biology and systematic research) to monitor the relevant scientific literature for today's common RF radiation exposures, then why is that information not on its website?

#### C4ST's supporting information

Over the past 11 years, Safety Code 6 has been re-examined twice, resulting in only minor revisions. The process was flawed,<sup>101,102</sup> and the now disproven premise from the 1920s<sup>103</sup> that there can be no harm without significant heating remains as the basis to determine safety of wireless devices such as cell phones and network antennas. After each of these revisions of Safety Code 6 was published, hearings were held by the Parliamentary Standing Committee on Health (HESA). Both times HESA made a number of recommendations for more protective approaches and standards in Safety Code 6.<sup>104</sup> None have had any substantive implementation.

During the 2010 Parliamentary hearings on Safety Code 6, Health Canada representatives stated that long-term studies were important. The only study the Director General of Health Canada cited indicating safety was the "*Danish*" study. This study was deeply flawed, as the Director General briefly alluded to. Health Canada has conducted no long-term studies and has conducted no studies on possible adverse effects of living close to a cell tower. Evidence was heard in Parliamentary HESA hearings in 2010 and 2015 that Canadians were reporting adverse effects from wireless radiation.<sup>105,106,107,108,109,110,111,112</sup> Further evidence was presented in 2014 when Health Canada conducted public consultations during the latest review of Safety Code 6.<sup>113</sup> The only recent study by Health Canada addresses the effects of heating (Appendix C), which is not useful to examine non-thermal effects.<sup>114</sup>

## HOW CANADA COMPARES TO THE REST OF THE WORLD

### If your MP said:

**#B40** *Our approach to RF exposure safety is among the most stringent in the world.*

#### Your possible reply

When it comes to exposure limits for cellular network antennas and devices that are more than 0.2 metres (8 inches) from our bodies, such as Wi-Fi, smart meters and baby monitors, this statement is false. China, Russia, parts of Italy and Switzerland have limits up to 50 times safer than Canada's, according to data from the World Health Organization.<sup>115</sup>

For exposures to devices that are held close to our bodies, such as cell phones, the statement may be true in theory, but falls short in real life for many cell phone models. ISED is turning a blind eye to the fact that some popular cell phones exceed safety standards/guidelines.<sup>116</sup> Similar violations have been uncovered elsewhere,<sup>117,118</sup> and in some cases legal actions have been launched by advocacy groups in France<sup>119</sup> and the USA.<sup>120</sup>

#### Ask your MP

Given that the CBC program *Marketplace* reported that cell phones as used by Canadians do not comply with Safety Code 6 guidelines,<sup>121</sup> what validation and verification has ISED conducted to ensure that Canadians are not exposed to RF radiation levels that exceed Safety Code 6 guidelines?

#### Ask your MP

Other than cell phone radiation emissions that breach Safety Code 6 (2015) safety limits, when else has a federal regulator stated that it is acceptable to exceed the guidelines that they are tasked with enforcing?

#### Ask your MP

What initiatives are planned to ensure that Canadians are aware of the “*fine print*” in their device manuals,<sup>122</sup> advising that a minimum distance must be kept between the cell phone and head or body to meet Health Canada safety guidelines? How is the Government of Canada ensuring that users respect the distance requirements indicated by the manufacturer? What initiatives are planned to ensure that testing for Safety Code 6 compliance is conducted for the ways devices are commonly used?

#### Ask your MP

What incentives are given to industry by the government to encourage the design and sale of information technology products that incorporate best-practices to prevent, eliminate or minimize RF radiation exposures?

#### C4ST's supporting information

- **Canada:** CBC TV *Marketplace* program episode “The Secret Inside Your Cellphone” <https://www.google.com/search?client=firefox-b-d&q=the+secret+inside+your+phone>
- **France:** Phonegate <https://www.phonegatealert.org/en>
- **USA:** *Chicago Times* “We tested popular cellphones for radiofrequency radiation. Now the FCC is investigating.” <https://www.chicagotribune.com/>

### If your MP said:

**#B41** *Our practices and guidelines remain consistent with other parts of the world who are moving towards the 5G network.*

#### Your possible reply

China, Russia, parts of Italy and Switzerland have limits up to 50 times safer than Canada's, according to data from the World Health Organization.<sup>123</sup> Nations and communities worldwide are resisting 5G rollout<sup>124</sup> because 5G technologies have not had any health safety testing for long-term exposures.<sup>125,126</sup>

#### Ask your MP

Given that China, Russia, parts of Italy and Switzerland have guidelines that are 50 times safer than Canada's, and that Brussels (Belgium), parts of Italy and Switzerland have put a halt to the rollout of 5G until more is known about possible adverse effects, what is Health Canada's plan to investigate why these countries are providing better protection to their citizens?

## GOVERNMENT OF CANADA WEBSITE

### If your MP said:

**#B50** *The Government of Canada responded to misinformation regarding 5G technology currently circulating on the internet. In early May, the Government launched a website dedicated to giving Canadians the facts about radiofrequency energy and safety. You can review that information clicking here (<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11467.html>).*

#### Your possible reply

Unfortunately, this website and other Government of Canada webpages dedicated to this issue contain misinformation, including incorrect and misleading statements.

For information to use in your reply, see "[C4ST Fact-checks Government of Canada Webpages Regarding Health Risks and Wireless Technologies, including 5G.](#)"

#### Ask your MP

Given the misleading and incorrect statements on the Government of Canada's webpage <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11467.html> will you determine what process is in place to ensure the accuracy of information posted on the GoC webpages and ask the appropriate Minister to make the necessary corrections?

#### C4ST's supporting information

C4ST's comprehensive and well referenced report, "[C4ST Fact-checks Government of Canada Webpages Regarding Health Risks and Wireless Technologies, including 5G,](#)" identifies many of the misleading and inaccurate statements made on the Government of Canada's federal ministries' webpages of Health Canada and Innovation, Science and Economic Development.

## THE ENVIRONMENT

So far, no MP has commented on the environment.

### Your possible reply to MP's lack of response

RF radiation affects plants and animals, including birds and pollinators.<sup>127, 128</sup> There is no environmental assessment for, and no protection against, RF radiation in the *Canadian Environmental Protection Act (CEPA)*. CEPA amendment is on the current Minister's mandate and was in the Speech from the Throne, so please ensure that attention is given to the submissions and recommendations noted in the ENVI report, that RF radiation be included in the amended CEPA.<sup>129</sup>

Wireless networks have a much larger carbon footprint than wired networks. When all factors are considered, wireless technology is a major contributor to global climate change.<sup>130</sup> These factors include: the embodied energy used to make the many 5G and smart technology devices, the energy needed to charge these wireless and cellular devices, the energy used to power the antennas (transmitters and receivers) that send and receive signals and data, as well as the energy used to store data in servers.<sup>131</sup>

### Ask your MP

Given that peer-reviewed and published papers show evidence of environmental harms to birds, pollinators, trees and other species; that there are no guidelines for the protection of wildlife from RF radiation; and that the Government of Canada report, **“Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening the Canadian Environmental Protection Act, 1999”** has recommended that the literature documenting adverse effects in wildlife, including pollinators, submitted to it should be reviewed,<sup>132</sup> would you please ask the Minister of the Environment and Climate Change what is being done to establish adequate RF radiation guidelines to protect the environment, including wildlife?

### Ask your MP

Tens of thousands of low-orbit satellites will be transmitting radiofrequency radiation to all parts of the Earth within one year. What is being done to determine whether there will be any adverse effects on individual species and on ecosystems, as well as on weather forecasting and astronomy, and to protect against these effects?

### Ask your MP

On October 15, 2020, the Canadian Radio-television and Telecommunications Commission (CRTC) approved SpaceX's application to provide low-orbit satellite Internet to rural Canadians. SpaceX already has U.S. Federal Communications Commission approval to launch 12,000 low-orbit satellites to provide wireless Internet service to every inch of the planet. Thousands more are planned. The CRTC seems to be approving these without consulting the public. What will you do to ensure the public is fully informed and consulted?

## C) APPEAL ITEM: PROCESS FOR CANADIANS TO HAVE A DECISIVE SAY IN CELL ANTENNA INSTALLATIONS

### CONSULTATIONS WITH THE PUBLIC ABOUT SMALL ANTENNA AND LARGE CELL TOWER INSTALLATIONS

#### TERMS OR ABBREVIATIONS USED IN THIS SECTION

- **ISED:** Canada's Ministry of Innovation, Science and Economic Development (formerly called Industry Canada)\*
- **Land-use authority (LUA):** any local authority that governs land-use issues and includes a municipality, town council, regional commission, development authority, township board, band council or similar body\*\*
- **Proponent:** anyone who is planning to install or modify an antenna system\*\*

\* The responsible Minister is called the Minister of Innovation, Science and Industry.

\*\* from the Government of Canada's "Guide to Assist Land-use Authorities in Developing Antenna System Siting Protocols"

#### If your MP said:

**#C01** *Telecom companies must consult openly and transparently with communities on all towers.*

#### Your possible reply

It is not correct that public consultations are required for all towers. It is true that telecommunications companies must consult the land-use authority (LUA), such as a municipal government, regarding new cell tower siting and notify the public within a radius that is 3 times the height of the proposed tower, but there are important exclusions for other cell antenna installations.

In fact, the ISED Client Procedures Circular CPC-2-0-03, Section 6 explicitly allows exclusions of antennas on non-tower structures such as “*buildings, water towers, lamp posts, etc.*”

According to the default process as outlined by this circular, there is no requirement for notice or consultation regarding the deployment of antennas on “*non tower structures,*” or the addition of antennas to a given tower, when the height of the current structure is not increased by more than 25%.<sup>133</sup> Public consultations are not required if a cell “*tower*” is less than 15 metres and is for non-commercial purposes. **This means that citizens will not be consulted when the many “*small cell*” antennas required for 5G are placed close to our homes, schools, hospitals and workplaces unless the LUA has a local antenna siting policy in place that requires otherwise.**

Regarding installations that do require notification, this process is run by the telecommunications company proposing the tower and has been continually shown to be inadequate, according to residents who have been affected.

#### If your MP said:

**#C02** *Consultations are required to be held with communities on all newly established commercial tower installations (regardless of height).*



### Your possible reply

It is not correct that public consultations are required for all towers. It is true that telecommunications companies must consult land-use authorities (LUA), e.g., municipal governments, regarding new cell tower siting and notify the public within a radius that is 3 times the height of the proposed tower.

In fact, the ISED Client Procedures Circular CPC-2-0-03, Section 6 explicitly allows exclusions of antennas on non-tower structures such as “*buildings, water towers, lamp posts, etc.*”

There are currently no regulations requiring any notification for the installation of “*small cell*” antennas on a current structure if the height of the current structure is not increased by more than 25%.<sup>134</sup> There is also no requirement for notice or consultation regarding height increase or addition of antennas to a given tower if the height is not increased by more than 25%.<sup>135</sup>

Public consultations are not required if a cell “*tower*” is less than 15 metres and is for non-commercial purposes.

This means that citizens will not be consulted when the many “*small cell*” antennas 5G requires are placed close to our homes, schools, hospitals and workplaces.

### If your MP said:

**#C03** *Antenna systems must be deployed in a manner that considers the local surroundings and most importantly, public input.*

### Your possible reply

It is not correct that public consultations are required for all towers. It is true that telecommunications companies must consult municipal governments regarding new cell tower siting and notify the public within a radius that is 3 times the height of the proposed tower.

In fact, the ISED Client Procedures Circular CPC-2-0-03, Section 6 explicitly allows exclusions of antennas on non-tower structures such as “*buildings, water towers, lamp posts, etc.*”

There is no requirement for notice or consultation regarding the deployment of antennas on “*non tower structures,*” or the addition of antennas to a given tower, when the height of the current structure is not increased by more than 25%.<sup>136</sup> Public consultations are not required if a cell “*tower*” is less than 15 metres and is for non-commercial purposes. These regulations mean that citizens will not be consulted when the many “*small cell*” antennas 5G requires are placed close to our homes, schools, hospitals and workplaces.

In regard to local input, ISED states, “*Radiocommunication antennas need to be strategically located to satisfy specific technical criteria and operational requirements. Therefore, there is a limited measure of flexibility in the placement of antennas and proponents are constrained to some degree.*”<sup>137</sup> Land-use authorities, municipalities and the public, if they take the initiative, can suggest alternate sites but the telecommunications companies may not agree and may insist on the site they want. In fact, ISED representatives have stated that since the

telecom companies have paid for the spectrum, they are entitled to fill in any “white spots” in their networks. An example where the public’s request was overridden is Charlottetown, PEI. See HESA 2010 Hearings.<sup>138</sup>

The main role of land-use authorities, e.g., municipalities, is to provide concurrence (agreement) or non-concurrence (non-agreement). If a land-use authority, e.g., municipality, disagrees with the proposed siting of a tower, the LUA does so by writing a “letter of *non-concurrence*.” A municipality can also pass motions, as occurred in Ontario and Québec (more details in C4ST’s guide “**Stop Wireless 5G until Health Canada’s Safety Code 6 Is Fixed: A Guide to Why and How**”). A municipality can also ensure that the public is informed about the process, e.g., the City of Winnipeg’s Public Engagement Process.<sup>139</sup> It can refuse to have antennas placed on its controlled property unless there are already by-laws and agreements in place that prevent refusal.

When local surroundings are mentioned, these procedures apply only to commercial antennas on towers and monopoles—not to antennas on “*non-tower*” structures.

### If your MP said:

**#C04** *There are procedures in place to address reasonable and relevant concerns raised in these consultations.*

#### Your possible reply

- 1) There are currently no regulations requiring any notification for the installation of a small cell antenna on an existing structure if the height of that structure is not increased by more than 25%.<sup>140</sup>
- 2) In addition, ISED’s Dispute Resolution Process specifically excludes written requests or concerns from the general public regarding cell antenna placement.<sup>141</sup>
- 3) Inappropriately, health concerns are not deemed “*reasonable and relevant*” (nor are the potential impacts on property values or municipal taxes).<sup>142</sup>
- 4) The results of these “*public consultations*” (which are carried out by the telecommunications companies themselves rather than an unbiased third party) are not made available to the public.
- 5) Regardless of the outcome of the consultation, permission is generally granted to the telecom company to install its antennas; the Minister of Innovation, Science and Industry has the authority to deny a telecom’s request but will not do so if the concerns are health-related.
- 6) Limitations inherent to 5G technology mean that deployment will require a much greater cell density, every 100 metres according to some estimates. (Each cell site, cell tower or cellular base station contains many antennas.<sup>143</sup>) In order for the 5G network to work, 5G small cell antennas must be installed close to the 5G devices with which they will wirelessly communicate. To be close to our homes, schools and places of work, many small antennas will be attached to utility poles, such as light posts, telephone and hydro poles, and other existing structures.

### If your MP said:

**#C05** *Innovation, Science and Economic Development Canada’s policy for siting antenna towers is outlined in Client Procedures Circular (CPC-2-0-03), Issue 5, entitled: Radiocommunication and Broadcasting Antenna Systems.*

#### Your possible reply

Land-use authorities, e.g., local municipalities, can have their own policies where broader public consultations are required, including for small cell antennas. However, there are strict guidelines and parameters within which the land-use authority must operate.<sup>144,145</sup>

### If your MP said:

**#C06** *The main objective of the procedures is to facilitate an open and transparent process that promotes the continued expansion of wireless technologies and services, while at the same time ensures that the associated infrastructure is deployed responsibly.*

#### Your possible reply

The consultation process has not been shown to be transparent nor open. Most of the time, consultation is not required because it is considered to be of “*minimal impact*” by ISED<sup>146</sup>—even though Canadian residents, who will be exposed 24/7 and are aware of the health risks, disagree.

### If your MP said:

**#C07** *Sharing of existing infrastructure must be ruled out before a new structure is proposed.*

#### Your possible reply

While it is true that mandatory tower and site-sharing conditions apply,<sup>147</sup> sharing of infrastructure (poles/towers/buildings) will not reduce the number of antennas from multiple carriers, and therefore will not reduce the amount of radiation close to homes. Each telecommunications company will require its own full 5G coverage for everyone on the street.

### If your MP said:

**#C08** *Innovation, Science and Economic Development Canada takes an active role and is available throughout all steps of the process to clarify the antenna siting procedures, to explain the roles and responsibilities of the parties and to answer any questions concerning options or alternatives.*

#### Your possible reply

ISED is available to support the telecommunication companies, not the general public.<sup>148</sup> ISED’s Client Procedures Circular “**CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems**” clearly assigns the responsibility of dealing with the public to proponents and local land-use authorities (LUAs). In fact, ISED’s Dispute Resolution Process specifically excludes written requests from the general public.<sup>149</sup>

### Ask your MP

Can you ask the Minister of Innovation, Science and Industry (ISED) to update ISED's policy for siting antenna towers as outlined in Client Procedures Circular CPC-2-0-03, Issue 5, entitled: "Radiocommunication and Broadcasting Antenna Systems" to remove the 15 metre exclusion for public consultation/notification for non-commercial towers?

### Ask your MP

Would you, as my elected representative, write to the Minister of Innovation, Science and Industry to support our Appeal for full, open and transparent public consultations on the installation of small cell antennas on all structures, regardless of height or existing infrastructure? If this is something you do not wish to do at this time, what other information do you, as my elected representative, need to act on this?

### Ask your MP

Given that for towers that are 30 metres or more in height, proponents of an antenna system must place a notice of public consultation in a local community newspaper, please write to the Minister of Innovation, Science and Industry asking to require this same level of notification for all towers of all heights.

### Ask your MP

Public consultation is not required for "non-commercial" purposes. Besides for Amateur Radio Operations (ham radio operations), what could these non-commercial purposes be? Is ISED involved in the licensing?

## MONITORING OF EMISSIONS

### If your MP said:

*#C50 ISED maintains a market surveillance program and routinely audits antenna installations and devices to verify compliance.*

### Your possible reply

While ISED has developed standards to monitor RF radiation emitted by cell tower antennas, small cell antennas, and Wi-Fi and Bluetooth devices, this department appears to conduct little, if any, monitoring activity. It is our understanding that the industry self-monitors and that ISED's role is largely administrative. Calls to ISED to measure specific locations have been refused since "there aren't enough resources available."

All radiofrequency-emitting devices—whether they are cell tower antennas, small cell antennas, cell phones, cordless phones, or Wi-Fi and Bluetooth devices such as tablets, laptops, baby monitors, wireless printers/keyboards/mice, gaming consoles, virtual reality headsets, wearables, "smart" appliances and utility meters—are each tested individually and approved by ISED. There is no procedure, process nor authoritative body that measures the cumulative effect of simultaneous exposures to emissions from more than one device. It must also be remembered that these tests only look at heating—not any of the biological effects documented in many high-quality studies.<sup>150</sup>

Models used to prove that wireless devices meet ISED and Health Canada's Safety Code 6 guidelines are based on an exposure duration of 6 minutes and whether heat is dissipated within this time. There is no testing, evaluation or monitoring of 24 hours per day, 7 days per week (24/7) exposure.

The guidelines in Health Canada's Safety Code 6, which ISED relies on to regulate the radiation from wireless devices, were first established in 1979. The frequency range used was from 3 kHz to 300 GHz. To automatically assume 5G devices in this frequency range are safe is unacceptable, especially since there has been no health safety testing on long-term exposures to 5G's millimetre waves.<sup>151,152</sup>

### If your MP said:

**#C51 Innovation, Science and Economic Development Canada (ISED) has adopted Health Canada's Safety Code 6 as the Canadian RF exposure limits for wireless devices and their associated infrastructure. Wireless devices must meet the RF exposure requirements at all times and be certified before they can be sold in Canada. Anyone who manufactures, imports, distributes, sells or leases wireless devices in Canada must comply with ISED's regulations.**

### Your possible reply

While ISED has developed standards to monitor RF radiation emitted by cell tower antennas, small cell antennas, and Wi-Fi and Bluetooth devices, this department appears to conduct little, if any, monitoring activity. It is our understanding that the industry self-monitors and that ISED's role is largely administrative. Calls to ISED to measure specific locations have been refused since *"there aren't enough resources available."*

All radiofrequency-emitting devices—whether they are cell tower antennas, small cell antennas, cell phones, cordless phones, or Wi-Fi and Bluetooth devices such as tablets, laptops, baby monitors, wireless printers/keyboards/mice, gaming consoles, virtual reality headsets, wearables, *"smart"* appliances and utility meters—are each tested individually and approved by ISED. There is no procedure, process nor authoritative body that measures and assesses the cumulative effect of simultaneous exposures to emissions from more than one device. It must also be remembered that these tests determine levels only aimed to prevent excessive heating—not any of the biological effects documented in many high-quality studies.

Models used to prove that wireless devices meet ISED and Health Canada's Safety Code 6 guidelines are based on an exposure duration of 6 minutes and whether heat is dissipated within this time. There is no testing, evaluation or monitoring of 24 hours per day 7 days per week (24/7) exposure.

The limits in Health Canada's Safety Code 6, which ISED relies on to regulate the radiation from wireless devices, were first established in 1979. The frequency range used was from 3 kHz to 300 GHz. To automatically assume 5G devices in this frequency range are safe is unacceptable, especially since there has been no health safety testing on long-term exposures to 5G's millimetre waves.<sup>153,154</sup>

## If your MP said:

**#C52** *Health Canada monitors radiation emissions emitted by RF electromagnetic energy, which is used in various electronic devices such as cell-phones and Wi-Fi, as well as broadcasting and cell phone towers. They have deemed that if 5G radiation emissions do not exceed exposure limits, there is no threat to public health.*

### Your possible reply

While ISED has developed standards to monitor RF radiation emitted by cell tower antennas, small cell antennas, and Wi-Fi and Bluetooth devices, this department appears to conduct little, if any, monitoring activity. It is our understanding that the industry self-monitors and that ISED's role is largely administrative. Calls to ISED to measure specific locations have been refused since *"there aren't enough resources available."*

All radiofrequency-emitting devices—whether they are cell tower antennas, small cell antennas, cell phones, cordless phones, or Wi-Fi and Bluetooth devices such as tablets, laptops, baby monitors, wireless printers/keyboards/mice, gaming consoles, virtual reality headsets, wearables, *"smart"* appliances and utility meters—are each tested individually and approved by ISED. There is no procedure, process nor authoritative body that measures the cumulative dose or effects of simultaneous exposures to emissions from more than one device. It must also be remembered that these tests determine levels only aimed to prevent excessive heating—not any of the biological effects documented in many high-quality studies.

Models used to prove that wireless devices meet ISED and Health Canada's Safety Code 6 guidelines are based on an exposure duration of 6 minutes and whether heat is dissipated within this time. There is no testing, evaluation, monitoring or regulation based on effects of 24 hours per day 7 days per week (24/7) exposure.

The guidelines in Health Canada's Safety Code 6, which ISED relies on to regulate the radiation from wireless devices, were first established in 1979. The frequency range used was from 3 kHz to 300 GHz. To automatically assume 5G devices in this frequency range are safe is unacceptable, especially since there has been no health safety testing, particularly of long-term exposures to 5G's millimetre waves.<sup>155,156</sup>

To meet compliance requirements, all manufacturers use a model that is based on a 200 pound (91 kilogram) male that does not take into account that children are more impacted by RF radiation than adults.<sup>157,158</sup> These models do not account for exposure 24 hours a day, 7 days a week (24/7). In addition, each type of device is tested individually. There is no evaluation of the effects on health from several devices operating at the same time in a classroom, lecture hall, home or office setting. The last test of power density levels in a simulated (empty) classroom-type setting was in 2012,<sup>159</sup> and technologies and usage behaviours have since changed.

## If your MP said:

**#C53** *The current Canadian limits already cover the frequency ranges that are used by 5G devices and antenna installations. Similar to current wireless devices and installations, 5G devices will need to meet RF exposure requirements before they can be sold in Canada. Antenna systems operators using 5G technology will continue to have the same RF exposure compliance obligations. Furthermore, compliance with RF exposure requirements will continue to be an ongoing obligation.*

### Your possible reply

While ISED has developed standards to monitor RF radiation emitted by cell tower antennas, small cell antennas, and Wi-Fi and Bluetooth devices, this department appears to conduct little, if any, monitoring activity. It is our understanding that the industry self-monitors and that ISED's role is largely administrative. Calls to ISED to measure RF radiation at specific locations have been refused since "*there aren't enough resources available.*"

All radiofrequency-emitting devices—whether they are cell tower antennas, small cell antennas, cell phones, cordless phones, or Wi-Fi and Bluetooth devices such as tablets, laptops, baby monitors, wireless printers/keyboards/mice, gaming consoles, virtual reality headsets, wearables, "*smart*" appliances and utility meters—are each tested individually before approval by ISED. There is no procedure, process nor authoritative body that measures the cumulative effect of simultaneous exposures to emissions from more than one device.

It must also be remembered that the current Canadian limits only apply to heating—not any of the biological effects documented in many high-quality studies.

Models used to prove that wireless devices meet ISED and Health Canada's Safety Code 6 limits are based on an exposure duration of 6 minutes and whether heat is dissipated within this time. There is no testing, evaluation or monitoring of 24 hours per day 7 days per week (24/7) exposure.

The guidelines in Health Canada's Safety Code 6, which ISED relies on to regulate the radiation from wireless devices, were first established in 1979. The frequency range used was from 3 kHz to 300 GHz. To automatically assume 5G devices in this frequency range are safe is unacceptable, especially since there has been no health safety testing on long-term exposures to 5G's millimetre waves.<sup>160,161</sup>

### Ask your MP

Is it true that ISED conducts only desk audits of cell antenna emissions? Files available from the Open Data portal for Spectrum Authorization\* are not consistent with the meta-data provided,\*\* and do not appear to include ground-truthed measured values. Consistent with Canada's Open Data policy, would you request that ISED provide access to the measurements that ISED has made of emissions from cell towers and from wireless devices?

\* <https://open.canada.ca/data/en/dataset/508040d7-6fa9-46e4-afbc-aa61f3ca317e>

\*\* [http://www.ic.gc.ca/engineering/SMS\\_TAFI\\_Files/tafi\\_description\\_tafi.pdf](http://www.ic.gc.ca/engineering/SMS_TAFI_Files/tafi_description_tafi.pdf)

### Ask your MP

Given industry projections of 500 billion wirelessly connected objects by 2030<sup>162</sup> (that averages to more than 50 wireless devices per person<sup>163</sup>), what activities are being

undertaken to model and to measure radiofrequency radiation exposures in the workplace and in public and private spaces due to cellular services, Wi-Fi and the “Internet of Things”?

#### Ask your MP

How can the public request investigations and access data describing exposures, particularly the peak exposures at various frequencies and modulations, e.g., of school children using wireless devices in close quarters and with a high and constant level of data transmission?

#### Ask your MP

Wireless devices are approved based on compliance of emissions from a single device operating individually in isolation. In the real world, numerous devices are operated simultaneously, so will you, as my elected MP, ask what plans ISED has to start monitoring the aggregate/cumulative levels from many devices, such as in a classroom, lecture hall or office setting?

#### Ask your MP

Given that there will be additional radiation from tens of thousands of low-orbit satellites, how will RF radiation be monitored and cumulative effects be determined? How is coordination to monitor the cumulative effects being conducted between ISED (regulator of devices and antennas) and the Canadian Radio-television and Telecommunications Commission (CRTC), which licenses Low Earth Orbit satellites?



## REFERENCES

- <sup>1</sup> Health Canada. (2015). **Limits of human exposure to radiofrequency electromagnetic energy in the frequency range from 3 KHz to 300 GHz. Safety Code 6 (2015)**, 24. [http://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/pdf/consult/2014/safety\\_code\\_6-code\\_securite\\_6/final-finale-eng.pdf](http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/consult/2014/safety_code_6-code_securite_6/final-finale-eng.pdf)
- <sup>2</sup> City of Toronto, Board of Health (2008, March). **City Council Decision HL10.3, Prudent Avoidance Policy on Siting Telecommunication Towers and Antennas**. <https://www.toronto.ca/legdocs/mmis/2007/hl/reports/2007-12-04-hl10-cr.pdf>
- <sup>3</sup> CBC Marketplace. (2017). **The Secret Inside Your Cellphone**. <https://www.cbc.ca/player/play/910329411834>.
- <sup>4</sup> **5G Appeal of International Scientists**. (2017, September). <http://www.5gappeal.eu/>
- <sup>5</sup> Physicians' Health Initiative for Radiation and Environment and British Society for Ecological Medicine. (2020, October 11). **Press Release. 2020 Consensus Statement of UK and International Medical and Scientific Experts and Practitioners on Health Effects of Non-Ionising Radiation (NIR)**. <https://phiremedical.org/wp-content/uploads/2020/11/Press-Release-2020-Non-Ionising-Radiation-Consensus-Statement-1.pdf>
- <sup>6</sup> Hardell, L., & Carlberg, M. (2020). **Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest**. *Oncology Letters*, 20(4). <https://doi.org/10.3892/ol.2020.11876>
- <sup>7</sup> **5G Appeal of International Scientists**. (2017, September). <http://www.5gappeal.eu/>
- <sup>8</sup> Physicians' Health Initiative for Radiation and Environment and British Society for Ecological Medicine et al. (2020, October 11). **2020 Consensus Statement of UK and International Medical and Scientific Experts and Practitioners on Health Effects of Non-Ionising Radiation (NIR)**. <https://phiremedical.org/wp-content/uploads/2020/11/2020-Non-Ionising-Radiation-Consensus-Statement.pdf>
- <sup>9</sup> Pall, M. L. (2015). **Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action**. *Reviews on Environmental Health*, 30(2), 99-116. <https://doi.org/10.1515/reveh-2015-0001>
- <sup>10</sup> **Declaration: Doctors Call for Protection from Radiofrequency Radiation Exposure**. (2014, September 28). <http://docs.c4st.org/C4STdocs/medical-doctors-submission-to-health-canada-english.pdf>
- <sup>11</sup> **Declaration: Scientists call for Protection from Radiofrequency Radiation Exposure**. (2014, July 9). <http://docs.c4st.org/C4STdocs/scientific-declaration-to-health-canada-english.pdf>
- <sup>12</sup> Canadians for Safe Technology. (2014). **Relevant scientific studies (140) omitted by Health Canada in its scientific review of draft Safety Code 6 (2014), Canada's safety guidelines for safe exposure to radiofrequency/microwave radiation**. *Submission to the Federal Minister of Health Canada, Honourable Rona Ambrose 15 July 2014*, [http://docs.c4st.org/Studies/140\\_studies\\_omitted\\_by\\_Health\\_Canada.pdf](http://docs.c4st.org/Studies/140_studies_omitted_by_Health_Canada.pdf)
- <sup>13</sup> Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings**. *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- <sup>14</sup> Webster, P. C. (2014). **Federal Wi-Fi safety report is deeply flawed, say experts**. *CMAJ: Canadian Medical Association Journal = Journal de l'Association Medicale Canadienne*, 186(9), E300. <https://doi.org/10.1503/cmaj.109-4785>
- <sup>15</sup> Huh, N. Y. (2014, April 15). **Canadian scientists urge more research into safety of wireless technology, saying recent report downgrades cancer risk**. *National Post*. <https://nationalpost.com/health/canadian-scientists-urge-more-research-into-safety-of-wireless-technology-saying-recent-report-downgrades-cancer-risk>

- <sup>16</sup> Cook, Harold J., Steneck, N. H., Vander, A. J., & Kane, G. L. (1980). **Early research on the biological effects of microwave radiation: 1940-1960.** *Annals of Science*, 37, 323-351. Page 326. <https://doi.org/10.1080/00033798000200271>
- <sup>17</sup> Health Canada. (2015). **Limits of human exposure to radiofrequency electromagnetic energy in the frequency range from 3 KHz to 300 GHz.** *Safety Code 6 (2015)*, 24. [http://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/pdf/consult/2014/safety\\_code\\_6-code\\_securite\\_6/final-finale-eng.pdf](http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/consult/2014/safety_code_6-code_securite_6/final-finale-eng.pdf)
- <sup>18</sup> Miller, A. B., Sears, M. E., Morgan, L. L., Davis, D. L., Hardell, L., Oremus, M., & Soskolne, C. L. (2019). **Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.** *Frontiers in Public Health*, 7. <https://doi.org/10.3389/fpubh.2019.00223>
- <sup>19</sup> Russell, C. L. (2018). **5 G wireless telecommunications expansion: Public health and environmental implications.** *Environmental Research*, 165, 484-495. <https://doi.org/10.1016/j.envres.2018.01.016>
- <sup>20</sup> Kelly, E., Blank, Martin, Lai, Henry, Moskowitz, Joel, & Havas, Magda. (2015). **International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure.** *Eur. J. Oncol.*, 20(3/4), 180-182. [https://www.researchgate.net/publication/298533689\\_International\\_Appeal\\_Scientists\\_call\\_for\\_protection\\_from\\_non-ionizing\\_electromagnetic\\_field\\_exposure](https://www.researchgate.net/publication/298533689_International_Appeal_Scientists_call_for_protection_from_non-ionizing_electromagnetic_field_exposure)
- <sup>21</sup> **United Nations Environment Programme Urged to Protect Nature and Humankind from Electromagnetic Fields (EMF). 4G/5G antenna densification is escalating health risks - a global crisis.** <https://emfscientist.org/>, & <https://www.businesswire.com/news/home/20190722005154/en/U.N.-Environment-Programme-Urged-Protect-Nature-Humankind>
- <sup>22</sup> **BioInitiative 2012 Report. (2012). A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *BioInitiative Working Group.* <https://www.Bioinitiative.Org/>
- <sup>23</sup> **BioInitiative Working Group 2017. (2017). Update summaries. A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *BioInitiative Working Group.* <https://www.Bioinitiative.Org/Updated-Research-Summaries-December-2017/>
- <sup>24</sup> Miller, A. B., Morgan, L. L., Udasin, I., & Davis, D. L. (2018). **Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).** *Environmental Research*, 167, 673-683. <https://doi.org/10.1016/j.envres.2018.06.043>
- <sup>25</sup> Hardell, L., & Carlberg, M. (2018). **Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz.** *International Journal of Oncology.* <https://pubmed.ncbi.nlm.nih.gov/30365129/>
- <sup>26</sup> **International Agency for Research on Cancer. (2019). Report of the Advisory Group to Recommend Priorities for the IARC Monographs during 2020-2024. Pages 148-149.** <https://monographs.iarc.fr/agents-classified-by-the-iarc/>
- <sup>27</sup> Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings.** *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- <sup>28</sup> **5G Appeal of International Scientists. (2017).** <http://www.5gappeal.eu/>
- <sup>29</sup> **United States Senator Richard Blumenthal. (2019, February 7). Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- <sup>30</sup> Fernández, C., de Salles, A. A., Sears, M. E., Morris, R. D., & Davis, D. L. (2018). **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** *Environmental Research*, 167, 694-699. <https://doi.org/10.1016/j.envres.2018.05.013>

- <sup>31</sup> Morgan, L. L., Kesari, S., & Davis, D. L. (2014). **Why children absorb more microwave radiation than adults: The consequences.** *Journal of Microscopy and Ultrastructure*, 2(4), 197-204. <https://doi.org/10.1016/j.jmau.2014.06.005>
- <sup>32</sup> Industry Canada. (2012b, May). **Case Study: Measurements of Radio Frequency Exposure from Wi-Fi Devices.** [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/\\$FILE/Wifi-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/$FILE/Wifi-e.pdf)
- <sup>33</sup> **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>
- <sup>34</sup> United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- <sup>35</sup> Fernández, C., de Salles, A. A., Sears, M. E., Morris, R. D., & Davis, D. L. (2018). **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** *Environmental Research*, 167, 694-699. <https://doi.org/10.1016/j.envres.2018.05.013>
- <sup>36</sup> Morgan, L. L., Kesari, S., & Davis, D. L. (2014). **Why children absorb more microwave radiation than adults: The consequences.** *Journal of Microscopy and Ultrastructure*, 2(4), 197-204. <https://doi.org/10.1016/j.jmau.2014.06.005>
- <sup>37</sup> Industry Canada. (2012). **Case Study: Measurements of Radio Frequency Exposure from Wi-Fi Devices.** [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/\\$FILE/Wifi-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/$FILE/Wifi-e.pdf)
- <sup>38</sup> Canadians for Safe Technology. (2014). **Relevant scientific studies (140) omitted by Health Canada in its scientific review of draft Safety Code 6 (2014), Canada's safety guidelines for safe exposure to radiofrequency/microwave radiation.** *Submission to the Federal Minister of Health Canada, Honourable Rona Ambrose 15 July 2014*, [http://docs.c4st.org/Studies/140\\_studies\\_omitted\\_by\\_Health\\_Canada.pdf](http://docs.c4st.org/Studies/140_studies_omitted_by_Health_Canada.pdf)
- <sup>39</sup> Miller, A. B., Morgan, L. L., Udasin, I., & Davis, D. L. (2018). **Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).** *Environmental Research*, 167, 673-683. <https://doi.org/10.1016/j.envres.2018.06.043>
- <sup>40</sup> Cook, Harold J., Steneck, N. H., Vander, A. J., & Kane, G. L. (1980). **Early research on the biological effects of microwave radiation: 1940-1960.** *Annals of Science*, 37, 323-351. Page 326. <https://doi.org/10.1080/00033798000200271>
- <sup>41</sup> Environmental Health Trust. (2019, August 28). **Commentary: The FCC needs to update its cellphone tests for radiofrequency radiation.** <https://ehtrust.org/commentary-the-fcc-needs-to-update-its-cellphone-tests-for-radiofrequency-radiation/>
- <sup>42</sup> Rooney, A. A., Boyles, A. L., Wolfe, M. S., Bucher, J. R., & Thayer, K. A. (2014). **Systematic Review and Evidence Integration for Literature-Based Environmental Health Science Assessments.** *Environmental Health Perspectives*. <https://doi.org/10.1289/ehp.1307972>
- <sup>43</sup> **Declaration: Doctors Call for Protection from Radiofrequency Radiation Exposure.** (2014, September 28). <http://docs.c4st.org/C4STdocs/medical-doctors-submission-to-health-canada-english.pdf>
- <sup>44</sup> **Declaration: Scientists call for Protection from Radiofrequency Radiation Exposure.** (2014, July 9). <http://docs.c4st.org/C4STdocs/scientific-declaration-to-health-canada-english.pdf>
- <sup>45</sup> Canadians for Safe Technology. (2020). **Compendium of Auditor General Environmental Petitions (22) and Government of Canada Replies Regarding Radiofrequency/microwave Radiation Related to Health Canada's Safety Code 6. Submitted 2007 to 2017, inclusive.** *Office of the Auditor General of Canada. Petitions Catalogue.* 651 pages. [http://docs.c4st.org/GovRelations/Fed/Auditor-General/Compendium-Environmental-Petitions-Submitted-to-AG-and-Govt-of-Canada-Replies\\_Dec\\_23\\_2020.pdf](http://docs.c4st.org/GovRelations/Fed/Auditor-General/Compendium-Environmental-Petitions-Submitted-to-AG-and-Govt-of-Canada-Replies_Dec_23_2020.pdf)
- <sup>46</sup> **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>

- <sup>47</sup> United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- <sup>48</sup> **2020 Consensus Statement of UK and International Medical and Scientific Experts and Practitioners on Health Effects of Non-Ionising Radiation (NIR).** <https://phiremedical.org/2020-nir-consensus-statement-read/>
- <sup>49</sup> EMF Scientist Appeal - U.N. Environment Programme. 2019. **"EMF Scientist Appeal - U.N. Environment Programme Urged to Protect Nature and Humankind from Electromagnetic Fields (EMF). 4G/5G Antenna Densification Is Escalating Health Risks - a Global Crisis.** <https://www.emfscientist.org/>
- <sup>50</sup> Moskowitz, Joel. 2020. <https://www.saferemr.com/>
- <sup>51</sup> Rooney, A. A., Boyles, A. L., Wolfe, M. S., Bucher, J. R., & Thayer, K. A. (2014). **Systematic Review and Evidence Integration for Literature-Based Environmental Health Science Assessments.** *Environmental Health Perspectives.* <https://doi.org/10.1289/ehp.1307972>
- <sup>52</sup> Hardell, L., & Carlberg, M. (2020). **Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest.** *Oncology Letters*, 20(4). <https://doi.org/10.3892/ol.2020.11876>
- <sup>53</sup> Hardell, L. (2017). **World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review).** *International Journal of Oncology*, 51(2), 405-413. <http://www.spandidos-publications.com/ijo/51/2/405/abstract>
- <sup>54</sup> Starkey, S. J. (2016). **Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation.** *Reviews on Environmental Health*, 31(4), 493-503. <https://doi.org/10.1515/reveh-2016-0060>
- <sup>55</sup> van Scharen, H., Buchner, K., & Rivasi, M. (2020). **The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest, corporate capture and the push for 5G.** *This Report Was Commissioned, Coordinated and Published by Two Members of the European Parliament - Michèle Rivasi (Europe Écologie) and Klaus Buchner (Ökologisch-Demokratische Partei), and Financed by the Greens/EfA group in the European Parliament.* 98. <https://klaus-buchner.eu/wp-content/uploads/2020/06/ICNIRP-report-FINAL-19-JUNE-2020.pdf>
- <sup>56</sup> Bortkiewicz, A., Gadzicka, E., Szyjkowska, A., Politański, P., Mamrot, P., Szymczak, W., & Zmyślony, M. (2012). **Subjective complaints of people living near mobile phone base stations in Poland.** *International Journal of Occupational Medicine and Environmental Health*, 25(1), 31-40. <https://doi.org/10.2478/s13382-012-0007-9>
- <sup>57</sup> Levitt, B. B., & Lai, H. (2010). **Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays.** *Environmental Reviews*, 18, 369-395. <https://cdnsiencepub.com/doi/10.1139/A10-018>
- <sup>58</sup> Zothansiana, -, Zosangzuali, M., Lalramdinpui, M., & Jagetia, G. C. (2017). **Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.** *Electromagnetic Biology and Medicine*, 1-11. <https://doi.org/10.1080/15368378.2017.1350584>
- <sup>59</sup> Huss, A., Egger, M., Egger, M., Hug, K., Huwiler-Müntener, K., Rösli, M., ... Da Ros, M. A. (2008). **Source of funding and results of studies of health effects of mobile phone use: systematic review of experimental studies.** *Ciência & Saúde Coletiva*, 13(3), 1005-1012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1797826/>
- <sup>60</sup> Hertsgaard, M., & Dowie, M. (2018, March 29). **How Big Wireless Made Us Think That Cell Phones Are Safe: A Special Investigation.** *The Nation.* <https://www.thenation.com/article/how-big-wireless-made-us-think-that-cell-phones-are-safe-a-special-investigation/>

- <sup>61</sup> Hertsgaard, M., & Dowie, M. (2018). **The inconvenient truth about cancer and mobile phones.** *The Guardian*. <http://www.theguardian.com/technology/2018/jul/14/mobile-phones-cancer-inconvenient-truths>
- <sup>62</sup> Levitt, B. B., & Lai, H. (2010). **Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays.** *Environmental Reviews*, 18, 369-395. <https://cdnsiencepub.com/doi/10.1139/A10-018>
- <sup>63</sup> Zothansiana, -, Zosangzuali, M., Lalramdinpuui, M., & Jagetia, G. C. (2017). **Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.** *Electromagnetic Biology and Medicine*, 1-11. <https://doi.org/10.1080/15368378.2017.1350584>
- <sup>64</sup> **Statement made by Brian Ahier, A/Director General, Environmental and Radiation Health Sciences Directorate, Health Canada, in a letter addressed to Sharon Noble on July 29, 2020.**
- <sup>65</sup> **Radiation Emitting Devices Regulations (C.R.C., c. 1370).** Schedule 1, Section 3. [https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,\\_c.\\_1370/page-2.html#h-506358](https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._1370/page-2.html#h-506358)
- <sup>66</sup> **Radiocommunication Act (R.S.C., 1985, c. R-2).** Current to November 17, 2020 <https://laws-lois.justice.gc.ca/eng/acts/R-2/index.html>
- <sup>67</sup> Health Canada. (2015). **Limits of human exposure to radiofrequency electromagnetic energy in the frequency range from 3 KHz to 300 GHz.** *Safety Code 6 (2015)*, 24. [http://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/pdf/consult/2014/safety\\_code\\_6-code\\_securite\\_6/final-finale-eng.pdf](http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/consult/2014/safety_code_6-code_securite_6/final-finale-eng.pdf)
- <sup>68</sup> Pall, M. L. (2015). **Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.** *Reviews on Environmental Health*, 30(2), 99-116. <https://doi.org/10.1515/reveh-2015-0001>
- <sup>69</sup> **Declaration: Doctors Call for Protection from Radiofrequency Radiation Exposure.** (2014, September 28). <http://docs.c4st.org/C4STdocs/medical-doctors-submission-to-health-canada-english.pdf>
- <sup>70</sup> **Declaration: Scientists call for Protection from Radiofrequency Radiation Exposure.** (2014, July 9). <http://docs.c4st.org/C4STdocs/scientific-declaration-to-health-canada-english.pdf>
- <sup>71</sup> Canadians for Safe Technology. (2014). **Relevant scientific studies (140) omitted by Health Canada in its scientific review of draft Safety Code 6 (2014), Canada's safety guidelines for safe exposure to radiofrequency/microwave radiation.** *Submission to the Federal Minister of Health Canada, Honourable Rona Ambrose 15 July 2014*, [http://docs.c4st.org/Studies/140\\_studies\\_omitted\\_by\\_Health\\_Canada.pdf](http://docs.c4st.org/Studies/140_studies_omitted_by_Health_Canada.pdf)
- <sup>72</sup> Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings.** *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- <sup>73</sup> Webster, P. C. (2014). **Federal Wi-Fi safety report is deeply flawed, say experts.** *CMAJ: Canadian Medical Association Journal = Journal de l'Association Médicale Canadienne*, 186(9), E300. <https://doi.org/10.1503/cmaj.109-4785>
- <sup>74</sup> Huh, N. Y. (2014, April 15). **Canadian scientists urge more research into safety of wireless technology, saying recent report downgrades cancer risk.** *National Post*. <https://nationalpost.com/health/canadian-scientists-urge-more-research-into-safety-of-wireless-technology-saying-recent-report-downgrades-cancer-risk>
- <sup>75</sup> Cook, Harold J., Steneck, N. H., Vander, A. J., & Kane, G. L. (1980). **Early research on the biological effects of microwave radiation: 1940-1960.** *Annals of Science*, 37, 323-351. Page 326. <https://doi.org/10.1080/00033798000200271>

- <sup>76</sup> Russell, C. L. (2018). **5 G wireless telecommunications expansion: Public health and environmental implications.** *Environmental Research*, 165, 484-495. <https://doi.org/10.1016/j.envres.2018.01.016>
- <sup>77</sup> Kelly, E., Blank, Martin, Lai, Henry, Moskowitz, Joel, & Havas, Magda. (2015). **International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure.** *Eur. J. Oncol.*, 20(3/4), 180-182. [https://www.researchgate.net/publication/298533689\\_International\\_Appeal\\_Scientists\\_call\\_for\\_protection\\_from\\_non-ionizing\\_electromagnetic\\_field\\_exposure](https://www.researchgate.net/publication/298533689_International_Appeal_Scientists_call_for_protection_from_non-ionizing_electromagnetic_field_exposure)
- <sup>78</sup> United Nations Environment Programme Urged to Protect Nature and Humankind from Electromagnetic Fields (EMF). 4G/5G antenna densification is escalating health risks - a global crisis. <https://emfscientist.org/>  
And <https://www.businesswire.com/news/home/20190722005154/en/U.N.-Environment-Programme-Urged-Protect-Nature-Humankind>
- <sup>79</sup> BioInitiative 2012 Report. (2012). **A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *BioInitiative Working Group*. <https://www.Bioinitiative.Org/>
- <sup>80</sup> BioInitiative Working Group 2017. (2017). **Update summaries. A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *BioInitiative Working Group*. <https://www.Bioinitiative.Org/Updated-Research-Summaries-December-2017/>
- <sup>81</sup> Rooney, A. A., Boyles, A. L., Wolfe, M. S., Bucher, J. R., & Thayer, K. A. (2014). **Systematic Review and Evidence Integration for Literature-Based Environmental Health Science Assessments.** *Environmental Health Perspectives*. <https://doi.org/10.1289/ehp.1307972>
- <sup>82</sup> Health Canada. (2015). **Limits of human exposure to radiofrequency electromagnetic energy in the frequency range from 3 KHz to 300 GHz.** *Safety Code 6 (2015)*, 24. [https://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/pdf/consult/2014/safety\\_code\\_6-code\\_securite\\_6/final-finale-eng.pdf](https://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/consult/2014/safety_code_6-code_securite_6/final-finale-eng.pdf)
- <sup>83</sup> Pall, M. L. (2015). **Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.** *Reviews on Environmental Health*, 30(2), 99-116. <https://doi.org/10.1515/reveh-2015-0001>
- <sup>84</sup> **Declaration: Doctors Call for Protection from Radiofrequency Radiation Exposure.** (2014, September 28). <http://docs.c4st.org/C4STdocs/medical-doctors-submission-to-health-canada-english.pdf>
- <sup>85</sup> **Declaration: Scientists call for Protection from Radiofrequency Radiation Exposure.** (2014, July 9). <http://docs.c4st.org/C4STdocs/scientific-declaration-to-health-canada-english.pdf>
- <sup>86</sup> Canadians for Safe Technology. (2014). **Relevant scientific studies (140) omitted by Health Canada in its scientific review of draft Safety Code 6 (2014), Canada's safety guidelines for safe exposure to radiofrequency/microwave radiation.** Submitted to the Federal Minister of Health Canada, Honourable Rona Ambrose 15 July 2014, [http://docs.c4st.org/Studies/140\\_studies\\_omitted\\_by\\_Health\\_Canada.pdf](http://docs.c4st.org/Studies/140_studies_omitted_by_Health_Canada.pdf)
- <sup>87</sup> Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings.** *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- <sup>88</sup> Webster, P. C. (2014). **Federal Wi-Fi safety report is deeply flawed, say experts.** *CMAJ: Canadian Medical Association Journal = Journal de l'Association Médicale Canadienne*, 186(9), E300. <https://doi.org/10.1503/cmaj.109-4785>

- <sup>89</sup> Huh, N. Y. (2014, April 15). **Canadian scientists urge more research into safety of wireless technology, saying recent report downgrades cancer risk.** *National Post*. <https://nationalpost.com/health/canadian-scientists-urge-more-research-into-safety-of-wireless-technology-saying-recent-report-downgrades-cancer-risk>
- <sup>90</sup> Cook, Harold J., Steneck, N. H., Vander, A. J., & Kane, G. L. (1980). **Early research on the biological effects of microwave radiation: 1940-1960.** *Annals of Science*, 37, 323-351. Page 326. <https://doi.org/10.1080/00033798000200271>
- <sup>91</sup> Russell, C. L. (2018). **5 G wireless telecommunications expansion: Public health and environmental implications.** *Environmental Research*, 165, 484-495. <https://doi.org/10.1016/j.envres.2018.01.016>
- <sup>92</sup> Kelly, E., Blank, Martin, Lai, Henry, Moskowitz, Joel, & Havas, Magda. (2015). **International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure.** *Eur. J. Oncol.*, 20(3/4), 180-182. [https://www.researchgate.net/publication/298533689\\_International\\_Appeal\\_Scientists\\_call\\_for\\_protection\\_from\\_non-ionizing\\_electromagnetic\\_field\\_exposure](https://www.researchgate.net/publication/298533689_International_Appeal_Scientists_call_for_protection_from_non-ionizing_electromagnetic_field_exposure)
- <sup>93</sup> United Nations Environment Programme Urged to Protect Nature and Humankind from Electromagnetic Fields (EMF). 4G/5G antenna densification is escalating health risks - a global crisis. <https://emfscientist.org/>  
And <https://www.businesswire.com/news/home/20190722005154/en/U.N.-Environment-Programme-Urged-Protect-Nature-Humankind>
- <sup>94</sup> Biolinitiative 2012 Report. (2012). **A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *Biolinitiative Working Group*. <https://www.Biolinitiative.Org/>
- <sup>95</sup> Biolinitiative Working Group 2017. (2017). **Update summaries. A rationale for biologically based exposure standards for low-intensity electromagnetic radiation.** C. Sage, and D.O. Carpenter (Eds) *Biolinitiative Working Group*. <https://www.Biolinitiative.Org/Updated-Research-Summaries-December-2017/>
- <sup>96</sup> Rooney, A. A., Boyles, A. L., Wolfe, M. S., Bucher, J. R., & Thayer, K. A. (2014). **Systematic Review and Evidence Integration for Literature-Based Environmental Health Science Assessments.** *Environmental Health Perspectives*. <https://doi.org/10.1289/ehp.1307972>
- <sup>97</sup> Hardell, L., & Carlberg, M. (2020). **Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest.** *Oncology Letters*, 20(4). <https://doi.org/10.3892/ol.2020.11876>
- <sup>98</sup> Hardell, L. (2017). **World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review).** *International Journal of Oncology*, 51(2), 405-413. <http://www.spandidos-publications.com/ijo/51/2/405/abstract>
- <sup>99</sup> Starkey, S. J. (2016). **Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation.** *Reviews on Environmental Health*, 31(4), 493-503. <https://doi.org/10.1515/reveh-2016-0060>
- <sup>100</sup> van Scharen, H., Buchner, K., & Rivasi, M. (2020). **The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest, corporate capture and the push for 5G.** *This Report Was Commissioned, Coordinated and Published by Two Members of the European Parliament - Michèle Rivasi (Europe Écologie) and Klaus Buchner (Ökologisch-Demokratische Partei), and Financed by the Greens/EfA group in the European Parliament.* 98. <https://klaus-buchner.eu/wp-content/uploads/2020/06/ICNIRP-report-FINAL-19-JUNE-2020.pdf>
- <sup>101</sup> Webster, P. C. (2014). **Federal Wi-Fi safety report is deeply flawed, say experts.** *CMAJ: Canadian Medical Association Journal = Journal de l'Association Médicale Canadienne*, 186(9), E300. <https://doi.org/10.1503/cmaj.109-4785>

- <sup>102</sup> Huh, N. Y. (2014, April 15). **Canadian scientists urge more research into safety of wireless technology, saying recent report downgrades cancer risk.** *National Post*. <https://nationalpost.com/health/canadian-scientists-urge-more-research-into-safety-of-wireless-technology-saying-recent-report-downgrades-cancer-risk>
- <sup>103</sup> Cook, Harold J., Steneck, N. H., Vander, A. J., & Kane, G. L. (1980). **Early research on the biological effects of microwave radiation: 1940-1960.** *Annals of Science*, 37, 323-351. Page 326. <https://doi.org/10.1080/00033798000200271>
- <sup>104</sup> a) **HESA Recommendations made subsequent to the 2010 hearings** (An examination of the potential health impacts of radiofrequency electromagnetic radiation, Report of the Standing Committee on Health, December 2010, 40th Parliament, 3rd Session): [http://publications.gc.ca/collections/collection\\_2010/parl/XC62-403-1-1-03-eng.pdf](http://publications.gc.ca/collections/collection_2010/parl/XC62-403-1-1-03-eng.pdf)  
b) **HESA Recommendations made subsequent to the 2015 hearings** (Radiofrequency Electromagnetic Radiation and the Health of Canadians, Report of the Standing Committee on Health, June 2015, 41st Parliament, 2nd Session): <https://www.ourcommons.ca/DocumentViewer/en/41-2/HESA/report-13/page-87>
- <sup>105</sup> Smith, J. (2010). **Evidence Hearing 1. An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation.** Committee Report No. 10 - HESA (40-3) - No. 12. House of Commons of Canada, 22. <https://www.ourcommons.ca/Content/Committee/403/HESA/Evidence/EV4467140/HESAEV12-E.PDF>
- <sup>106</sup> Smith, J. (2010). **Evidence Hearing 2. An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation.** Committee Report No. 10 - HESA (40-3) - House of Commons of Canada - HESA (40-3) - No. 13 - House of Commons of Canada, 18. <https://www.ourcommons.ca/DocumentViewer/en/40-3/HESA/report-10/> . <https://www.ourcommons.ca/DocumentViewer/en/40-3/HESA/meeting-13/evidence>
- <sup>107</sup> Smith, J. (2010). **Evidence Hearing 3. An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation.** Committee Report No. 10 - HESA (40-3) - House of Commons of Canada - HESA (40-3) - No. 34 - House of Commons of Canada, 24. <https://www.ourcommons.ca/Content/Committee/403/HESA/Evidence/EV4738168/HESAEV34-E.PDF>.
- <sup>108</sup> Smith, J. (2010). **Report: An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation.** Committee Report No. 10 - HESA (40-3) - House of Commons of Canada, 23. <https://www.ourcommons.ca/DocumentViewer/en/40-3/HESA/report-10/>
- <sup>109</sup> Lobb, B. (2015). **Evidence, Hearing 1. Radiofrequency electromagnetic radiation and the health of Canadians** Report No. 13 - HESA (41-2) - No. 54 - House of Commons of Canada, 24. <http://www.parl.gc.ca/content/hoc/Committee/412/HESA/Evidence/EV7892702/HESAEV54-E.PDF>.
- <sup>110</sup> Lobb, B. (2015). **Evidence, Hearing 2. Radiofrequency electromagnetic radiation and the health of Canadians** Report No. 13 - HESA (41-2) - No. 57 - House of Commons of Canada, 19. <http://www.parl.gc.ca/content/hoc/Committee/412/HESA/Evidence/EV7936469/HESAEV57-E.PDF>.
- <sup>111</sup> Lobb, B. (2015). **Evidence, Hearing 3. Radiofrequency electromagnetic radiation and the health of Canadians** Report No. 13 - HESA (41-2) - No. 58 - House of Commons of Canada, 19. <http://www.parl.gc.ca/content/hoc/Committee/412/HESA/Evidence/EV7945128/HESAEV58-E.PDF>
- <sup>112</sup> Lobb, B. (2015). **Report: Radiofrequency electromagnetic radiation and the health of Canadians** Report No. 13 - HESA (41-2) - No. 13 - House of Commons of Canada, 42. <http://www.parl.gc.ca/content/hoc/Committee/412/HESA/Reports/RP8041315/hesarp13/hesarp13-e.pdf>
- <sup>113</sup> **Public Consultations: Royal Society of Canada and Health Canada. 2014.** [http://docs.c4st.org/GovRelations/Fed/Royal-Society/Public-Consultations\\_Royal-Society-of-Canada-and-Health-Canada\\_2014.pdf](http://docs.c4st.org/GovRelations/Fed/Royal-Society/Public-Consultations_Royal-Society-of-Canada-and-Health-Canada_2014.pdf)
- <sup>114</sup> Gajda, G. B., Lemay, E., & Paradis, J. (2019). **Model of Steady-state Temperature Rise in Multilayer Tissues Due to Narrow-beam Millimeter-wave Radiofrequency Field Exposure.** *Health Physics*, 117(3), 254-266. <https://doi.org/10.1097/HP.0000000000001036>



- 115 Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings.** *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- 116 CBC Marketplace (2017, March 24). **Company responses: Cellphones.** [http://docs.c4st.org/Media/Letters/CBCMarketplace-CompanyResponses\\_2017.pdf](http://docs.c4st.org/Media/Letters/CBCMarketplace-CompanyResponses_2017.pdf)
- 117 Environmental Health Trust. (2019, August 28). **Commentary: The FCC needs to update its cellphone tests for radiofrequency radiation.** <https://ehtrust.org/commentary-the-fcc-needs-to-update-its-cellphone-tests-for-radiofrequency-radiation/>
- 118 Chicago Tribune (2019, Aug 21). **We tested popular cellphones for radiofrequency radiation. Now the FCC is investigating.** <https://www.chicagotribune.com/investigations/ct-cell-phone-radiation-testing-20190821-72qgu4nzlfda5kyuhteieh4da-story.html>
- 119 Phonegate, E. (2019, November 8). **[Open letter] Protection of the health of users overexposed to mobile phone waves: the appeal from our associations to the government!** <https://www.phonegatealert.org/en/open-letter-protection-of-the-health-of-users-overexposed-to-mobile-phone-waves-the-appeal-from-our-associations-to-the-government>
- 120 Environmental Health Trust. (2019, August 28). **Commentary: The FCC needs to update its cellphone tests for radiofrequency radiation.** <https://ehtrust.org/commentary-the-fcc-needs-to-update-its-cellphone-tests-for-radiofrequency-radiation/>
- 121 CBC Marketplace. (2017). **The Secret Inside Your Cellphone.** <https://www.cbc.ca/player/play/910329411834>. [https://www.youtube.com/watch?v=Wm69ik\\_Qdb8](https://www.youtube.com/watch?v=Wm69ik_Qdb8)
- 122 Environmental Health Trust. (2020). **The Fine Print Manufacturer Radio Frequency Radiation Warnings.** <https://ehtrust.org/fine-print-manufacturer-radio-frequency-radiation-warnings/>
- 123 Clegg, F. M., Sears, M., Friesen, M., Scarato, T., Metzinger, R., Russell, C., ... Miller, A. B. (2020). **Building science and radiofrequency radiation: What makes smart and healthy buildings.** *Building and Environment*, 176, (Figure 3). <https://doi.org/10.1016/j.buildenv.2019.106324>
- 124 Environmental Health Trust. **International Actions to Halt and Delay 5G.** <https://ehtrust.org/international-actions-to-halt-and-delay-5g/>
- 125 **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>
- 126 United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- 127 **United Nations Environment Programme Urged to Protect Nature and Humankind from Electromagnetic Fields (EMF). 4G/5G antenna densification is escalating health risks - a global crisis.** <https://emfscientist.org/>, and <https://www.businesswire.com/news/home/20190722005154/en/U.N.-Environment-Programme-Urged-Protect-Nature-Humankind>
- 128 Lázaro, A., Chroni, A., Tschulin, T., Devalez, J., Matsoukas, C., & Petanidou, T. (2016). **Electromagnetic radiation of mobile telecommunication antennas affects the abundance and composition of wild pollinators.** *Journal of Insect Conservation*, 20(2), 315-324. <https://doi.org/10.1007/s10841-016-9868-8>
- 129 Schulte, Deborah. Government of Canada. (2017). **Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening the Canadian Environmental Protection Act, 1999.** <http://www.ourcommons.ca/Content/Committee/421/ENVI/Reports/RP9037962/envirp08/envirp08-e.pdf>
- 130 Bell Labs and University of Melbourne (2013). **The Power of Wireless Cloud.** *ceet (Centre for Energy-Efficient Telecommunications)*, 22 pages. <https://ceet.unimelb.edu.au/publications/ceet-white-paper-wireless-cloud.pdf>

- <sup>131</sup> Elegant, Naomi Xu. (2019). **The Internet Cloud's Dirty Secret: It Consumes Tons of Energy, Has Large Carbon Footprint.** *Fortune*. <https://fortune.com/2019/09/18/internet-cloud-server-data-center-energy-consumption-renewable-coal/>
- <sup>132</sup> Schulte, Deborah. Government of Canada. (2017). **Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening the Canadian Environmental Protection Act, 1999.** <http://www.ourcommons.ca/Content/Committee/421/ENVI/Reports/RP9037962/envirp08/envirp08-e.pdf>
- <sup>133</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 6 (Exclusions).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>134</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 6 (Exclusions).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>135</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 6 (Exclusions).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>136</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 6 (Exclusions).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>137</sup> Government of Canada, Industry Canada. (2014). **Guide to Assist Land-use Authorities in Developing Antenna System Siting Protocols.** *Spectrum Management and Telecommunications*, (2), Section 2.1, page 2. [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/\\$file/LUA-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/$file/LUA-e.pdf)
- <sup>138</sup> Smith, J. (2010). **Report: An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation.** Committee Report No. 10 - HESA (40-3) - House of Commons of Canada, 23. <https://www.ourcommons.ca/DocumentViewer/en/40-3/HESA/report-10/>
- <sup>139</sup> City of Winnipeg, Public Engagement. **Small Cell Technology Review.** <https://engage.winnipeg.ca/smallcelltechnology>
- <sup>140</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 6 (Exclusions).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>141</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 5 (Dispute Resolution Process).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>142</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 4.2 (Land-use Authority and Public Consultation).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- <sup>143</sup> CTIA (the trade association representing the wireless communications industry in the United States). (2018). **What is a Small Cell? A Brief Explainer.** <https://www.ctia.org/news/what-is-a-small-cell>
- <sup>144</sup> Government of Canada, Industry Canada. (2014). **Guide to Assist Land-use Authorities in Developing Antenna System Siting Protocols.** *Spectrum Management and Telecommunications*, (2), 10. [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/\\$file/LUA-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/$file/LUA-e.pdf)
- <sup>145</sup> Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19.** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>

- 146 Government of Canada, Industry Canada. (2014). **Guide to Assist Land-use Authorities in Developing Antenna System Siting Protocols.** *Spectrum Management and Telecommunications*, (2), 10. [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/\\$file/LUA-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/LUA-e.pdf/$file/LUA-e.pdf)
- 147 Government of Canada, Industry Canada. (2013, March 7). **CPC-2-0-17 – Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements. Issue 2. Section 2 (Mandatory Tower Sharing).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09081.html>
- 148 Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 4.2 (Land-use Authority and Public Consultation).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- 149 Government of Canada, Industry Canada. (2014, June 26). **CPC-2-0-03 – Radiocommunication and Broadcasting Antenna Systems. Spectrum Management and Telecommunications Client Procedures Circular. 5. 19. Section 5 (Dispute Resolution Process).** <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>
- 150 Miller, A. B., Sears, M. E., Morgan, L. L., Davis, D. L., Hardell, L., Oremus, M., & Soskolne, C. L. (2019). **Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.** *Frontiers in Public Health*, 7. <https://doi.org/10.3389/fpubh.2019.00223>
- 151 **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>
- 152 United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology’s Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- 153 **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>
- 154 United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology’s Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- 155 **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>
- 156 United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology’s Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- 157 Fernández, C., de Salles, A. A., Sears, M. E., Morris, R. D., & Davis, D. L. (2018). **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** *Environmental Research*, 167, 694-699. <https://doi.org/10.1016/j.envres.2018.05.013>
- 158 Morgan, L. L., Kesari, S., & Davis, D. L. (2014). **Why children absorb more microwave radiation than adults: The consequences.** *Journal of Microscopy and Ultrastructure*, 2(4), 197-204. <https://doi.org/10.1016/j.jmau.2014.06.005>
- 159 Industry Canada. (2012a). **Case Study: Measurements of Radio Frequency Exposure from Wi-Fi Devices (Spectrum Management and Telecommunications Report).** [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/\\$FILE/Wifi-e.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Wifi-e.pdf/$FILE/Wifi-e.pdf)
- 160 **5G Appeal of International Scientists.** (2017). <http://www.5gappeal.eu/>

- <sup>161</sup> United States Senator Richard Blumenthal. (2019, February 7). **Press release: At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risk.** <https://www.blumenthal.senate.gov/newsroom/press/release/at-senate-commerce-hearing-blumenthal-raises-concerns-on-5g-wireless-technologys-potential-health-risks>
- <sup>162</sup> Cisco. **Cisco Start - Connect.** [https://www.cisco.com/c/en\\_sg/solutions/small-business/smb-networking.html](https://www.cisco.com/c/en_sg/solutions/small-business/smb-networking.html)
- <sup>163</sup> United Nations - Sustainable Development Goals. (2015). **UN projects world population to reach 8.5 billion by 2030, driven by growth in developing countries.** <https://www.un.org/sustainabledevelopment/blog/2015/07/un-projects-world-population-to-reach-8-5-billion-by-2030-driven-by-growth-in-developing-countries/>.