

Before the  
Federal Communications Commission  
Washington DC 20554

In the Matter of: )  
Accelerating Wireline Broadband ) WC Docket No. 25-208  
Deployment by Removing Barriers to )  
Infrastructure Investment<sup>1</sup> ) WC Docket No. 25-209  
)

**COMMENTS OF WIRED BROADBAND, INC.  
AND THE FILING PARTIES  
ON BEHALF AMERICANS INJURED AND DISABLED  
FROM ELECTROMAGNETIC RADIATION  
(ELECTROMAGNETIC RADIATION SYNDROME – EMR-SYNDROME)**

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**FILING PARTIES**

**The parties listed in Appendix A (attached hereto and incorporated herein by this reference) collectively constitute the “Filing Parties,” have granted permission to submit these Comments on their behalf, and join together to submit these Comments.**

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<sup>1</sup> <https://docs.fcc.gov/public/attachments/FCC-25-37A1.pdf>.

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## Introduction

Wired Broadband, Inc., and the Filing Parties set forth in **Appendix A**, respectfully submit these comments on behalf of Americans injured or disabled by electromagnetic radiation, and those who do not want to be injured or disabled by electromagnetic radiation. The Filing Parties and coalition partner groups have a reach of over two million people across the country. We advocate for the safe deployment of communications infrastructure.

We are in **strong opposition** to the Commission’s proposed rulemaking to eliminate copper landlines. By eliminating copper landlines, the Commission would be removing the very lifeline that the Commission was created to maintain. The Commission’s primary obligation since the Communications Act of 1934 has been to provide ubiquitous telecommunications service in the U.S. that is affordable with a statutory mandate “to protect life and property through the use of wire and radio communication.”<sup>2</sup> Removing copper landlines would endanger the lives of Americans because there is no adequate or reliable substitute in the event of an electrical or cellular outage.

There is no effective alternative to replace copper landlines in emergencies. For people who live in rural, tribal or coastal communities without viable alternatives, landlines are the most reliable form of communication and are crucial in emergencies.<sup>3</sup> Landlines are also the only alternative for individuals with Electromagnetic Radiation Syndrome (EMR-Syndrome) who cannot use wireless technology, whether in emergencies or for everyday needs. In short, wireless is no substitute for copper landlines, or for wired broadband, for that matter. See **Appendix D** for biological hazards of wireless technology.

These comments cover the following issues:

1. The Need to Maintain Copper Landlines and the Insufficiency of Alternatives,
2. What Happens When the Emergency Collapses the Cellular Network? When Cellular Networks and VoiP/Internet Networks Are Not Reliable in Emergencies,
3. When Cellular Networks and VoiP/Internet Networks Are Not Reliable Even in the Absence of Emergencies, or So-Called “Sunny Day Outages,”<sup>4</sup>
4. FCC Should Not Take Away Americans' Lifeline to Copper Landlines
5. The Trend is More People, Including Parents, Want to Re-Activate Their Copper Landlines, and
6. What Will the FCC Tell Americans Who Need Their Copper Landlines as a Lifeline?

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<sup>2</sup> Communications Act of 1934, as amended by the Telecommunications Act of 1996, 47 USC §151 *et seq.*

<sup>3</sup> “Experts Say Landlines Are Crucial In An Emergency And Are Opposing AT&T’s Request To Phase Them Out,” 3/27/04, <https://laist.com/news/landlines-emergency-request-to-phase-them-out>.

<sup>4</sup> “[T]he term “sunny day outage” refers to an outage that results from circumstances other than severe weather or other natural disasters. Sunny day outages can result from a multitude of different events, such as equipment configuration errors, equipment failures, and software bugs.” FCC ISSUES REPORT ON NATIONWIDE AT&T WIRELESS OUTAGE Feb. 22, 2024, fn 3, <https://www.fcc.gov/document/fcc-issues-report-nationwide-att-mobility-outage>.

7. The Disadvantages of Wireless
8. How Cellular Networks Can Create Emergencies
9. Retiring Copper Landlines Serves to Streamline the Permitting Process Which Really Means Overruling Local Government

## **(1) THE NEED TO MAINTAIN COPPER LANDLINES AND THE INSUFFICIENCY OF ALTERNATIVES**

The Commission states on its website that “[u]niversal service is the principle that all Americans should have access to communications services . . . Universal service is a cornerstone of the law that established the FCC, the Communications Act of 1934. Since that time, universal service policies have helped make telephone service ubiquitous, even in remote rural areas.”<sup>5</sup> While the Commission seeks to make high-speed Internet “as ubiquitous as voice, stating that it continues to support voice service,” instead, it is proposing to support industry in cutting off Americans’ lifeline by eliminating reliable voice service via landlines on which Americans still depend to participate in society and for emergencies. The Telecommunications Act of 1996 did not contemplate the elimination of a ubiquitous, reliable service with an unreliable, and in the instance of wireless, an inferior service.

Phone service has been essential since at least the Communications Act of 1934. Americans should be able to retain, at their option, phone service, such as plain old telephone service (POTS). Despite assurances of backup power systems for wireless and wireline providers, some as long as 72-hour backup power systems, there have been complaints that many customers could not access 911 when the power would go out, including during fast-trip electrical outages.<sup>6</sup>

### ***Advantages of Copper Landlines, or POTS Lines:***

The benefits of copper landlines, or POTS lines, cannot be overstated. They offer several advantages over the more “advanced” communications systems such as wireless or wireline:<sup>7</sup>

- **Accessible emergency services:** Ensures that one can reach emergency services, family, and friends during a power outage.
- **Works during power outages:** Don’t rely on electricity or the electrical power grid, are low voltage (typically 6-12 volts) and powered by the telephone exchange. Dedicated power supply -- the local telephone exchange is equipped with extensive backup

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<sup>5</sup> <https://www.fcc.gov/general/universal-service>.

<sup>6</sup> *Ibid.*

<sup>7</sup> <https://www.ifaxapp.com/analog-to-digital-fax/what-is-pots/#!//%23benefits-of-pots-lines>; <https://www.battlbox.com/blogs/outdoors/do-landlines-work-when-the-power-is-out#:~:text=The%20Mechanics%20of%20Traditional%20Landlines,landline%20network%20even%20during%20outages>; <https://www.cnet.com/tech/mobile/you-may-still-need-your-landline-in-2025-heres-why/>;

battery systems, backup diesel generators to recharge the batteries and keep the network operational.

- **Proven technology:** Have been operational since the 1880s, minimal downtime. Utilize a pair of copper wires that connect your home to the local telephone exchange.
- **Simple to use:** Provide reliable voice communication. Easy to install, requiring only a direct connection.
- **Universally compatible:** Work with nearly every analog device, such as traditional phones, [fax machines](#), and alarm systems.
- **Independent of Internet or cellular networks:** Uses own infrastructure, without reliance on the Internet, cellular towers, or Wi-Fi to make calls. When connected to a traditional landline service, one should still be able to make calls, including emergency calls, without interruption.
- **Private and dedicated connection:** Each POTS call is connected by a dedicated circuit, immune to cyber threats.
- **Resilient:** “Telephone systems were designed with resilience in mind, allowing communication to persist even during significant disruptions. This reliability is largely due to the way traditional landline systems operate.”<sup>8</sup>
- **Analog fax machines:** Are “built around landline phone systems, which means most hospitals and doctor’s offices, as well as policy and law offices, need to keep a landline connection running.”<sup>9</sup>

#### ***Disadvantages of Non-Copper Landlines:<sup>10</sup>***

- **Voice Over Internet Protocol (VOIP) Services:** requires an internet connection, which relies on the electric grid for power to function. If there is no backup system, VOIP will not work during an outage.
- **Smart phones:** need to be recharged which cannot be done during a power outage, with limited or no ability to make an emergency call given that the cellular network is even working during the emergency.
- **Fiber Optic Services:** Fiber optic lines rely on electrical power to operate, as does the modem or router to which the fiber optic lines connects. When power goes out, there is no internet connection and no ability to make phone calls via VOIP.
- **Unreliable Quality:** With cellular networks, people experience dropped calls, poor or distorted quality or weak reception. In emergencies, networks can become congested with an inability to make an emergency call.

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<sup>8</sup> <https://www.battlbox.com/blogs/outdoors/do-landlines-work-when-the-power-is-out#:~:text=The%20Mechanics%20of%20Traditional%20Landlines,landline%20network%20even%20during%20outages.>

<sup>9</sup> [https://www.cnet.com/tech/mobile/you-may-still-need-your-landline-in-2025-heres-why/.](https://www.cnet.com/tech/mobile/you-may-still-need-your-landline-in-2025-heres-why/)

<sup>10</sup> <https://www.battlbox.com/blogs/outdoors/do-landlines-work-when-the-power-is-out#:~:text=The%20Mechanics%20of%20Traditional%20Landlines,landline%20network%20even%20during%20outages;> [https://www.cnet.com/tech/mobile/you-may-still-need-your-landline-in-2025-heres-why/;](https://www.cnet.com/tech/mobile/you-may-still-need-your-landline-in-2025-heres-why/)

While the Commission is emphasizing a shift away from copper lines to “advanced” communications systems, the fact remains that copper will continue to be in use.

“There is a widely held belief that the increased use of wireless and fiber optic technology will render copper wire obsolete. Nothing could be further from the truth – every wireless link added to an information system means added copper. Even if fiber optic cables sometimes replace copper in certain parts of the network, the end points will still be copper. The bottom line is that the more the information highway grows, the more uses there will be for copper wire.”<sup>11</sup>

## **(2) What Happens When the Emergency Collapses the Cellular Network? When Cellular Networks and VoiP/Internet Networks Are Not Reliable in Emergencies**

What occurs when an emergency collapses the cellular network? Here are accounts of Americans across the country who were unable to make emergency calls because the emergency caused the cellular network to go down:

1. In September 2024, Hurricane Helene, hit South Carolina, North Carolina, Georgia, Tennessee and Virginia, with high winds and flooding, and was the deadliest since Hurricane Katrina in 2005.<sup>12</sup>
  - a. USA Today reported on “Frustrated Helene survivors struggle to get cell service in destructive aftermath,” as the hurricane “destroyed cell phone towers, severing communication for potentially millions of people,” “raising questions about safety, missed emergency warnings and the inability to reassure far-flung friends and family.”<sup>13</sup>
  - b. “The lack of service is obvious across the region, as frustrated residents cluster near the few sites offering Wi-Fi or spotty cell service.”<sup>14</sup>
  - c. Jonathan Sury, a senior staff associate at the National Center for Disaster Preparedness at Columbia University's Climate School said “[t]here's a feeling of real disconnect when cell phone service goes out.”<sup>15</sup>
  - d. “In the storm's aftermath, the town of Red Hill's 355 residents couldn't . . . get news about road closures, who had gasoline or generators, and who needed help.”<sup>16</sup>

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<sup>11</sup> “The Role of Wireline in the Complex Web of Information and Control,”

<https://www.copper.org/applications/telecomm/consumer/wireline.html>.

<sup>12</sup> USA Today, 9-24-25, <https://www.usatoday.com/story/news/nation/2024/10/05/hurricane-helene-aftermath-cell-service/74471438007/>; also see, [https://en.wikipedia.org/wiki/Hurricane\\_Helene](https://en.wikipedia.org/wiki/Hurricane_Helene).

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

2. The Mayor of Canton, North Carolina, Zeb Smathers, posted on Facebook his frustration at the lack of cellular service when his residents needed it the most in the aftermath of Hurricane Helene:<sup>17</sup>

“I must also express my deep frustration and anger with the failures in cellular communication, particularly the inability to rely on services when we needed them most. From the very start of this crisis, our ability to communicate with basic emergency services was crippled, and there is no excuse for this.

“The idea that not just us here in Canton and across Western North Carolina cannot communicate to our citizens, families, and our emergency management is absolutely disgraceful. Our people and their families demand the best, especially in the historic moment that we needed it the most; something our cellular providers have not done.

“Further the possibility that anybody had the ability to rescue someone and tell their loved ones to get out, and they couldn't is horrible, disgusting, and unacceptable.”<sup>18</sup>

3. In 2012, Hurricane Sandy took out 25% of cell towers in the U.S.<sup>19</sup> However, many people who lost power for weeks were still able to use their landline phones to communicate.<sup>20</sup>

### **(3) When Cellular Networks and VoiP/Internet Networks Are Not Reliable Even in the Absence of Emergencies, or So-Called “Sunny Day Outages”**

On February 22, 2024, there was a nationwide cellular outage on AT&T Mobility’s network, as reported by the FCC:<sup>21</sup>

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<https://www.facebook.com/zlsmathers/posts/pfbid02YMfw2rXpmTS2Bx987ZUkwiA7VUjtwRQfqGiEzWwSPsgPKkmFmQU16cBFd3rgkZhkl>.

<sup>18</sup> Ibid.

<sup>19</sup> <https://www.gadgets360.com/telecom/news/hurricane-sandy-takes-out-25-percent-of-cell-towers-in-us-286624>.

<sup>20</sup> <https://www.battlbox.com/blogs/outdoors/do-landlines-work-when-the-power-is-out#:~:text=The%20Mechanics%20of%20Traditional%20Landlines,landline%20network%20even%20during%20outages>.

<sup>21</sup> FCC Issues Report on Nationwide AT&T Wireless Outage, Feb. 22, 2024, [DOC-404154A1.pdf](#), see also, FCC’s full report at <https://www.fcc.gov/document/fcc-issues-report-nationwide-att-mobility-outage>; Press Release, New York State Attorney General Letitia James, Attorney General James Announces Investigation of Recent AT&T Outage (Feb. 29, 2024), <https://ag.ny.gov/press-release/2024/attorney-general-james-announces-investigation-recent-att-outage>; <https://www.mushroomnetworks.com/blog/unpacking-the-att-outage-causes-impacts-and-future-safeguards/> (see outage map across the U.S.

- “The outage affected users in all 50 states as well as Washington, D.C., Puerto Rico, and the U.S. Virgin Islands. All voice and 5G data services for AT&T wireless customers were unavailable, affecting more than 125 million devices, blocking more than 92 million voice calls, and preventing more than 25,000 calls to 911 call centers.
- “Voice and 5G data services were unavailable to customers of other wireless providers that regularly use or were roaming on AT&T’s network.
- “It took AT&T at least 12 hours to fully restore service.
- “The outage also cut off service to devices operated by public safety users of the First Responder Network Authority (FirstNet). AT&T prioritized the restoration of FirstNet before other services but did not notify FirstNet customers of the outage until three hours after it began, and nearly one hour after service was restored.
- “The incident began after AT&T implemented a network change with an equipment configuration error. The report details numerous factors that resulted in the extensive scope and duration of the outage, and it cites the corrective actions since taken by AT&T to prevent a reoccurrence.”<sup>22</sup>

“AT&T Mobility implemented a network change with an equipment configuration error on Thursday, February 22, 2024 at 2:42 AM [CST]. Just three minutes later, the nationwide outage began. Once implemented, this configuration error caused the AT&T Mobility network to enter “protect mode” to prevent impact to other services, disconnecting all devices from the network, and prompting a loss of voice and 5G data service for all wireless users. It took close to two hours to roll back the network change. Full service restoration, however, took at least 12 hours because AT&T Mobility’s device registration systems were overwhelmed with the high volume of requests for re-registration onto the network.”<sup>23</sup>

The Commission’s Public Safety and Homeland Security Bureau which investigated the outage, its effects, and AT&T Mobility’s response found that the “extensive scope and duration:”

“was the result of several factors, including a configuration error, a lack of adherence to AT&T Mobility’s internal procedures, a lack of peer review, a failure to adequately test after installation, inadequate laboratory testing, insufficient safeguards and controls to ensure approval of changes affecting the core network, a lack of controls to mitigate the effects of the outage once it began, and a variety of system issues that prolonged the outage once the configuration error had been remedied.”<sup>24</sup>

#### **(4) FCC Should Not Take Away Americans’ Lifeline to Copper Landlines**

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<sup>22</sup> Ibid.

<sup>23</sup> FCC’s full report at <https://www.fcc.gov/document/fcc-issues-report-nationwide-att-mobility-outage>.

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The FCC proposes to do on a broader scale across the U.S. what AT&T has attempted to do in California. Eliminating copper landlines would take away Americans' lifeline by taking away what Americans need most in emergencies – their landlines. The FCC should first listen to Americans and serve their communications needs, not the industry's needs. The FCC's motto should be **"Americans first, then industry follows."**

As a case study, the Commission should review how AT&T's attempt in 2024 to end its landline phone obligations as the Carrier of Last Resort (COLR) has been met with strong disapproval by the California Public Utility Commission (CPUC), many California cities, labor and rural associations and many others. The CPUC dismissed AT&T's application, with prejudice,<sup>25</sup> and a state bill with a similar attempt has been withdrawn.<sup>26</sup>

The CPUC determined that although AT&T may upgrade its copper landline service to fiber, AT&T must continue to provide copper landline service to its customers.<sup>27</sup> "Our vote [CPUC] to dismiss AT&T's application made clear that we will protect customer access to basic telephone service..."<sup>28</sup> The CPUC proceeding garnered over 639 comments in opposition to AT&T's petition, incorporated herein by reference.<sup>29</sup>

It was reported that, when AT&T then sought to change California state law through AB470 to eliminate the mandate to serve rural and underserved communities,<sup>30</sup> the bill was pulled in 2025<sup>31</sup> as a result of opposition by a broad coalition of organizations, labor unions and city governments because it would have:

- (a) allowed carriers to cherry pick who they would serve, directly conflicting with CPUC requiring AT&T to provide all customers with telecommunications service,
- (b) endangered rural communities and 500,000 fixed income seniors would have no recourse if their phone service were cut off as they rely on home phone service for connection, emergency assistance, and critical alerts during natural disasters,
- (c) left vulnerable communities without guaranteed, affordable and quality service,
- (d) created a one-sided appeals process with AT&T choosing who resolves disputes of service cut-offs, and

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<sup>25</sup> <https://arstechnica.com/tech-policy/2024/06/california-rejects-att-request-to-end-carriers-landline-phone-obligation/>; see also, judge's recommendation to reject AT&T's petition at <https://mendofever.com/2024/05/15/judge-rejects-atts-bid-to-abandon-rural-landline-duty/#:~:text=A%20packed%20Board%20of%20Supervisors,no%20such%20company%20in%20California.>

<sup>26</sup> Ibid; see also, <https://mendofever.com/2024/07/09/mendocino-county-secures-victory-as-telecom-deregulation-bill-pulled/>.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> [https://mail.google.com/mail/u/0/?ui=2&ik=9bc78895e9&attid=0.1&permmsgid=msg-f:1842822539564218749&th=1993055606cef97d&view=att&zw&disp=inline&acrobatPromotionSource=gmail\\_chrome-list.](https://mail.google.com/mail/u/0/?ui=2&ik=9bc78895e9&attid=0.1&permmsgid=msg-f:1842822539564218749&th=1993055606cef97d&view=att&zw&disp=inline&acrobatPromotionSource=gmail_chrome-list.)

<sup>30</sup> <https://cwa-union.org/news/cwa-district-9-activists-defeat-atts-attempt-leave-rural-customers-behind.>

<sup>31</sup> Ibid; see also, <https://mendofever.com/2024/07/09/mendocino-county-secures-victory-as-telecom-deregulation-bill-pulled/>.

- (e) allowed carriers to significantly reduce their service territory, denying consumers phone service.<sup>32</sup>

The broad coalition in opposition to AT&T's petition to end its COLR status and in support of maintaining phone service for rural and underserved areas with AT&T as COLR included, among others,

- a. **Organizations:** CWA - Communications Workers of America, TURN - The Utility Reform Network, California Community Foundation, Communities in Schools (Los Angeles), Our Voice (Communities for Quality Education), RCRC – Representing California's Rural Counties, California Federation of Labor Unions, California Farm Bureau, Nextgen California, and Southeast Community Development Corporation,<sup>33</sup>
- b. **Local governments in CA:** City of San Francisco,<sup>34</sup> Butte County,<sup>35</sup> Marin County,<sup>36</sup> Lake County,<sup>37</sup> San Mateo County,<sup>38</sup> Nevada County,<sup>39</sup> Yuba County<sup>40</sup> and many others.
- c. **Members of U.S. Congress:** Joint letter of Feb. 20, 2024 from Representatives Mike Thompson, Doug LaMalfa, Jimmy Panetta, Katie Porter, Jared Huffman, John Garamendi, Barbara Lee and Anna Eshoo.<sup>41</sup>
- d. **Residents:** e.g., "the people of Mendocino County and Humboldt County, people who drove and waited for hours to give public testimony on the problems with AT&T's proposals . . ." <sup>42</sup>

A similar request by Lumens was denied in Utah.<sup>43</sup>

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<sup>32</sup> <https://www.dropbox.com/scl/fi/27ki00w3oizzgl9lpeoev/CA-Landlines-AB470-Opposition-Letter-2025.pdf?rlkey=wx734gpm5h3d6vex122bqo2g7&st=bwx5beeh&dl=0>.

<sup>33</sup> <https://www.dropbox.com/scl/fi/27ki00w3oizzgl9lpeoev/CA-Landlines-AB470-Opposition-Letter-2025.pdf?rlkey=wx734gpm5h3d6vex122bqo2g7&st=bwx5beeh&dl=0>.

<sup>34</sup> <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M525/K982/525982411.PDF>.

<sup>35</sup> [https://buttecounty.granicus.com/Viewer.php?view\\_id=2&clip\\_id=1346&meta\\_id=203759](https://buttecounty.granicus.com/Viewer.php?view_id=2&clip_id=1346&meta_id=203759).

<sup>36</sup> <https://www.marincounty.gov/departments/executive/budget-and-priority-setting/legislative-support-and-advocacy/legislative-letters/2024-feb-16-oppose-letter-att-application-relief-carrier-last-resort-obligation>.

<sup>37</sup> <https://countyoflake.legistar.com/View.ashx?M=F&ID=12704678&GUID=5A6B25D0-4DB9-4260-B8B9-EAE311545557>.

<sup>38</sup> <https://sanmateocounty.legistar.com/View.ashx?M=E1&ID=1124289&GUID=8850CE88-A670-4A03-BDC6-D48A9D2F4EC6>; see also, <https://www.smcgov.org/ceo/news/county-demands-answers-att-seeks-cut-landlines>.

<sup>39</sup> <https://nevco.legistar.com/View.ashx?M=F&ID=12703321&GUID=D043DEB5-CF32-45A8-BDCD-27BA3D068CE6>.

<sup>40</sup> <https://agendasuite.org/iip/yuba/file/getfile/30594>.

<sup>41</sup> <https://mikethompson.house.gov/sites/evo-subsites/mikethompson.house.gov/files/evo-media-document/Letter%20to%20CPUC%20re%20AT%26T%20Petition%20to%20End%20Landlines.pdf>.

<sup>42</sup> <https://mendofever.com/2024/07/09/mendocino-county-secures-victory-as-telecom-deregulation-bill-pulled/>.

<sup>43</sup> <https://www.fierce-network.com/broadband/states-push-back-isp-copper-retirement-plans#:~:text=By%20Masha%20Abarinova%20Jun%2010,and%20directory%20and%20operator%20services>.

A common refrain in the comments to the CPUC has been that landlines provide reliable emergency 911 service while cell service does not, and without landlines would leave vulnerable communities stranded without phone service, e.g.,

- a. San Mateo Board of Supervisors in CA emphasized “[t]wo critical aspects . . .
  - i. First, the ability of the public to call 911 is a paramount service provided by landlines, especially in areas with poor cell service, such as the San Mateo County Coast side and hillside areas. Landlines prove to be reliable during power disruptions, a crucial factor in emergencies where every moment counts. The potential withdrawal of landline services becomes a significant concern, given their resilience during power disruptions that might affect distributed antennas system and network equipment.
  - ii. Second, the County Department of Emergency Management (“DEM”) relies on telephone service for emergency notifications through the reverse 911 system. DEM’s essential tool, reverse 911, primarily targets over 270,000 landlines affecting businesses and residences for emergency communication, emphasizing their importance in reaching people during emergencies.”<sup>44</sup>
  
- b. Marin Board of Supervisors in CA pointed out that: “Over 580,000 AT&T customers would be affected – including 28,800 households in Marin County – many of whom are senior citizens, live in low-income households, or reside in rural areas where other connectivity is not available to them, placing their lives in jeopardy in the event of an emergency. This includes:
  - i. Approximately 630 households in west Marin who have no other option if the AT&T application is approved, and
  - ii. Approximately 23,000 residents in suburban and urban areas that currently subscribe to AT&T’s plain landline service and may have to select a different carrier and/or pay more if the application is approved.”<sup>45</sup>
  
- c. Butte County Board of Supervisors also pointed out that : “If approved by the CPUC, over 580,000 affected AT&T customers would be left with fewer options in terms of choice, quality, and affordability. Alternative services, such as VoIP and wireless, have no obligation to serve a customer or to provide equivalent services to AT&T landline

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<sup>44</sup> <https://sanmateocounty.legistar.com/View.ashx?M=E1&ID=1124289&GUID=8850CE88-A670-4A03-BDC6-D48A9D2F4EC6>.

<sup>45</sup> <https://www.marincounty.gov/departments/executive/budget-and-priority-setting/legislative-support-and-advocacy/legislative-letters/2024-feb-16-oppose-letter-att-application-relief-carrier-last-resort-obligation>.

customers, including no obligation to provide reliable access to 9-1-1 or LifeLine program discounts.”<sup>46</sup>

### **(5) The Trend is More People, Including Parents, Want to Re-Activate Their Copper Landlines**

Americans see landlines as critical infrastructure.<sup>47</sup> Power outages, due to hurricanes, wildfires and other conditions, make landlines a critical means of reaching emergency services. Statistics from 2000 to 2023 show almost 2200 power outages in the U.S.,<sup>48</sup> when electricity that otherwise powers the Internet and VoiP goes down, with no way to recharge your cell phone, and no way to call for emergency services unless there’s access to a landline.

Statistics showing a declining trend in landline use does not take into account that contributing to that decline is the fact that carriers are no longer maintaining copper landlines, consumers being compelled to buy cell phones, and when consumers realize that they prefer their landlines and want to re-activate them, they are no longer available. Those factors would artificially accelerate the decline, with some statistics showing that 27% of homes still have landlines while 73% of homes use cell phones only.<sup>49</sup> Americans who deactivated their landline service are now starting to realize that they want to re-activate that service, but are now finding it is unavailable. There is also a trend among parents to re-activate their landlines to protect their children from social media addiction and other online dangers. “Many parents are reactivating their long-dormant landlines for one primary reason: They’re 99% safer than most smartphones . . . Landlines don’t have apps, texting, web browsers, or social media, and they can only be used in the house.”<sup>50</sup> The Commission’s proposal take away the ability of parents to protect their children.

The choice should remain with Americans, the choice should not be taken away from Americans’ right to choose to have a landline, especially for emergencies. When emergencies collapse the cellular network, the Commission will leave Americans with no alternative means for emergencies.

### **(6) What Will the FCC Tell Americans Who Need Their Copper Landlines as a Lifeline?**

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<sup>46</sup> [https://buttecounty.granicus.com/MetaViewer.php?view\\_id=2&clip\\_id=1346&meta\\_id=203448](https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1346&meta_id=203448); see also, Letter from Butte County Board of Supervisors to CPUC, 2-13-24 at

[https://buttecounty.granicus.com/MetaViewer.php?view\\_id=2&clip\\_id=1346&meta\\_id=203759](https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1346&meta_id=203759).

<sup>47</sup> <https://mdsafetech.org/2024/05/01/saving-landlines-a-critical-infrastructure-for-all/>.

<sup>48</sup> <https://poweroutage.report/united-states>.

<sup>49</sup> <https://mixnetworks.com/the-ultimate-list-of-pots-line-statistics/>.

<sup>50</sup> <https://www.parents.com/landlines-are-making-a-comeback-and-theyre-helping-families-in-a-major-way-11810473#comments>.

The critical importance that landlines have in the voices of Americans are contained in the over 600 public comments made to the CPUC, some of which are included below and in **Appendix C**, attached hereto and incorporated herein. The comments point out that industry has made their profits over the years, and it should not now take their profits and leave Americans stranded. While the FCC cites the decline in landline use, Americans are waking up to the fact that they need their landlines in emergencies, but after having given them up, are now unable to get them back.

### ***In Their Own Words – Americans’ Opposition to Copper Landline Removal***

Americans like Rosemarie and Mary have relied on copper landlines in emergencies. Their accounts on reliance on copper landlines during those emergencies are included in **Appendix B**, attached hereto and incorporated herein.

In Rosemarie’s case in Hurricane, UT, the copper landline was reliable and crucial during an emergency when her husband had a fatal heart attack, at a time when her cell service was grossly deficient despite “5G upgrades” and antennas from multiple carriers. Her DSL through her copper landline provided excellent phone and internet service. As soon as the cell tower was installed with its multiple antennas added onto from different carriers, she lost her copper landline, has had spotty internet service and no phone service through her internet.

In Mary’s case, she writes from California that:

“During the Sonoma County fires of 2017 and 2020 and the multiple power outages through that period, my AT&T landline was a lifeline for many, and the only way my neighbors or I could communicate with others. “

Because Mary has been medically diagnosed with electromagnetic hypersensitivity, now known as Electromagnetic Radiation Syndrome, she cannot use a cell phone or any wireless device. What does the FCC propose, then, in Mary’s instance?

### ***In Their Own Words – Comments Submitted to the CPUC Opposing Removal of Copper Landlines***

#### **Lonnie Gordon, Malibu, CA 90265**

*Comment to the CPUC: Oppose AB 470 – Preserve Landline Protections*

*As a resident of a high fire-risk area in Malibu, I am urging the CPUC to oppose AB 470 and protect access to traditional landline service. My landline is not a luxury—it is a lifeline. It functions during power outages, Wi-Fi failures, and cellular dead zones, thanks to its backup battery and direct copper line connection. In emergencies, it is the only reliable form of communication I have.*

*I am electrosensitive and work from home. I cannot use cellular service due to poor reception and health limitations. AB 470 threatens to eliminate the only safe and functional communication tool available to me and many others in similar situations.*

*This bill removes critical protections for the public in fire and medical emergencies, during massive network outages, and when wireless systems are compromised. It disproportionately harms older adults, rural residents, and those with disabilities who depend on landlines for medical alert systems, clear voice quality, and reliable 9-1-1 location tracking.*

*The so-called "modernization" proposed by AB 470 is not progress—it is abandonment. The copper-based Plain Old Telephone Service (POTS) is a sophisticated, energyefficient system that has served Californians equitably for decades. It should be preserved as part of our climate resilience and emergency preparedness strategy. The CPUC has the authority and responsibility to regulate landline access, service quality, and affordability. I urge you to use that authority to reject AB 470 and stand with the communities who rely on landlines for safety, health, and basic communication. Please do not allow Telecom industry interests to override public safety and equity. I cannot lose my landline. It is my lifeline.*

*Respectfully,*

**Lonnie Gordon**

**Aug 14, 2025 9:54 am**

**Susan Foster Lyons, CO 80540**

*I oppose changing the definition of Carrier of Last Resort (COLR), making it easier for communications companies to abandon copper landlines and incorporate cellular technology into this definition.*

*I lived in California for 32 years. During that time, I worked with the firefighters of California on health and safety issues. I became an Honorary Firefighter with the San Diego Fire Department in 2004. This is an honor I carry for life, and I do so with great pride.*

*I'm also a Fire & Utility Consultant, having testified on telecommunications fires before the California Assembly.*

*I strongly urge the CPUC to insist on the maintenance of copper Landlines. This is my request for two reasons.*

*1) SAFETY: Copper Landlines are safer and more secure. Telecommunications cannot be relied upon in emergencies, particularly when the present danger is fire.*

*2) ACCOMMODATION OF DISABLED: numerous people are sensitive to telecommunications technologies. Without landline phones and copper landlines to service them, they would be unable to communicate with the outside world.*

*Regarding safety, my greatest concern is safety in the event of fire. As all Californians know, the fires are becoming more frequent and more ferocious.*

*I have worked with residents in the city of Malibu to create a safer telecommunications ordinance for small cells. I worked as a team with an attorney and an electrical engineer. We created the Malibu Fire Safety Protocol to ensure that the telecommunications industry would go through eight (8) critical engineering steps to prove the safety of their telecommunications equipment, insofar as that is possible. We know we will not be able to stop all telecommunications fires, but we will be able to cut down on these fires by insisting on adherence to the Fire Safety Protocol for all carriers who apply for permits in the city of Malibu.*

*As I know the CPUC is aware, Malibu has suffered fire loss in 2007 with the Malibu Canyon Fire and in 2018 with the Woolsey Fire. There is evidence in your SED reports showing telecommunications components, in whole or in part, as causal factors in these fires.*

*In January 2025, the Palisades Fire burned into Malibu, approaching it from the east. As the fire moved over the highest point of land directly east of Malibu where many cell towers had been positioned, the cell towers were destroyed by the rapidly advancing fire. By January 8, Malibu city officials issued urgent evacuation orders to all remaining residents as the fire remained out of control and threatened the whole of Malibu. The fire destroyed thousands of homes and structures along the Pacific Coast Highway and throughout Malibu, resulting in significant loss including fatalities.*

*Even though the CPUC has a redundancy program for backup. When the tower is taken out completely by fire, there is nothing to back up. These fires are advancing so rapidly there is not time to bring in backup generators as per CPUC orders.*

*A large number of Malibu residents could not call 911 because the cell towers were no longer there to service their calls. The people who could call 911 had landline phones. This was true during the 2018 Woolsey Fire. It was after the Woolsey Fire in Malibu and the Paradise Camp Fire, with substantial loss of life and inability to call 911, the CPUC created a backup plan for cell tower communication. It was a good move on the part of the CPUC. However, the rapid movement of these fires driven by Santa Ana winds makes it too dangerous to get backup batteries to existing towers. Clearly, the burned towers have no capacity to communicate. California is hotter, drier and the Santa Ana Winds are moving faster than ever before.*

*These combined circumstances beg for the retention of copper Landlines. The definition of COLR must not change. Copper Landlines must be preserved.*

**Susan Foster, Honorary Firefighter SDFD**

**Jul 01, 2025 1:09 pm**

**Linda Ikeda ATASCADERO, CA 93422**

*I oppose AB 470. We need to keep our land lines as 1st priority. We have power outages and cellular outages. Cell Services are unreliable and poor quality in comparison. Plus, many are sickened from wireless. Twenty years ago it was 3 % sickened by wireless. Today, it's 33% - 1 in 3! and it's caused by too much tech. This percentage is only going to get worse.*

*We need telecoms to step up and maintain their obligations on landlines as Carriers of Last Resort. Many would like landlines but the telecoms have been denying them access. This is wrong for them to deny us safe COLR!*

**May 12, 2025 3:47 pm**

## **(7) The Disadvantages of Wireless**

Wired and wireless technologies are not equivalent. The Commission is trying to impose wireless for fixed applications, which will only perpetuate and worsen the digital divide. Mobile applications, such as making a phone call while driving, require wireless connectivity. Each technology should be deployed where it is most effective: wired for fixed applications

and wireless for mobile applications. As the Commission seeks to replace copper landlines with fixed wireless, certain disadvantages of wireless should be pointed out.

### **Disadvantages of Fixed Wireless Networks and Services:**<sup>51</sup>

1. Higher costs than fiber because of the ongoing need to replace wireless equipment, with **40% to 80%** of its capital investment needing to be replaced every five years.
2. Capacity constraints -- typically **asymmetrical** download and upload speeds of **100 Mbps / 20 Mbps**.
  - a. Millimeter wave frequencies can support faster speeds, but only in short ranges (less than approximately 500-1500 feet from an antenna), unsuitable for rural applications because of dispersion of homes and lack of mounting structures.
3. **Not financially sustainable:** the re-investment required every five years to maintain the network makes it inherently unsustainable.
4. **Vulnerable to obstructions**, such as line-of-sight or inclement weather, making it more complex to deliver to every household.
5. **Less efficient** - wireless signals rely on radio waves which are less efficient over long distances, require frequent access points and repeaters to maintain consistent coverage, using extra signal energy just to reach end users.<sup>52</sup>
6. **Scalability is a critical challenge:** an increase in users requires more spectrum, which is scarce and expensive, and more antennas. Wireless is not dedicated, but shared, prone to congestion during peak or emergencies, and therefore data caps and throttling.
7. **High energy consumption.** 5G is acknowledged by industry as “power-hungry” requiring a large amount of energy consumption.<sup>53</sup> Energy consumption from “5G” infrastructure “is expected to increase 61x between 2020 to 2030 due to its energy demands.”<sup>54</sup>
8. **Inherently more complex**, more costly, more unstable (subject to frequent revision and “upgrades”), and more constrained in what they can deliver.<sup>55</sup>
9. **Poses unique security threats.** Former FCC Chairman, Tom Wheeler, has coined the term, the “5G Cyber Paradox,” to denote that the increased efficiency of 5G

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<sup>51</sup> <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber>.

<sup>52</sup> <https://pipelinepub.com/digital-transformation-2024/reducing-energy-consumption-with-fiber-sustainability-ESG#:~:text=Fiber:%20Green%20Champion%20of%20Broadband&text=How%20does%20fiber%20consume%20less,to%202.7%20tons%20for%20DOCSIS>.

<sup>53</sup> 5G Heats Up Base Stations, <https://semiengineering.com/5g-heats-up-base-stations/>.

<sup>54</sup> <https://ehtrust.org/report-5g-to-increase-energy-consumption-by-61-times/>; see also “Reinventing Wires: The Future of Landlines and Networks,” at 73, National Institute for Science, Law and Public Policy, authored by Timothy Schoechele, PhD; <https://gettingsmarteraboutthesmartgrid.org/pdf/Wires.pdf>.

<sup>55</sup> “Re-inventing Wires: The Future of Landlines and Networks,” former President of Microsoft Canada, Frank Clegg, calls the report “a reasonable voice for our turbulent world.”

architecture renders it inherently insecure and “more vulnerable to cyberattacks than [5G’s] predecessors.”<sup>56</sup>

- a. 5G is a distributed, software-based network with thousands of nodes and access points that a hacker can exploit; there is no choke point control as there is with the centralized, hardware-based switching network of 4G.<sup>57</sup>
- b. E.g., in 2018 a hacker gained access to a Nevada casino’s network through its internet connected “smart” thermostat system located in a fish tank at the casino, and was able to extract information out through the thermostat and load it into the cloud.<sup>58</sup> This shows that 5G architecture that is supposed to facilitate the Internet of Things (IoT) poses a serious security threat.

**10. Out of step with what most Americans want** – two-thirds of Americans prefer fiber to the home (FTTP).<sup>59</sup> When the Affordable Connectivity Program (ACP) ended, 90% of wireline subscribers retained their service, wireless services lost 80% of their subscribers, satellite services also had losses.<sup>60</sup>

## **(8) How Cellular Networks Can Create Emergencies**

In retiring copper landlines, this NPRM seeks to accelerate wireless facility deployment which would increase the risk of fire. Wireless facilities are known to catch on fire.<sup>61</sup> People need time to escape. If a wireless facility catches on fire, and it is near or on school grounds or just feet from a window, how will people especially children have time to escape? Firefighters cannot put out the fire unless the power to the wireless facility is turned off, otherwise they can be electrocuted. As this can take up to an hour, the fire may have the opportunity to spread rapidly, dramatically increasing the risk to public safety. While local government is responsible for public safety, this NPRM would create a conflict for local government. While local government remains responsible for public safety, it will be preempted by this NPRM in determining the safe placement of wireless facilities otherwise within its jurisdiction.

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<sup>56</sup> Why 5G Requires New Approaches to Cybersecurity, Tom Wheeler and David Simpson, Brookings Institute, Sept 3, 2019, <https://www.wita.org/nextgentrade/why-5g-requires-new-approaches-to-cybersecurity/>.

<sup>57</sup> Ibid.; see also, Why 5G Networks Are Disrupting The Cybersecurity Industry, Oct 29, 2021, <https://www.forbes.com/sites/forbestechcouncil/2021/10/29/why-5g-networks-are-disrupting-the-cybersecurity-industry/?sh=5186fc041fe9>.

<sup>58</sup> <https://www.casino.org/news/hackers-stole-las-vegas-casino-high-roller-database-via-its-fish-tank/>;  
<https://www.forbes.com/sites/leemathews/2017/07/27/criminals-hacked-a-fish-tank-to-steal-data-from-a-casino/>;  
<https://www.washingtonpost.com/news/innovations/wp/2017/07/21/how-a-fish-tank-helped-hack-a-casino/>.

<sup>59</sup> <https://www.fibre-systems.com/article/fiber-connect-2023-two-thirds-us-consumers-prefer-fibre?iframe=1>.

<sup>60</sup> <https://broadbandbreakfast.com/acp-fallout-wireline-retains-most-wireless-and-satellite-face-major-losses/>.

<sup>61</sup> <https://ehtrust.org/cell-tower-safety-risks-fires-and-collapse/>.

Cell towers are, essentially, electrical installations and should require compliance with strict electrical building codes.<sup>62</sup> Industry commentary admits that 5G runs hot as 5G circuits are inefficient.”<sup>63</sup> A lot of heat needs to be dissipated because of the amount of equipment, conversions and inefficiencies.<sup>64</sup> Heat builds up at the cell tower because it is tightly packed with lots of equipment required to do digital to analog conversions, and they are “power-hungry” requiring a large amount of energy consumption.<sup>65</sup>

There were four notable fires in California that were started in whole or in part by failures or overload of telecommunications equipment. The Guejito Fire in San Diego in 2007,<sup>66</sup> the Malibu Canyon Fire in 2007,<sup>67</sup> the Silverado Fire in 2020, and the Woolsey Fire in 2018 being the worst in California history (\$6 billion of damage, 295,000 people evacuated, 3 deaths).<sup>68</sup> The Guejito Fire in San Diego in 2007 was started by a Cox Communications lashing wire. This fire merged into the Witch Creek Fire which became the largest and deadliest in San Diego history, and also forced the largest mass evacuation in California history.<sup>69</sup>

Many instances of cell tower fires abound.<sup>70</sup> In 2021 in Brooklyn, the cause of fire on an apartment building rooftop was reported to be caused by an “electrical malfunction of a cell tower on the roof of a building.”<sup>71</sup> In Hanover, VA in 2020, a cell tower was engulfed in flames which officials believed to have been caused by electrical/mechanical issues.<sup>72</sup> In Chula Vista, CA in 2021, a cell tower at a school stadium burst into flames, and while firefighters

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<sup>62</sup> See, <https://thenationalcall.org/wp-content/uploads/2024/03/SFoster-Testimony-Submitted-to-US-Senate-Energy-Natural-Resources-Committee-3-25-24.pdf>; Guest Commentary: Is 5G a Potential Fire Hazard?, Tony Simmons, P.E., The Aspen Times, June 13, 2021,

<https://www.aspentimes.com/opinion/guest-commentary-is-5g-a-potential-fire-hazard/>.

<sup>63</sup> 5G Heats Up Base Stations, <https://semiengineering.com/5g-heats-up-base-stations/>.

<sup>64</sup> Id.

<sup>65</sup> 5G Heats Up Base Stations, <https://semiengineering.com/5g-heats-up-base-stations/>.

<sup>66</sup> PROTECTING LA COUNTY’S FUTURE: HOW FIRE RISKS FROM TELECOMMUNICATIONS EQUIPMENT, CLIMATE CHALLENGES & A DANGEROUS SHIFT AWAY FROM ENVIRONMENTAL REVIEW THREATEN LOS ANGELES COUNTY’S FUTURE, Susan Foster, November 15, 2022, p. 11.

<sup>67</sup> *California Public Utilities Commission, Incident Investigation Report*, 10/21/2008, at 6, [http://file.lacounty.gov/SDSInter/bos/bc/115889\\_ReportBack-BoardMotion60A-SessionWildfireReport.pdf](http://file.lacounty.gov/SDSInter/bos/bc/115889_ReportBack-BoardMotion60A-SessionWildfireReport.pdf).

<sup>68</sup> *City of Los Angeles, After Action Review of the Woolsey Fire Incident*, Citigate Associates, LLC, Nov. 17, 2019, at 4, <http://file.lacounty.gov/SDSInter/bos/supdocs/144968.pdf>; Guest Commentary: Is 5G a Potential Fire Hazard?, Tony Simmons, P.E., The Aspen Times, June 13, 2021,

<https://www.aspentimes.com/opinion/guest-commentary-is-5g-a-potential-fire-hazard/>.

<sup>69</sup> PROTECTING LA COUNTY’S FUTURE: HOW FIRE RISKS FROM TELECOMMUNICATIONS EQUIPMENT, CLIMATE CHALLENGES & A DANGEROUS SHIFT AWAY FROM ENVIRONMENTAL REVIEW THREATEN LOS ANGELES COUNTY’S FUTURE, Susan Foster, November 15, 2022, p. 11.

<sup>70</sup> <https://ehtrust.org/cell-tower-safety-risks-fires-and-collapse/>.

<sup>71</sup> *Fire on Rooftop With Cell Antennas in Brooklyn New York*, Apr 19, 2021, <https://ehtrust.org/firecell-tower-brooklyn-new-york/>.

<sup>72</sup> *Hanover cell tower catches fire*, NBC 12 Newsroom, June 26, 2020, <https://www.nbc12.com/2020/06/26/cell-phone-tower-hanover-catches-fire/>.

were waiting for the power to be shut off, it had become molten plasma.<sup>73</sup> The incident report stated the reason as “electrical arcing,” which means that the temperature can reach as high as 35,000 degrees Fahrenheit, three times the estimated temperature of the sun’s surface. The tower also collapsed onto the bleachers near a football field, burning the track and destroying the bleachers.

### **(9) Retiring Copper Landlines Serves to Streamline the Permitting Process Which Really Means Overruling Local Government**

By retiring copper landlines and placing emphasis on fixed wireless, the Commission seeks to streamline the permitting process for companies while imposing heavy-handed regulations on local governments. This lop-sided approach rewards market inefficiencies, otherwise known as market failure or market distortion, where the public is compelled to be exposed to a product or service that they do not want or need, and distorts market forces of supply and demand. Local government is in the best position to determine the responsible deployment of communications infrastructure in their community, not industry. Over 90% of Americans won’t buy or rent a home near a wireless facility.<sup>74</sup> Without competition, there is no societal benefit to ensure that the best products and services with product liability to ensure that for-profit corporations compete on safety. True advancement in technology occurs when there is accountability and where technology benefits society, and not industry at the expense of society.

“Permitting reform” takes away local control and accelerates deployment without accountability to the public. We have received numerous complaints from around the country complaining about the irresponsible placement of wireless facilities near residences and schools. The radiation cannot be shut off and is irradiating people within their homes, and children within their schools, 24/7, making their homes and schools into radiation zones and creating clusters of chronic disease.

That is not a free market economy of supply and demand particularly in light of the Commission’s failure to issue an interpretive rule that the Communications Act was never intended to shield the wireless industry from liability for injuries to persons or property.

### **Conclusion**

For the foregoing reasons, we oppose the retirement of copper landlines.

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<sup>73</sup> <https://thenationalcall.org/resources/> below the fold at “Additional Valuable Resources,” see “Cell Towers & Fires.”

<sup>74</sup> <https://www.emfanalysis.com/property-values-declining-cell-towers/?iframe=1&iframe=1&iframe=1>.

**On behalf of Americans Injured and Disabled  
from Electromagnetic Radiation and the Filing Parties**

Respectfully Submitted,

A handwritten signature in cursive script that reads "Odette J. Wilkens".

Odette J. Wilkens  
President & General Counsel  
Wired Broadband, Inc.  
(non-profit)  
P.O. Box 750401  
Forest Hills, NY 11375  
owilkens@wiredbroadband.org  
718.575.8784

## APPENDIX A

The parties listed below collectively constitute the “Filing Parties,” have granted permission to submit these Comments on their behalf, and join together to submit these Comments.

National Organizations – Filing Parties	
	The National Call for Safe Technology, Odette J. Wilkens, Chair & General Counsel, NY
	The Weston A. Price Foundation, Sally Morell Fallon, President, Washington, D.C.

U.S. State	Filing Parties
AK - Alaska	Hal Stachman, Sitka, AK
AL - Alabama	Donald Campbell, Huntsville, AL
AR - Arkansas	PACTS International, Ken Stroud, Advisory Board Member/Technical Director, with Havana Syndrome, Little Rock, AR
AZ - Arizona	Arizonans for Safe Technology
	EMF Wellness Tucson, Lisa Smith, PhD, Tucson, AZ
	Safe Tech Tucson, Tucson, AZ
	Floris R. Freshman, published artist and composer, Scottsdale, AZ, with EMR-Syndrome
	Susan Molloy, M.A., Snowflake, AZ
	Melissa Hayes, M.S., Oro Valley, AZ, Oak Haven Wellness, LLC, with EMR-Syndrome
	Renée Neumann, Tucson / Green Valley, AZ Kathy Flanagan, Prescott Valley, AZ, with EMR-Syndrome Karen Carswell, Flagstaff, AZ
CA – California	EMF Safety Network, Sidnee Cox, Co-director, Windsor, CA
	Fiber First LA, Charlene Hopey, Topanga, CA
	Malibu for Safe Tech, Lonnie Gordon, Executive Director, Malibu, CA
	Napa Neighborhood for Safe Technology, Amy Martenson, Napa, CA
	Safe Tech International, Sara Aminoff, Union City, CA
	5G Free California, Julie Levine, with EMR-S, Topanga, CA,
	California Brain Tumor Association, Ellen Marks, Director, Indian Wells, CA
	Sustainability Management Consulting, Angela Casler, Chico, CA
	Eagle Forum of California, Orlean Koehle, CEO, Santa Rosa, CA
	Brenda Shafer, CA, with EMR-Syndrome Gene Wagenbreth, Topanga, CA Margaret Holt Baird, Esq, San Diego, CA, with EMR-Syndrome Raymond Michael LeVesque, RayGuardProtect.com, National Health Federation Board Member, Clear Lake Riviera, CA
CO - Colorado	Coloradans for Safe Technology, Andrea Mercier (mother of a severely disabled child who is adversely impacted various forms of non-ionizing radiation), Colorado Springs, CO
	Coloradans for Safe Technology, Nancy VanDover, DVM, OMD, Dipl Acup, CO, disabled by EMR

	La Plata for Safe Technology, Ingrid Iverson, La Plata County, CO, with EMR-Syndrome
	Longmont for Safe Technology, Doe Kelly, Co-Founder, Longmont, CO, with EMR-Syndrome
	Deborah Shisler, CO, with EMR-Syndrome Virginia Farver, Fort Collins, CO
CT - Connecticut	Connecticut for Responsible Technology, Private Membership Association (PMA), Paska Nayden, Co-Founder & Administrator, with EMR-Syndrome
FL - Florida	Kay Fitt, Palm Harbor, FL; Susan Lee, Miami, FL Shirley Denton Jackson, with EMR-S, unexpected early retirement from School District of Palm Beach County, FL - Research Project Manager and Safe Schools Coordinator - due to EMR-Syndrome, North Palm Beach, Florida
IL - Illinois	Safer Cell Phone and Wi-Fi Project, Marne Glaser, Chicago, IL
LA - Louisiana	Southern EMF Radiation Solutions, Shari Champagne, Houme, LA, with EMR-Syndrome
MA – Massachusetts	Massachusetts for Safe Technology, Cecelia Doucette, Director, Ashland, MA
	Pittsfield Cell Tower Injured & Concerned Citizens, Pittsfield, MA, injured with EMR-Syndrome
	Safer Siting 01240, Lenox, MA
	Safe Tech International, Patricia Burke, journalist, Millis, MA, with EMR-Syndrome
	Sustainable Upton, Laurie Wodin, Co-Administrator, Upton, MA, with EMR-Syndrome
	Last Tree Laws (.com), Kirstin Beatty, Director, Holyoke, MA, with EMR-Syndrome
	The Leto Foundation, Westborough, MA
	Alison McDonough, Canton, MA, with EMR-Syndrome Janet FitzGerald, M.S., CCC-SLP Rowley, MA, member of Massachusetts for Safe Technology Anna Nelson, Pittsfield, MA , with EMR-Syndrome Tais Howard, Lynn, MA
MD - Maryland	Safe Tech International, Kate Kheel, Taneytown, MD
	Katherine Katzin, Takoma Park, MD
ME - Maine	Global Union Against Radiation Deployment from Space, Bowdoinham, ME
	Maine Coalition to Stop Smart Meters, Richmond, ME
	Janet Drew, retired Registered Nurse, York, ME Jen Goddard, Board Certified Doctor of Natural Health, Thriving Proof Holistic Health Practice, and 2025 United States of America Mrs. Maine Pageant, Brewer, ME
MN - Minnesota	Safe Tech Minnesota, Leo Cashman, Petra Brokken, St. Paul, MN
MO - Missouri	Loraine Uebele, FACHE, Kansas City, MO

	Marty Freyer, Mexico, MO David B. Klug, Kansas City, MO Bethany Klug, Supporter and Advocate for EMF Affected, Kansas City, MO
NC - North Carolina	Sharon Behn, Arden, NC Susan Marlan, Asheville, NC Nicole Stallings, Black Mountain, NC, with EMR-Syndrome
NE - Nebraska	Tammy Lee, Lincoln, NE, with EMR-Syndrome Linda Becker, Lincoln, NE
NH - New Hampshire	New Hampshire for Safe Technology, Deb Hodgdon, Stratham, NH, with EMR-Syndrome
NJ - New Jersey	Lisa Allen, Plainfield, NJ Diane Grossi, East Hanover, New Jersey, with EMR-Syndrome
NM - New Mexico	Lori Bagley, Concerned Individual, Albuquerque, NM, with EMR-Syndrome
NY - New York	New Yorkers 4 Wired Tech, New York, NY
	New York City Alliance for Safe Technology, New York, NY
	Safe Tech Westchester, Ruth F. Moss, Westchester, NY
	Amy Harlib, Concerned Citizen, New York, NY Fred P. Sinclair, Jr., Alfred, NY Kate Reese Hurd, Philmont, NY, with EMR-Syndrome Gabriela Munoz, Carmel, NY, with EMR-Syndrome Stephanie Stewart, LaGrangeville, NY
OH - Ohio	Craig McDowell, veteran, Rocky River, OH Erin McDowell, Registered Nurse, Rocky River, OH, Southwestern, with EMR-Syndrome, Ohio for Responsible Technology (SWORT) Jennifer Manzler, Certified Health & Wellness Coach, Cincinnati, OH, SWORT Sean Polacik, Automation Control Systems Technician, OH Cristina Shonk, Cincinnati, OH
OR - Oregon	Oregon for Safer Technology, Ashland, OR Kelly Marcotulli, Ashland, OR, with EMR-Syndrome The Soft Lights Foundation, Mark Baker, President, Beaverton, OR
PA - Pennsylvania	Pennsylvanians for Safe Technology, Donna DeSanto Ott PT DPT MS FMCHC, Founder & President, PA
	Southwest Pennsylvania for Safe Technology, Mount Pleasant, PA, Susan Jennings, MPA, BA, Founder (son has EMR-Syndrome)
	Jan Kiefer, Scottsdale, PA
RI - Rhode Island	Rhode Island 4 Safe Tech, Sheila Resseger, M.A., Co-Founder, Cranston, RI
TN - Tennessee	Janet Taché, Hohenwald, TN
UT - Utah	Rosemarie Russell, member of The Women's State Legislative Council of Utah, Hurricane, UT

VA - Virginia	Virginians for Safe Technology, Jenny DeMarco, Communications Director, and Mary Bauer, retired radio frequency engineer, Fredericksburg, VA
	Charles Frohman, M.Ed, HIA, lobbyist, National Health Federation, Williamsburg, VA Linda M. Cifelli, retired Registered Nurse, Williamsburg, VA Grace Hilbert, Annandale, VA, with EMR-Syndrome
VT - Vermont	Martine Victor, VT
WI - Wisconsin	Katrine Colton, Sheboygan, WI, with EMR-Syndrome Tracey Seymour, Westfield, WI, with EMR-Syndrome

<b>Europe</b>	<b>Joiners</b>
Sweden	Eva Christina Andersson, E.U., Sweden

**APPENDIX B  
IN THEIR OWN WORDS**

**COMMENTS FROM MARY DAHL, SANTA ROSA, CA, 9-14-25**

Office of the Secretary  
Federal Communications Commission  
45 L Street NE  
Washington, DC 20554

September 14, 2025  
Mary Dahl  
5110 Monte Verde R.  
Santa Rosa, CA 95409

Re: WC Docket Nos. 25-208 and 25-209

Dear Secretary Marlene Dortch,

I am an 81-year-old woman who has lived in the same house in Santa Rosa, California for 55 years. I don't have a computer or internet, so a friend is typing this letter for me. I live by myself and am frugal, living on a very limited income. I am partially disabled and don't drive.

I have become extremely sensitive to wifi and anything that emits radiofrequency radiation. In 2018, Verizon installed a small cell on a utility pole only 42 feet from my house. This constant RFR has taken a toll on my health and I suffer from frequent nausea, weakness, exhaustion, and headaches. Because of my condition, my only means of communication with friends and neighbors is my copper AT&T landline. It is also the only way I can call for emergency help.

During the Sonoma County fires of 2017 and 2020 and the multiple power outages through that period, my AT&T landline was a lifeline for many, and the only way my neighbors or I could communicate with others.

In 2022, I was diagnosed by a medical doctor with EHS (Electromagnetic Hypersensitivity), a recognized condition with ADA accommodation requirements.

I recently learned that the FCC has opened a new rulemaking that will allow AT&T to discontinue servicing and providing landline service. What is a person in my situation to do? This is very distressing as I rely completely on my copper landline. I can't afford a cell phone, nor can I even use one due to my disabling RFR condition.

I'm told that I could use a cable service or a fiber optic service, but they use modems and routers that rely on electricity, and if the power goes out, I'll lose my service. I also rely on the landline phones in my other rooms that plug into the wall, including the upstairs bedroom. How will they work? I know nothing about this technology.

What will I do if I'm made sick by wireless and my wired connection is no longer available? It's very important that I keep my AT&T landline.

Thank you for your time and attention to this critical matter.

Sincerely,



Mary Dahl

**COMMENTS OF ROSEMARIE RUSSELL, HURRICANE, UT 9-28-25**

FCC Proceeding(s): 25-208, 25-209

Re: Landlines, reliable and clean

A cell tower was placed next to our home in Washington County, Utah, on property owned by the Washington County Water Conservancy District, without notice to the residents. Nine individuals have died and several have complained to me about health issues that they think are caused by the tower or other radio frequency devices like the “smart utility meters”. While the tower was approved for three antennae many additional antennae have been added including upgrading to 5G and adding antennae for an Internet Provider.

Cell phone reception prior to the tower being activated was four bars at our location. Since the tower was activated I do not have reception now and many residents do not have cell reception. Although the nearest cell tower was about 7 miles from our lot, because there were no obstructions to block the signal (such as mountains), or any direct reflection off the nearby cliffs, paradoxically, the service was above average compared to our current situation. Reflected radiation can cause out-of- phase signals which degrade service.

In 2009 a cell tower was approved (without notice) within one hundred feet of my property and between two residential developments with numerous residences. No cellular service was provided for the ensuing three years. Then, in 2011 AT&T contracted to place cellular antennae on the tower. Additional antennae have been continually added or “upgraded” (recently 5G service was added without notice or discussion of health concerns or NEPA review). Also, other providers of internet have likewise been added.

Upon activation of service on this tower in 2013, the radiation levels increased and the quality of cell service tanked (no bars to occasionally one bar). Since many of the antennae are directed at the Hurricane Cliffs that soar a thousand feet above our home, the out-of- phase issue noted above, likely contributes to the degradation of service and potentially, the re-exposure of harmful scattered radiation redirected to our residential development.

I contacted the FCC regarding this matter. There was no concern or effort on the part of the FCC to measure or test the signals. Sadly, there were other locations available (more remote from residences) for the tower, and eliminating the Cliffs reflection. However, when my husband and I questioned the employee of the cell tower company, the rationale was purely economic. It was much cheaper to build where the electrical and the road infrastructure were already present. Perversely, some residents have been forced to install mini cell towers in their homes in order to have adequate service. The radiation (WiFi) coverage from the mini cell can extend to 16 users according to Verizon. This radiation may trespass to other properties.

My landline was working at the time my husband suffered a fatal heart attack. I was able to contact the police and emergency rescue because I had a working landline. My cell phone did not work.

Recently, Conducted Electromagnetic Emissions from the Digital Electric Utility Meter “Smart Meter” exceeded 1675 Graham Stetzer units throughout my entire home, well above FCC limits. This caused interference with my copper landline and caused it to become unuseable.

Keep our landlines. We paid for them and I want a choice that is not wireless.

**Rosemarie Russell**  
**Hurricane, Utah 84737**

### **COMMENTS FROM CATHERINE GORMAN, WINKELMAN, AZ**

It would be dangerous for us if landlines were eliminated. We already have too many problems with our landline that lead to loss of service. We feel that our provider, CenturyLink, doesn't support landlines, especially in rural areas, even though they are subsidized for this service. We have no cell service available here and CenturyLink does not offer any internet options. If our electric service goes out, we only have our landline to report it and/or call for help in an emergency.

Thanks for your efforts to maintain landlines,

Catherine J Gorman  
Winkelman, AZ 85192

### **COMMENTS FROM KAREN JENSEN, PRESCOTT VALLEY, AZ**

I am opposed to the FCC's and Telecom's latest attempts to do away with the requirement for environmental protection studies called NEPA reviews. I am opposed their their trying to eliminate copper landlines, which would bring great harm to the growing population of those injured and disabled from electromagnetic radiation and need access to this non-harmful and vital infrastructure (which is also needed by everyone when cell service goes down). I am also opposed to legislating away the restrictions on putting egregiously powerful antennas anywhere they please on our existing infrastructure. When I bought our present home here in the quad city area, the position of antennas was a major factor in choosing which one and eliminating others.

Karen Jensen  
8150 N Sable Way,  
Prescott Valley, AZ 86315

## **COMMENTS OF SHELLY KORNBLUTH, SCOTTSDALE, AZ**

I am very against eliminating copper landlines and replacing them with powerful antennas. Copper landlines are very much needed when cell service goes down & are especially needed during emergency situations. And antennas (5G etc) cause harm to our health with the most vulnerable being affected sooner, but over long run all will be affected. Thank you for reading this.

Shelly Kornbluth  
Scottsdale, Arizona  
Volunteer for Childrens Health Defense, Arizona Chapter

**APPENDIX C  
IN THEIR OWN WORDS  
COMMENTS TO THE CALIFORNIA PUBLIC UTILITY COMMISSION (CPUC)**

The over 600 comments are set forth in the footnoted link.<sup>75</sup> These are several of the comments that were made to the CPUC.

**Dawn Isis Campbell, CA 95008**

*I strongly oppose allowing AT&T to be relieved of the responsibility to provide & maintain landline service in California. AT&T had the exclusive right to this business for many decades & clearly made a good profit doing so. It seems they've now decided they want 'out' since it's not as lucrative anymore. But we clearly still need to have landline service available, for multiple reasons which I know many have cited & explicated. Further, a trend to have landline service available in one's home is gathering momentum. People with young children are especially interested in having phone service that their children can easily access, whether it be to call 911 or to be able to have long conversations with relatives & friends. AT&T should be ashamed that after having had a monopoly on all phone service for so long, they now want to duck out of their corporate RESPONSIBILITY to continue providing it. This should not be allowed.*

**Aug 27, 2025 4:26 pm**

**Linda Garfield, Boulder Creek, CA 95006**

*I urge the CPUC to require AT&T, and other telecommunications providers in California, to retain their Carrier of Last Resort Status. My husband and I gave up our AT&T land line a number of years ago, believing that the voice over IP service that Comcast provides would be a reliable replacement. We overwhelmingly regret our decision. Every time we lose power, which is frequently, we lose phone service, as well as cable and internet. This effectively cuts off ALL communication to our home. That's because cable companies aren't required to provide emergency power backup systems for their service. Neither are cell phone companies. AT&T previously maintained their copper wire infrastructure and emergency backup generators, providing reliable land line phone service during power outages. They have since deferred maintenance for years, allowing these systems to degrade. We would like to drop our Comcast phone service, but aren't confident that AT&T's landline system has been maintained regularly in our community. We want AT&T to maintain their copper lines so that they can resume providing excellent land line phone service to my street and to Boulder Creek and other rural, mountainous areas in California. These landline phone connections are necessary in life or death situations. The 2020 CZU Lightning wildfire in our area is an example of such a life or death situation. Without landlines, many people in our valley would not have received the reverse 911 calls for evacuation. Thank you for considering my thoughts regarding this matter.*

**Jun 29, 2025 2:26 pm**

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<sup>75</sup> [https://mail.google.com/mail/u/0/?ui=2&ik=9bc78895e9&attid=0.1&permmsgid=msg-f:1842822539564218749&th=1993055606cef97d&view=att&zw&disp=inline&acrobatPromotionSource=email\\_chrome-list](https://mail.google.com/mail/u/0/?ui=2&ik=9bc78895e9&attid=0.1&permmsgid=msg-f:1842822539564218749&th=1993055606cef97d&view=att&zw&disp=inline&acrobatPromotionSource=email_chrome-list).

**Helen Finley Ben Lomond, CA 95005**

*Re: CPUC Proceeding 24-06-012 - the attempted abandonment of Carrier of Last Resort (COLR) obligations by AT&T and the other telecommunications companies When disaster strikes—whether it's wildfire, flood, or prolonged power outage—as rural Californians rely on copper landlines as their last connection to emergency services. preserve landline access for us, the most vulnerable. We Need Reliable Landlines. As a resident of the Santa Cruz Mountains, which are heavily forested in steep, erosive terrain and have suffered frequent natural disasters in the past few years, including wildfire and repeated atmospheric river events and landslides, copper landlines are not outdated. In many areas of the San Lorenzo Valley and throughout the Santa Cruz Mountains cell reception is limited, unreliable and of poor quality. Contacting emergency services would be impossible in many cases without landlines. Copper landlines are lifelines. They are essential to our safety. During the 2020 CZU Lightning Complex Fire, which burned 86,509 acres and almost 1,000 homes, we were able to evacuate thanks to reverse 911 calls to our landline, despite poor cell phone service. These same landlines allowed residents to call for help during the 2022-2023 atmospheric river events, because the landlines worked even with the power out for up to a month for some residents.*

*With wildfire dangers and the risk of natural disasters increasing due to changing climate conditions, it is imperative to retain this lifeline for us residents, businesses, schools, and communities. AT&T and the other COLR telecommunications service providers should be required to continue providing landline service to customers and to resume regular maintenance of their copper landlines to retain functionality and reliability of this critical infrastructure.*

**Jun 25, 2025 8:33 am**

**Kristin Praly SLV, CA 95005**

*Reliable communication isn't a luxury—it's a lifeline. In rural communities like ours, dependable phone and internet service is essential for public safety, education, and healthcare access. When wildfires sweep through remote areas, timely evacuation alerts can mean the difference between life and death. During the 2020 CZU Lightning Complex fires in California, many rural residents struggled to receive emergency notifications due to poor cell coverage and internet outages.*

*Even so-called "guaranteed" solutions like WhatsApp messaging or satellite-based devices often fail in our mountainous terrain. Dense tree cover, steep canyons, and limited sky visibility can block satellite signals entirely, leaving residents without any way to call for help or receive critical updates. In some cases, messages sent via satellite messengers have taken 30–40 minutes—or longer—to transmit, if they go through at all. This isn't just inconvenient—it's dangerous. We need infrastructure that's designed for the realities of rural life, not just urban assumptions. The California Public Utilities Commission (CPUC) must prioritize resilient, redundant communication systems that work where we live. Our safety depends on it.*

**Jun 24, 2025 8:51 am**

**B Dudley, MD (retired) Guerneville, CA 95446**

*This retired family physician has sensed for years being sensitive to EMR. Just a few days ago I had the most intense, utterly undeniable, fortunately brief illness due to EMR. Sonic sent a replacement modem that had Wi-Fi turned on by default. After spending some time setting it up, I lay my elder bones down for some rest, but noticed I was feeling very bizarre, as if my whole body was buzzing a bit, quite intensely though subtly vibrating, as if I was lying atop a bed-size vibrator. It was an extremely oppressive feeling of being taken over, drained, even immobilized, as if some alien force had found a way to creep inside me like a non-material but very effective vibrator. It felt as if I had gotten sick with an intense flu bug. Before I said anything, a neighbor who shares my WIRED internet connection noticed I was not walking normally, more staggering like a drunk, and brought that to my attention. I hadn't noticed that myself, just felt very much out of sorts. As soon as I turned Wi-Fi off, the symptoms greatly diminished and ceased within at most a minute or two. There is no longer any way to deny this radiation epidemic is bad news and very much arguably deadly. May The Divine help us! Looks like nowhere near enough humans are helping.*

*B*

**Jun 19, 2025 2:29 pm**

**Chris Sheridan Carmel, CA 93923**

*I've had neck cancer and was advised by my oncologist to avoid all sources of radiation including radio-frequency waves. Wireless phones and cell phones have not been proven safe and they produce radiofrequency emissions. Traditional landlines (corded landlines) use a copper wire to connect the landline phone to the phone network. This type of phone does not produce any radiofrequency waves and is the type of phone recommended by my oncologists. I'm a senior citizen with multiple medical issues. I have many phone consultations with my physicians at UCLA, Stanford, and UCSF Medical Centers. I depend on my landline phone because it consistently provides clear reception and a solid connection. In my area there are frequent lengthy power outages that often last for days. My traditional landline is extremely reliable and essential for me to communicate with my doctors during these frequent power outages. Cell phones require electricity for charging. Even my computer does not function during power outages. Only copper wire landlines function during power outages. AT&T wants to impose another service as a replacement for my dependable landline. I have an extremely old computer that is nearing its end. I live on social security and will not be purchasing a new computer. AT&T's proposed replacement service for my landline would likely involve WIFI, VOIP, or access to the internet. Friends who have cell phones, VOIP, or wireless phones are always complaining about shabby erratic reception, dropped calls, loud annoying echo feedback, metallic sounding static noises, and lack of clarity during use. Also, traditional landlines are extremely durable and do not necessitate upkeep, so traditional landlines are not a maintenance overhead cost for AT&T whose profit ending 12/31/24 was 73,115 billion. DESPITE AT&T's CLAIM THAT ANY REPLACEMENT OF MY TRADITIONAL LANDLINE WILL BE AS GOOD OR BETTER THAN MY LANDLINE, THIS IS A FALSE PROMISE. ANY SERVICE THAT AT&T PROPOSES AS*

*REPLACEMENT WILL BE HIGHLY INFERIOR TO MY LANDLINE. Due to my former neck cancer, I must avoid radiofrequency devices. Also, the ONLY phone or means of communication that functions during frequent power outages in my area is my traditional landline. Traditional landlines provide clarity of reception, consistent dependability, and functional durability that is unsurpassed by any other communication service that AT&T proposes. PLEASE do NOT change the CPUC's Carrier of Last Resort Rules. I need my traditional landline. Thank you for your attention to this matter.*

**Jun 06, 2025 12:01 am**

**barbara tyger santa cruz, CA 95060**

*i know 2 people who are seniors or disabled who can not afford a cellphone. and my mother can not even manage using an atm or debit card. i am sorry i got rid of my landline but i had a long commute. every so often i have to get as new one because of system updates. but the old faithful land line goes on. dial ones still work. and in an emergency cell phones will be down.*

**May 13, 2025 1:08 pm**

**Linda Wright McKinleyville, CA 95519**

*Yet ANOTHER attempt to kill the essential lifeline phone service to so many of us who live in "cell service deserts"!!! Our old landlines are the ONLY reliable means of communication for emergencies (911 or reverse 911 warnings for wildfire evacuations, etc.) Cell service is NOT reliable, especially in areas where power outages are common, especially in stormy/windy conditions. If AT&T is allowed to kill our only reliable communication with the world, there will literally be blood on their hands as people will DIE. NO to allowing them to stop providing last-resort landline service!*

**May 12, 2025 11:37 am**

**Curtis Cochran Chico, CA 95928**

*I am disabled, and can not afford nor will I be coerced into using mobile digital communications devices. The copper low voltage transmission wires belong to everyone, and like the postal service should never be taken away from we the people. It is still the most reliable and secure way to realize a phone call. If the CPUC allows ATT to abrogate their responsibility to the public they will be capitulating to an end around, a scam upon the American people.*

**May 12, 2025 11:22 am**

**Isabel Dryer Rodeo , CA 94572**

*DON'T YOU DARE LET AT&T GET AWAY WITH THIS! I am 66, husband 70, and we need our landline!! He's already had 2 heart attacks. Just exactly how am I supposed to call 911 without this!*

*This is earthquake country. Don't let us die because the landline is the only form of communication in an earthquake.*

**May 12, 2025 10:18 am**

**Jennie Brown Trinidad, CA 95570**

*We are seniors who live in a rural setting where at times our cellular service does not*

*work especially during storms when we are more likely to need help. Within the last year there was a serious medical event at our home, cell service was not available and it was our landline that provided life saving assistance. Landline service is essential.*

**Sara Sunstein Richmond, CA 94804**

*Keep copper landlines!! As one of those sensitive to micro-radio-frequencies, I can use a cell phone only for a few minutes at a time before my head or hands start hurting. I rely on my landline for so many of my calls: when communicating sensitive information that can easily be hacked on a cell phone, all my calls with friends, and any time the power and/or cell service is down, which happens frequently in Northern CA it seems. Make AT&T keep its copper landlines! Thank you.*

**Apr 27, 2025 10:49 pm**

**Floyd Bradshaw Brentwood, CA 94513**

*I'm writing for my father who is 94 years old, has bad tremors and has macular degeneration with geographic atrophy. Therefore he can't use a cell phone. My parents have had landlines for over 70 years. We have a very close family and the only way they can reach us (their family) is via a landline which they count on tremendously. We have looked at all other options to no avail.*

**Apr 18, 2025 5:04 pm**

**Charles Engles Portola Valley, CA 94028**

*Dear Commissioners,*

*I urge you to require Carriers of Last Resort to continue offering traditional landline service. This is an IREPLACEABLE service because NO OTHER technology – VOIP or cellular – will work during a multi-day power outage at a residence. Cell phones have to be charged every day or two. Nearly all VOIP handsets require immediate external power, and the few specialized systems (PoE enabled) that can draw power from the internet will die after a day or two when the residential modem battery is depleted . . .*

**Apr 05, 2025 1:37 pm**

## APPENDIX D

### BIOLOGICAL HAZARDS OF WIRELESS RADIATION – EXECUTIVE SUMMARY

The FCC's standards for wireless radiation were established back in 1996, and have not been reviewed, updated or verified despite significant changes in the wireless technology in use today. The FCC's standards relate solely to wireless radiation's thermal impacts on a body (e.g. how the body reacts to being heated), and do not consider other known adverse biological impacts of non-thermal levels of RF radiation (such as damage to DNA or other changes to cells). The FCC's limits were established long before the existence of 2G, 3G, 4G, or 5G technology.

Congress eliminated the EPA's funding for electromagnetic research in 1996, knee capping the EPA from studying biological impacts of RF radiation for nearly 30 years. *At the very least, the FCC's standards should be reconsidered (FCC is under federal court order to do so, but has not) given current technology.*

**Wireless radiation, also referred to as radio frequency (RF) radiation, produces biological effects and evidence of its hazards are clear and convincing, yet the hazards are not generally publicized, and the hazards are unnecessary to reap the benefits of wireless technology.**

- **Industry Funded Research** – The wireless industry has funded studies that show adverse biological impacts. A 1990s \$28.5 million study found that RF radiation produces biological effects that are potentially hazardous to humans in ways that have nothing to do with heated tissue. A 2000 study for a major telecom carrier found RF radiation has links to cancer, neurological disorders and cognitive impairment. Insurance companies will not insure for personal injury from RF radiation, reflecting their concerns about the possible magnitude of their liability, e.g., that 5G is a high, “off the leash” risk.
- **Reports from Federal Agencies** – A 2018 \$30 million US National Toxicology Program (NTP) study found “clear evidence of cancer” in lab rats from wireless radiation. In 2019, the FCC admitted that RF radiation can have non-thermal impacts on humans, but it has conducted no studies to determine what those impacts might be or what changes should be made to its RF radiation emission limits. In 2021, the DC Circuit Court of Appeals ruled in *Environmental Health Trust, et al v. FCC* that the FCC's lack of action was arbitrary and capricious for failing to review its emission standards in light of new science and current technology and that it should consider non-cancer health impacts of wireless radiation. So far, the FCC has failed to comply with the Court order. As early as 1971, the US Naval Medical Research Academy concluded from 2300 studies that RF radiation, including millimeter (e.g. 5G), are linked to cardiac, neurological and other disorders.
- **Independent Studies** – Several major independent studies have concluded biological effects from RF radiation, including by the World Health Organization in 2025 (finding increased risk of cancer, initial Class 2B carcinogen classification in 2011), the Ramazzini Institute in 2018 (clear evidence of cancer in lab rats, corroborating the NTP's results) and the New Hampshire Commission in 2020 (all forms of wireless radiation are harmful). The American Academy of Pediatrics warns that children are disproportionately affected by cell phone radiation. Studies concluded increased risk for ADHD, delayed motor skills, diabetes and demyelination of fetuses' brain neurons.
- **Chronic Diseases and Clusters near Cell Towers** – Illnesses near cell towers, e.g., nausea, rashes, stroke, atrial fibrillation and a variety of cancers, have been documented near Duluth, MN (51 strokes), Pittsfield, MA (17 residents fell ill and many evacuated, one resident who

remained died), Ripon, CA (4 children and 4 teachers developed cancer; one child died) and Eagle, ID (atrial fibrillations from 5G cell towers).

## **BIOLOGICAL HAZARDS OF WIRELESS RADIATION -- SOME HIGHLIGHTS**

*“The evidence presented to the Board includes well over one thousand peer-reviewed scientific and medical studies which consistently find that pulsed and modulated RFR has bio-effects and can lead to short- and long-term adverse health effects in humans, either directly or by aggravating other existing medical conditions. Credible, independent peer-reviewed scientific and medical studies show profoundly deleterious effects on human health, including but not limited to: neurological and dermatological effects; increased risk of cancer and brain tumors; DNA damage; oxidative stress; immune dysfunction; cognitive processing effects; altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and damage to the blood-brain barrier.”<sup>76</sup>*

~ Board of Health, Pittsfield, MA, Emergency Cease & Desist Order to remove cell tower that was sickening 17 residents simultaneously.

### **What the Industry Knows About the Biological Hazards of Radiofrequency (RF) Radiation:**

1. **Industry Funded Research Finds Biological Effects.** A 1990s research program funded by the wireless industry at \$28.5 million under the independent non-profit, Wireless Technology Research, LLC (WTR), found that wireless radiation (i.e., non-thermal radiation) is **biologically active producing biological effects and potentially hazardous to human health.**<sup>77</sup> That means the radiation does not need to heat human tissue. (Note that the FCC limits only account for thermal, not non-thermal, adverse effects.)
  - a) The research was peer-reviewed with scientific oversight by both an independent Peer Review Board at the Harvard School of Public Health and a U.S. Government Interagency Working Group, chaired by the FDA, and including EPA, OSHA, NIOSH, CDC, FCC, and NIH.<sup>78</sup>
  - b) Abruptly after these findings, the EPA was defunded from doing any further research on the biological effects of wireless radiation.<sup>79</sup>
2. **Industry Commissioned Study Finds Biological Effects.** A study in 2000 commissioned by a major telecom carrier found links to cancer, leukemia, neurological disorders and cognitive

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<sup>76</sup> <https://ehtrust.org/cease-and-desist-order-against-verizon-cell-tower-by-board-of-health-pittsfield-ma/>, see below the fold for link to the Order at 3, 2<sup>nd</sup> “Whereas” clause, paragraph #1.

<sup>77</sup> Wireless Phones and Health II: State of the Science 2002 Edition, edited by George L. Carlo; Wireless Phones and Health: Scientific Progress, edited by George L. Carlo.

<sup>78</sup> Ibid.

<sup>79</sup> Overpowered, What Science Tells Us About the Dangers of Cell Phones and Other WiFi-Age Devices, Martin Blank, PhD, 2014 at 110-112.

impairment, with special caution for children and an acknowledgement of those already disabled from the radiation.<sup>80</sup>

3. **Industry Patents Point to Health Risks.** Telecom and cell phone manufacturers have filed patents to reduce the level of wireless exposure tied directly to health risks such as neurological disorders and cancer.<sup>81</sup>
4. **Risk Warnings of Litigation.** Industry annual reports warn their shareholders of litigation risk from potential personal injury claims from RF radiation and potential financial losses.<sup>82</sup>
5. **RF Radiation is a Pollutant.** The telecom industry characterizes RF radiation as a pollutant in their device protection plans and disclaim insurance liability.<sup>83</sup>
6. **Insurance Companies Exclude Injury Coverage for RF Radiation.** Insurance companies such as Lloyd's of London will not insure for personal injury from RF radiation because of the high risk of claims, with Swiss Re characterizing "5G" as "high," "off-the-leash" risk.<sup>84</sup>
7. **No 5G Pre-Market Testing.** Telecom executives during a Feb. 2019 Senate hearing confirmed no industry pre-market testing of 5G for public health or safety. Sen. Blumenthal (CT)

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<sup>80</sup> T-Mobile Deutsche Telekom commissioned study by the Ecolog-Institute, April 2000, "Mobile Telecommunications and Health Review of the Current Scientific Research in View of Precautionary Health Protection," <https://ehtrust.org/wp-content/uploads/ecolog2000.pdf>.

<sup>81</sup> Swisscom patent, 2004 at [https://www.dropbox.com/sc/fi/nwdfklq7r7j2wwsipv7ws/SwissCom-Patent-application-2003-2004-WO2004075583A1-1-1-1.pdf?rlkey=liuy6175hamj24lbuszpe7vux&st=5p2oy0ji&dl=0](https://www.dropbox.com/sc/fi/nwdfklq7r7j2wwsipv7ws/SwissCom-Patent-application-2003-2004-WO2004075583A1-1-1.pdf?rlkey=liuy6175hamj24lbuszpe7vux&st=5p2oy0ji&dl=0); "Manufacturers Own Patents to Cut Radiation," RCR Wireless, June 4, 2001 at <https://www.dropbox.com/sc/fi/0rfwys743dgeqipifu3ua/Manufacturer-own-patents-to-cut-radiation-RCR-Wireless-News.pdf?rlkey=e5hm46nyp9an6ugu4y005ldm3&st=xr7ocreh&dl=0>.

<sup>82</sup> AT&T, Inc., 2021 Annual Report, <https://investors.att.com/~media/Files/A/ATT-IR-V2/financial-reports/annual-reports/2021/complete-2021-annual-report.pdf> at 41.

Verizon's 2021 U.S. SEC Form 10-K at 17, <https://www.verizon.com/about/sites/default/files/2020-Annual-Report-on-Form-10-K.PDF>.

<sup>83</sup> Exclusions of loss from electromagnetic radiation from insurance coverage:

- Verizon, Sec B "Exclusions," Subsection 16 "Pollution," <https://ehtrust.org/wp-content/uploads/device-protection-brochure-nationwide.pdf>;
- AT&T, Sec II "Exclusions," Subsection H. Loss from "Pollutants," Sec IX.T. Definition of "Pollutants," <https://ehtrust.org/wp-content/uploads/ATT-Multi-Device-Protection-Pack-Insurance.pdf>;
- Sprint, Sec II "Exclusions," Subsection H. Loss from "Pollutants," Sec IX.P. Definition of "Pollutants," <https://ehtrust.org/wp-content/uploads/Sprint-Insurance-Terms-and-Conditions-Downloaded-2019.pdf>.

<sup>84</sup> <https://ehtrust.org/key-issues/electromagnetic-field-insurance-policy-exclusions/>.

criticized the FCC and FDA for inadequate answers on questions of public health, and concluded, “We’re kind of flying blind here as far as health and safety is concerned.”<sup>85</sup>

8. **“Why Tech Leaders Don’t Let Their Kids Use Tech.”**<sup>86</sup> The article reports that technology executives restrict or forbid their children’s use of the very technology that they are providing to the public, including “the makers of smartphones and tablets, of social media channels and game boxes.” Technology “titans” such as former Apple’s Steve Jobs and Bill and Melinda Gates have admitted to placing restrictions on their children’s use of technology. Chris Anderson, former Wired magazine editor and CEO of 3D Robotics, said that his kids “accuse me and my wife of being fascists and overly concerned about tech, and they say that none of their friends have the same rules. That’s because we have seen the dangers of technology firsthand. I’ve seen it in myself, I don’t want to see that happen to my kids.”<sup>87</sup>

### **What Federal Agencies Know About the Biological Effects of Wireless Radiation and Have Disregarded:**

1. **Chronology of Federal Agencies** expressing since at least the 1990s that the FCC’s wireless limits address only thermal (heating of human tissue), not non-thermal exposure of RF radiation.<sup>88</sup>
2. **Food and Drug Administration (FDA).** The U.S. National Toxicology Program’s (NTP) 2018 report concluded **clear evidence of cancer** in lab rats from wireless radiation (similar to 2G and 3G cell phones).<sup>89</sup> NTP found malignant heart schwannomas and malignant brain gliomas.<sup>90</sup> NTP is one of the most prestigious toxicology institutions in the world. In 1999, the FDA had nominated the NTP to conduct a \$30 million study of RF radiation “with a high priority,” to conduct animal studies, stating that it was “not scientifically possible to guarantee that non-thermal levels of microwave radiation . . . will not cause long-term adverse health effects.”<sup>91</sup>

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<sup>85</sup> <https://ehtrust.org/health-effects-of-5g-wireless-technology-confirmed-at-us-senate-hearing-after-senator-blumenthal-questions-industry/>; see also, <https://mdsafetech.org/2019/02/13/no-research-on-5g-safety-senator-blumenthal-question-answered/>.

<sup>86</sup> “Why Tech Leaders Don’t Let Their Kids Use Tech,” <https://kidzu.co/health-wellbeing/why-tech-leaders-dont-let-their-kids-use-tech/>.

<sup>87</sup> Ibid.

<sup>88</sup> <https://ehtrust.org/timeline-of-development-of-safety-limits-for-wireless-radiation-in-us/>.

<sup>89</sup> See letter of Dr. Birnbaum, former NIH and NTP Director, and hyperlinked amicus brief <https://www.dropbox.com/scl/fi/nc7l00p8zxc8tj0l2a1yr/Dr.-Linda-Birnbaum-cell-tower-letter.pdf?rlkey=vq1i363i74umg9ybydrhmn5d&st=q9l49h88&dl=0> ; see also, <https://ehtrust.org/former-niehs-director-dr-linda-birnbaum-interviewed-about-cell-phone-radiation/>.

<sup>90</sup> <https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones#studies> *Environmental Health Trust, et al v. FCC*, Motion for Leave to File Brief of Amicus Curiae Joseph Sandri in Support of Petitioners Urging Reversal, Aug. 5, 2020, <https://ehtrust.org/wp-content/uploads/20-1025-Amicus-Brief-Joe-Sandri.pdf>.

<sup>91</sup> FDA letter to NTP, May 19, 1999, pp. 2, 3, 7, available at <https://ehtrust.org/wp-content/uploads/FDA-Nomination-for-Cell-Phone-NTP-Study-.pdf>.

- a) Dr. Linda Birnbaum, former NIH and NTP director, has stated: “Every agent known to cause cancer in humans will also produce it in animals when adequately tested.”<sup>92</sup> “Overall, the NTP findings demonstrate the potential for RFR **to cause cancer in humans.**”<sup>93</sup> [Emphasis added.]

### 3. Federal Communications Commission (FCC)

- a) **The FCC admitted in 2019** that at least some types of RF radiation can cause instantaneous, non-thermal adverse effects with RF radiation frequencies ranging between 3 KHz and 10 MHz.<sup>94</sup> Despite this, the FCC does not regulate for RF frequencies below 150 KHz, except for Class A digital devices for commercial use.<sup>95</sup> The FCC averages exposure levels are for 30 minutes,<sup>96</sup> which obscures the effects of the **constant peaking and pulsations of RF radiation which are the cause of adverse biological effects**, and does not account for 24/7 exposure by the population.<sup>97</sup>

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<sup>92</sup> Dr. Birnbaum’s statement in Attorney Joe Sandri’s Amicus Brief filed 8-5-2020 in connection with *Environmental Health Trust, et al v. FCC*, <https://ehtrust.org/fcc-amicus-briefs/> (below the fold, right column) at 9.

<sup>93</sup> Ibid at 11.

<sup>94</sup> Proposed Changes in the Commission’s Rule Regarding Human Exposure to Radiofrequency Electromagnetic Fields, 34 FCC Rcd 11687, 11743-11745, ¶¶122- 124 & nn. 322-335 (2019).

<sup>95</sup> See, e.g., 47 CFR 15.107(a) and (b) on conducted limits, <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15/subpart-B/section-15.107>.

<sup>96</sup> 47 CFR 1.1307(b)(2): “Time-averaging period is a time period not to exceed 30 minutes for fixed RF sources or a time period inherent from device transmission characteristics not to exceed 30 minutes for mobile and portable RF sources,” [https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307\(b\)](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307(b)).

<sup>97</sup> Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review) (2021) Pangopolous DJ, et al. International Journal of Oncology. August 23, 2021. <https://pubmed.ncbi.nlm.nih.gov/34617575/>.

Computational modeling investigation of pulsed high peak power microwaves and the potential for traumatic brain injury. Sci Adv. 2021 Oct; 7(44). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8555891/>. "These studies reveal that the MAE threshold depends on the energy in a single pulse (not the average power density) for sufficiently short pulses [e.g., 32 μs in (46)], and peak power densities of 102 to 105 mW/cm<sup>2</sup> have been known to cause auditory effects in human participants (45)."

“Diplomats’ Mystery Illness and Pulsed Radiofrequency/Microwave Radiation,” Dr. Beatrice Golomb. Neural Comput. 2018 Nov; 30(11):2882-2985. <https://pubmed.ncbi.nlm.nih.gov/30183509/>; “Reported facts appear consistent with pulsed RF/MW as the source of injury in affected diplomats.”

“5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them,” Martin L. Pall, PhD, <https://peaceinspace.blogspot.com/files/5g-emf-hazards--dr-martin-l.-pall--eu-emf2018-6-11us3.pdf>.

- b) **The FCC received in its docket**, when requesting public comment on the adequacy of its 1996 RF radiation emission limits, 11,000 pages of peer-reviewed, scientific studies showing biological effects from RF radiation and about two hundred personal accounts of injury. When the FCC closed the docket, it declined to update its limits. The FCC was sued and in 2021 the D.C. Circuit Court of Appeals ruled against the FCC and remanded the case back to the FCC to examine long-term effects on the public, especially children. The court concluded that the FCC failed to provide a reasoned explanation for not updating its limits and ignoring the current science.<sup>98</sup> The FCC has not yet complied. The FCC has also failed to reply to three petitions seeking compliance.<sup>99</sup>
- c) **FCC’s Maximum Permissible Exposure Limit (MPEL)** are the limits of RF radiation for human exposure. MPEL allows for a very high human exposure limit of ten million microwatts per square meter.<sup>100</sup> The FCC has acknowledged a "worst-case" scenario of transmitters “operating simultaneously and continuously” at the MPEL with an individual “in the main transmitting beam and within a few feet of the antenna for several minutes or longer.”<sup>101</sup> While the FCC dismisses this scenario as “extremely remote,” it is allowing 4G and 5G cell towers to be installed<sup>102</sup> just feet from a home,

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Belyaev, I., Dean, A., Eger, H. et al. "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis, and treatment of EMF-related health problems and illnesses." *Rev environ Health*. 2016;31(3):363-397. Doi:10.1515/reveh-2016-0011. B. W. G. (2012). "Bioinitiative Report 2012: A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation."

<sup>98</sup> <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

<sup>99</sup> Petitions:

- On 11/30/2021, Environmental Health Trust (EHT) filed a [Request to Reopen and Refresh Record in Remand of Emissions Guidelines Notice of Inquiry](#);
- On 6/30/2022, Environmental Working Group (EWG) filed a petition with 22,000 signatures [requesting that the FCC protect children’s health by setting strict standards limiting public exposure to radiofrequency radiation](#);
- On 4/4/2023, Children’s Health Defense (CHD) filed a [Petition to Implement D.C. Circuit Judgment and Mandate, Reopen Notice of Inquiry and Perform Tasks Ordered by the Court, Petition to Implement CEQ-Mandated NEPA Procedures Update and Request for Prompt Ruling](#). CHD stated: "Any continued non-action will violate the judgment and mandate and expose the Commission to further judicial review and, ultimately, a mandamus order requiring compliance."

<sup>100</sup> 47 CFR 1.1310(e)(1)(II) shows 1 mW/cm<sup>2</sup>, which is equivalent to 10 million uM/m<sup>2</sup>, <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1310>.

<sup>101</sup> FCC’s *Guidelines for Cellular Antenna Site Calculations*, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%2C%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters>.

<sup>102</sup> *In re Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Inv.*, 33 F.C.C.R. 9088, 9104-05 (2018).

business or school where individuals and children are in the main transmitting beam for many hours a day or for 24/7.

- d) **The FCC's MPEL** is based on IEEE (Institute of Electrical and Electronic Engineers) guidelines<sup>103</sup> which “have not been changed since 1991 and do not consider children.”<sup>104</sup> Testing was performed on “a model head with dimensions based [on] the 90th percentile of U.S. military recruits in the year 1989. The corresponding body of the head would be a six foot, two inches, 220 lb. male.”<sup>105</sup> A Specific Absorption Rate (SAR) – rate of absorption of electromagnetic radiation -- is then calculated based on thermal effects (heating tissue) of that model head.<sup>106</sup> However, biological effects from RF radiation are also non-thermal, documented by the studies cited herein, yet neglected in FCC testing. The FCC's limits are based on “outdated exposure metrics and circumvent important animal data” and “do not address conclusions from scientific organizations, such as the IARC.”<sup>107</sup>
- e) **The FCC failed to disclose** that in 2019 when it tested cell phones next to the body (which is the way that the public typically uses cell phones), the cell phones exceeded the limits of RF radiation for human exposure (discovered via FOIA).<sup>108</sup>

4. **A U.S. Naval Medical Academy Research** report from 1971 by Dr. Zory Glaser<sup>109</sup> linked 23 chronic diseases to RF radiation based on over 2300 studies.<sup>110</sup> A Feb 2025 report correlates Dr. Glaser's findings from 1971 of biological effects of RF radiation and millimeter wave (5G) technology to reported cases of chronic disease.<sup>111</sup> The 2025 report states that Dr. Glaser reported biological effects and diseases related to the central and autonomic nervous systems, genetic / chromosomal, vascular, blood, metabolic, endocrine and gastrointestinal

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<sup>103</sup> FCC guidelines are set forth at 47 CFR 1.1310, see note at (d)(4); see also, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%2C%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters.>

<sup>104</sup> *The Effects of RF-EMF on the Child Brain*, Aaron Skaist, Vol 12, No. 2, 2019, at 2, The Science Journal of the Lander College of Arts and Sciences, <https://touro scholar.touro.edu/cgi/viewcontent.cgi?article=1218&context=sjlcas>.

<sup>105</sup> Ibid at 3.

<sup>106</sup> Ibid.

<sup>107</sup><sup>107</sup> Dr. James C. Lin, distinguished former member of the International Commission on Nonionizing Radiation Protection (ICNIRP) and the Institute of Electrical and Electronic Engineers (IEEE), “RF Health Safety Limits and Recommendations [Health Matters],” IEEE Microwave Magazine, May 8, 2023, DOI: [10.1109/MMM.2023.3255659](https://doi.org/10.1109/MMM.2023.3255659).

<sup>108</sup> <https://ehtrust.org/press-release-concealed-fcc-cell-phone-radiation-tests-show-human-exposure-limits-were-exceeded/>.

<sup>109</sup> About Dr. Zory Glaser, <https://zoryglaser.com/>.

<sup>110</sup> [https://www.magdahavas.com/wp-content/uploads/2010/06/Navy\\_Radiowave\\_Brief.pdf](https://www.magdahavas.com/wp-content/uploads/2010/06/Navy_Radiowave_Brief.pdf).

<sup>111</sup> Report: “Safety of Wireless Radiation, a Scientific View, Feb 2025, Richard Lear and Camilla Rees, [https://www.researchgate.net/publication/388763046\\_Safety\\_of\\_Wireless\\_Technologies\\_The\\_Scientific\\_View](https://www.researchgate.net/publication/388763046_Safety_of_Wireless_Technologies_The_Scientific_View) at 12-13.

disorders.<sup>112</sup> In 1976, Dr. Glaser updated the total bibliography to 3700 reports relating to the biological effects of RF radiation.<sup>113</sup>

5. **A U.S. Air Force report** from 1994<sup>114</sup> states that “[i]t is known that electromagnetic radiation [EMR] has a biological effect on human tissue” covering a wide range including adverse cardiovascular, neurological and behavioral effects including the risk of cancer. Since 1956, the Dept. of Defense directed the Armed Forces (Army, Navy, Air Force) to study EMR. The report found that EMR can interact with human tissue’s bioelectrical function and Eastern Europe and the then Soviet Union found that human tissue may be more sensitive to EMR’s non-thermal effects.
6. **Central Intelligence Agency (CIA).** In 2012, the CIA declassified and approved for release a 1977 Russian study on the “Biological Effects of Millimeter Radiowaves” which found that while millimeter waves only penetrate the skin, they trigger a cascade of adverse biological effects within the body.<sup>115</sup>
  - a) The study coins the term “**radiowave disease**” to describe these effects.<sup>116</sup> Adverse effects on the skin included demyelination of sections of nerve fibers (damage or destruction to the insulation around nerve fibers which disrupts normal nerve impulse transmission), fragmented neural conductors, and deformation of sensory receptors, leading to neurological disorders.
  - b) The people observed working with millimeter radio wave generators had disturbances in their blood and immuno-biology.<sup>117</sup>
  - c) Exposure in lab animals inhibited “oxygen consumption rate by the mitochondria” of the liver, spleen, heart and brain.<sup>118</sup>
  - d) The degree of adverse effects **increased with more exposure**;<sup>119</sup> the lab animals had been exposed for 15 minutes a day for 60 days. When exposure ceases, disorders from low millimeter radio waves are reversible.<sup>120</sup> However, if adverse effects depend on duration of exposure, then Americans exposed continuously 24/7, 365 days a year, would suffer adverse biological effects without reprieve and without the ability to recover.

#### **Independent Research on Biological Effects of RF Radiation, Disregarded by Federal Agencies:**

1. **The World Health Organization’s (WHO) International EMF Project Review of April 2025** of animal studies found reliable evidence that RF radiation increases the risk of cancer.<sup>121</sup> This reinforces the 2018 findings of cancer from the National Toxicology Program for 2G and 3G cell

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<sup>112</sup> Ibid at 3.

<sup>113</sup> <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>.

<sup>114</sup> *Radiofrequency / Microwave Radiation Biological Effects and Safety Standards, a Review (1994)*, Scott Bolen, Rome Laboratory, Griffiss Air Force Base, at 1, <https://youandemf.com/wp-content/uploads/2025/01/EMR-US-Military-Report.pdf>.

<sup>115</sup> <https://mdsafetech.org/wp-content/uploads/2019/02/biological-effects-of-millimeter-wavelengths.-zalyubovskaya-declassif-by-cia-1977-biol-eff-mm-waves.pdf>.

<sup>116</sup> Ibid at 57.

<sup>117</sup> Ibid at 60.

<sup>118</sup> Ibid at 59.

<sup>119</sup> Ibid at 59.

<sup>120</sup> Ibid at 58.

<sup>121</sup> <https://www.sciencedirect.com/science/article/pii/S0160412025002338>.

phones and the Ramazzini Institute for cell towers. Scientists may call for the WHO's International Agency on Research on Cancer (IARC) to augment its RF radiation classification from "possible" Class 2B in humans set in 2011 to "probable" or "known" carcinogenicity in 2025.<sup>122</sup>

- a. **The WHO's IARC** (composed of independent scientists) classified EMF as a **Class 2B possible human carcinogen** in 2011<sup>123</sup> (similar to lead, diesel fuel and gasoline engine exhaust). This was based on "epidemiological observations in humans which exhibited higher risks for the glioma-type of malignant brain cancer and of benign vestibular schwannoma of the vestibulocochlear nerve among heavy or long-term subscribers of cell or mobile phones."<sup>124</sup>
- b. "[R]esults from animal experiments that the IARC was lacking were later provided by the U.S. National Toxicology Program (NTP). The NTP had reported two types of cancers in lab animals that were exposed, lifelong, to 2G and 3G cell phone RF radiation frequencies below 6 GHz . . . did not exceed 1°C,"<sup>125</sup> i.e., did not heat tissue.
- c. Since the WHO 's 2011 IARC Class 2B classification, other factions within the WHO have sought to produce industry-aligned pronouncements. For example, its website states a lack of causality of harm from wireless radiation,<sup>126</sup> but does not state that, nonetheless, IARC concluded Class 2B possible carcinogenicity.
  - i. Researchers have called for the retraction of:
    1. A study commissioned by the WHO, conducted by Karpidis, et al, which concluded in 2024 no hazards from wireless radiation,<sup>127</sup> but the study was found to be severely flawed with no scientifically valid assessment,<sup>128</sup> its

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<sup>122</sup> See, e.g., <https://icbe-emf.org/who-funded-study-reports-high-certainty-of-the-evidence-linking-cell-phone-radiation-to-cancer-in-animals/>.

<sup>123</sup> [https://www.iarc.who.int/wp-content/uploads/2018/07/pr208\\_E.pdf](https://www.iarc.who.int/wp-content/uploads/2018/07/pr208_E.pdf).

<sup>124</sup> J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in *IEEE Microwave Magazine*, vol. 24, no. 6, pp. 18-77, June 2023, doi: 10.1109/MMM.2023.3255659. keywords: {Radiation detectors;Human factors;Safety;Radiation effects;Cellular phones;Radio frequency}.

<sup>125</sup> Ibid.

<sup>126</sup> <https://www.who.int/news-room/questions-and-answers/item/radiation-5g-mobile-networks-and-health>.

<sup>127</sup> K. Karipidis, D. Baaken, T. Loney, M. Blettner, C. Brzozek, M. Elwood, C. Narh, N. Orsini, M. Rösli, M.S. Paulo, S. Lagorio, The effect of exposure to radiofrequency fields on cancer risk in the general and working population: A systematic review of human observational studies - Part I: Most researched outcomes *Environ Int.*, 191 (2024), Article 108983, 10.1016/j.envint.2024.108983.

<sup>128</sup> John W. Frank, Joel M. Moskowitz, Ronald L. Melnick, Lennart Hardell, Alasdair Philips, Paul Héroux, Elizabeth Kelley, *The Systematic Review on RF-EMF Exposure and Cancer by Karipidis et al. (2024) has Serious Flaws that Undermine the Validity of the Study's Conclusions*, *Environment International*, Vol. 195, 2025, 109200, ISSN 0160-4120, <https://doi.org/10.1016/j.envint.2024.109200>. (<https://www.sciencedirect.com/science/article/pii/S0160412024007876>)

conclusion contradicted the scientific evidence and was drawn from data showing hazards.<sup>129</sup> Researchers have called for the retraction of the study.<sup>130</sup>

2. Another WHO study in 2024 on RF-induced oxidative stress which identified 11,599 studies on oxidative stress within the 800-2450 MHz range, but remarkably discarded more than 99% of those studies.<sup>131</sup> Researchers have called for a retraction of that study, as well.<sup>132</sup>

- d. Dr. Miller, former Senior Epidemiologist and Senior Scientist at the IARC has, since 2011, stated “[t]here is sufficient evidence to now classify radiofrequency radiation as a human carcinogen,”<sup>133</sup> a Group 1 carcinogen (the highest level of evidence).<sup>134</sup> The WHO’s EMF Project Review of April 2025 review reinforces that conclusion.

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<sup>129</sup> “WHO to build neglect of RF-EMF exposure hazards on flawed EHC reviews? Case study demonstrates how ‘no hazards’ conclusion is drawn from data showing hazards,” 7/10/24, <https://www.degruyter.com/document/doi/10.1515/reveh-2024-0089/html>;

“WHO’s EMF Project’s Systemic Reviews on the Association between RF Exposure and Health Effects Encounter Challenges,” James Lin, IEEE Microwave Magazine, Jan 2025, [https://www.dropbox.com/scl/fi/xq492i5ha6f2431vyxn3g/World\\_Health\\_Organizations\\_EMF\\_Projects\\_Systemic\\_Reviews\\_on\\_the\\_Association\\_Between\\_RF\\_Exposure\\_and\\_Health\\_Effects\\_Encounter\\_Challenges\\_Health\\_Matters.pdf?rlkey=o77i19den485rdo2k4ktdzhgj&st=842p0rbv&dl=0](https://www.dropbox.com/scl/fi/xq492i5ha6f2431vyxn3g/World_Health_Organizations_EMF_Projects_Systemic_Reviews_on_the_Association_Between_RF_Exposure_and_Health_Effects_Encounter_Challenges_Health_Matters.pdf?rlkey=o77i19den485rdo2k4ktdzhgj&st=842p0rbv&dl=0).

<sup>130</sup> Lennart Hardell, Mona Nilsson. A Critical Analysis of the World Health Organization (WHO) Systematic Review 2024 on Radiofrequency Radiation Exposure and Cancer Risks. Journal of Cancer Science and Clinical Therapeutics. 9 (2025): 09-26., <https://cdn.fortunejournals.com/articles/a-critical-analysis-of-the-world-health-organization-who-systematic-review.pdf>.

<sup>131</sup> Frank, John W., Melnick, Ronald L. and Moskowitz, Joel M.. "A critical appraisal of the WHO 2024 systematic review of the effects of RF-EMF exposure on tinnitus, migraine/headache, and non-specific symptoms" Reviews on Environmental Health, 2024. <https://doi.org/10.1515/reveh-2024-0069>;  
“Another WHO RF Review Challenged, More than 99% of Studies on Oxidative Stress Discarded,” Microwave News, 8/21/24, <https://www.microwavenews.com/short-takes-archive/another-who-rf-systematic-review-challenged>.

<sup>132</sup> Ibid.

<sup>133</sup> Professor Miller, MD, FRCP, FRCP (C), FFPH, FACE, is an eminent physician and expert in preventative medicine, a scientific advisor to various scientific and health authorities, and a former Senior Epidemiologist and Senior Scientist at the World Health Organization’s (WHO) International Agency for Research on Cancer (IARC), <https://phiremedical.org/2020-nir-consensus-statement-press-release/>; see Prof. Miller’s statement at 00:15:06 at <https://www.youtube.com/watch?v=S16QI6-w9I8>; see also Proceedings from a Symposium on the Impacts of Wireless Technology on Health, Prof. Miller at 8, [https://www.womenscollegehospital.ca/wp-content/uploads/2022/06/Symposium\\_Document\\_Final\\_Jan\\_12.pdf](https://www.womenscollegehospital.ca/wp-content/uploads/2022/06/Symposium_Document_Final_Jan_12.pdf).

<sup>134</sup> Hardell, L., Carlberg, M."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 54, no. 1 (2019): 111-127. <https://doi.org/10.3892/ijo.2018.4606>

2. **The Ramazzini Institute** in Italy in 2018 found increased malignant heart schwannomas and malignant brain gliomas in lab animals from cell tower base stations, similar to what the NTP found from 2G/3G cell phones.<sup>135</sup>

**Note:** “Since the IARC evaluation in 2011, the evidence on human cancer risks from RF radiation has been strengthened based on human cancer epidemiology reports [IARC Class 2B designation for RF radiation], animal carcinogenicity studies [NTP study finding clear evidence of cancer] and experimental findings on oxidative mechanisms [associated with increased DNA damage]<sup>136</sup> and genotoxicity [associated with increased DNA damage]<sup>137</sup>. Therefore, the IARC Category should be upgraded from Group 2B to Group 1, a human carcinogen<sup>138</sup>. ”<sup>139</sup> [Some internal footnotes omitted]

3. **International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF).** “Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G.”<sup>140</sup>
  - a. The FCC wireless radiation limits for human exposure are based **largely** on 1980s experiments “**involving 40-60 minute exposures in 5 monkeys and 8 rats**, and then applying arbitrary safety factors to an apparent threshold specific absorption rate (SAR) of 4 W/kg . . . Adverse effects observed at exposures below the assumed threshold SAR include non-thermal induction of reactive oxygen species, DNA damage, cardiomyopathy, carcinogenicity, sperm damage, and neurological effects . . . ”<sup>141</sup>
4. **Panagopoulos, et al, Review on human-made EMF’s ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (2021).** “[E]xtremely low frequency (ELF) band, and the microwave/radio frequency (RF) band which is always

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<sup>135</sup> <https://pubmed.ncbi.nlm.nih.gov/29530389/>; see also J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in IEEE Microwave Magazine, vol. 24, no. 6, pp. 18-77, June 2023, doi: 10.1109/MMM.2023.3255659. keywords: {Radiation detectors;Human factors;Safety;Radiation effects;Cellular phones;Radio frequency}.

<sup>136</sup> Yakymenko I, Tsybulin O, Sidorik E, Henshel D, Kyrlyenko O, Kyrlyenko S. Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. 2016;35:186–202. doi: 10.3109/15368378.2015.1043557.

<sup>137</sup> Smith-Roe SL, Wyde ME, Stout MD, Winters JW, Hobbs CA, Shepard KG, Green AS, Kissling GE, Shockley KR, Tice RR, et al. Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure. Environ Mol Mutagen. 2020;61:276–290. doi: 10.1002/em.22343.

<sup>138</sup> Carlberg M, Hardell L. Evaluation of mobile phone and cordless phone use and glioma risk using the Bradford Hill viewpoints from 1965 on association or causation. BioMed Res Int. 2017;2017:9218486. doi: 10.1155/2017/9218486.

<sup>139</sup> Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest, LHardell, MCarlberg, Oncol Lett. 2020 Jul 15;20(4):15. doi: 10.3892/ol.2020.11876.

<sup>140</sup> EnvironHealth 21, 92 (2022). <https://doi.org/10.1186/s12940-022-00900-9>.

<sup>141</sup> Ibid.

combined with ELF, may lead to DNA damage [which is] connected with cell death, infertility and other pathologies, including cancer.”<sup>142</sup>

5. **New Hampshire Commission** studied the biological effects of wireless radiation and issued a report Nov. 2020<sup>143</sup> with former commissioner Kent Chamberlin, PhD, explaining a “key finding being that exposure to wireless communication radiation is harmful to the health of humans and the environment. Those findings apply to all forms of wireless radiation, which include all generations of cellphone radiation.”<sup>144</sup>
6. **Thousands of scientific and medical studies** show neurological disorders; increased risk of cancer<sup>145</sup> and brain tumors; DNA damage; oxidative stress; immune dysfunction; cognitive processing effects; altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and damage to the blood-brain barrier.<sup>146</sup>
7. **Eight case studies** since Jan 2023 in Sweden show adverse health impacts from exposure to 5G towers. Previously healthy individuals developed typical “microwave syndrome” symptoms shortly after the towers were installed: headaches, abnormal fatigue, heart arrhythmia, burning skin, trouble concentrating.<sup>147</sup> The significance of these reports is that non-

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<sup>142</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC8562392/> Dr. Dimitris J. Panagopoulos is an EMF-biophysicist at the Choremion Research Laboratory, Medical School, University of Athens, Greece, <https://www.researchgate.net/profile/Dimitris-Panagopoulos-3>.

<sup>143</sup>

<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>.

<sup>144</sup> Kent Chamberlin, PhD, Professor & Chair Emeritus, Fulbright Distinguished Chair, Univ of NH, Coll. Of Eng. and Physical Sciences, Dept of Electrical and Computer Engineering, 2-13-23 letter to NYC Community Board 12 in Queens.

<sup>145</sup> *Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (Review)*, Journal of Oncology, <https://www.spandidos-publications.com/10.3892/ijo.2015.2908>.

<sup>146</sup> A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation, 2022, <https://bioinitiative.org/conclusions/>; see also, Adverse health effects of 5G mobile networking technology under real-life conditions, May 1, 2020, <https://pubmed.ncbi.nlm.nih.gov/31991167/>; Wireless Radiation (RFR) – Is U.S. Government Ignoring Its Own Evidence for Risk? March, 28, 2019, <https://electromagnetichealth.org/electromagnetic-health-blog/u-s-gov-ignoring-own-evidence/>; Oxidative Mechanisms of Biological Activity of Low-Intensity Radiofrequency Radiation, *Electromagnetic Biology and Medicine*, 35(2), 186-202, Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2016), <https://pubmed.ncbi.nlm.nih.gov/26151230/>.

<sup>147</sup> <https://mdsafetech.org/2023/11/20/5g-health-effects-5-case-reports-of-health-symptoms-after-5g-cell-towers-placed-in-sweden/>; e.g., Jan 2023 study of 63 year old man and 62 year old woman where 5G antennas were installed on the rooftop of their home, [https://www.gavinpublishers.com/assets/articles\\_pdf/Case-Report-The-Microwave-Syndrome-after-Installation-of-5G-Emphasizes-the-Need-for--Protection-from-Radiofrequency-Radiation.pdf](https://www.gavinpublishers.com/assets/articles_pdf/Case-Report-The-Microwave-Syndrome-after-Installation-of-5G-Emphasizes-the-Need-for--Protection-from-Radiofrequency-Radiation.pdf) and <https://childrenshealthdefense.org/defender/5g-radiation-microwave-syndrome-symptoms/>; Feb 2023 study of two previously healthy men where 5G antennas were installed on the rooftop of their business, <https://www.anncaserep.com/open-access/development-of-the-microwave-syndrome-in-two-men-shortly-after-9589.pdf>; April 2023 study of 52 year old woman whose apartment was 60 meters from a 5G base station, <https://acmcasereport.com/pdf/ACMCR-v10-1926.pdf?fbclid=IwAR2J-mE3XeBxqaXPQdFxsI9Q23bMCer9vgUBHnCvJXBrgBv-w7YdRUDwF0>; see

ionizing radiation<sup>148</sup> from 5G — well below levels allowed by authorities — can cause health problems in individuals who had no prior history of electromagnetic sensitivity.<sup>149</sup> Dr. Lennart Hardell, lead author of the reports and world-renowned scientist on cancer risks from radiation, affirms these reports as “groundbreaking” because they serve as the “first warning of a health hazard.”<sup>150</sup>

8. **One-third of Americans suffer from symptoms from RF radiation**, based on a 2019 Bevington study which analyzed the prevalence of symptoms from RF radiation within any given population.<sup>151</sup> Based on a population of 332.4 million people in the U.S.,<sup>152</sup> 120 million have symptoms, 2% of which (7 million) have severe symptoms or can't work.
9. **The Bioinitiative Report's** review of 1800 studies found biological effects of RF radiation which can occur within minutes of exposure,<sup>153</sup> and recommends **no more than 0.1 microwatts per centimeter squared** for human exposure<sup>154</sup> (compared to the **FCC's MPEL of 580 microwatts** per centimeter squared for the general public<sup>155</sup>). Chronic or prolonged exposure to cell towers can result in biological effects; RF radiation exposures “prevent the body from healing damaged DNA, produce immune system imbalances, metabolic disruption . . . lower resistance to disease . . . pervasive impairment of metabolic and reproductive functions.”<sup>156</sup>
10. **Children absorb more RF radiation and are at greater risk than adults.**<sup>157</sup>

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also, “The microwave syndrome or electro-hypersensitivity: historical background,”

<https://pubmed.ncbi.nlm.nih.gov/26556835/>.

<sup>148</sup> <https://childrenshealthdefense.org/emr/emf-key-terms-descriptions/>.

<sup>149</sup> <https://childrenshealthdefense.org/emr/emf-wireless-health-impacts/>.

<sup>150</sup> <https://www.stralskyddsstiftelsen.se/two-studies-show-that-5g-caused-the-microwave-syndrome-in-healthy-persons/>.

<sup>151</sup> "The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments," Journal of Environment and Health Science,

<https://mdsafetech.files.wordpress.com/2019/10/2018-prevalence-of-electromagnetic-sensitivity.pdf>.

<sup>152</sup> <https://www.commerce.gov/news/blog/2022/01/us-population-estimated-332403650-jan-1-2022#:~:text=As%20our%20nation%20prepares%20to,since%20New%20Year's%20Day%202021>.

<sup>153</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf).<https://bioinitiative.org/>; see also,

BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

<sup>154</sup> *Key Scientific Evidence and Public Health Policy Recommendations* 2007, at 22-23,

[https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2007\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2007_Key_Scientific_Studies.pdf).

<sup>155</sup> <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%20the%20case%20of%20cellular,personnel%20working%20on%20the%20rooftop>.

<sup>156</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4,

[https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf).<https://bioinitiative.org/>; see also,

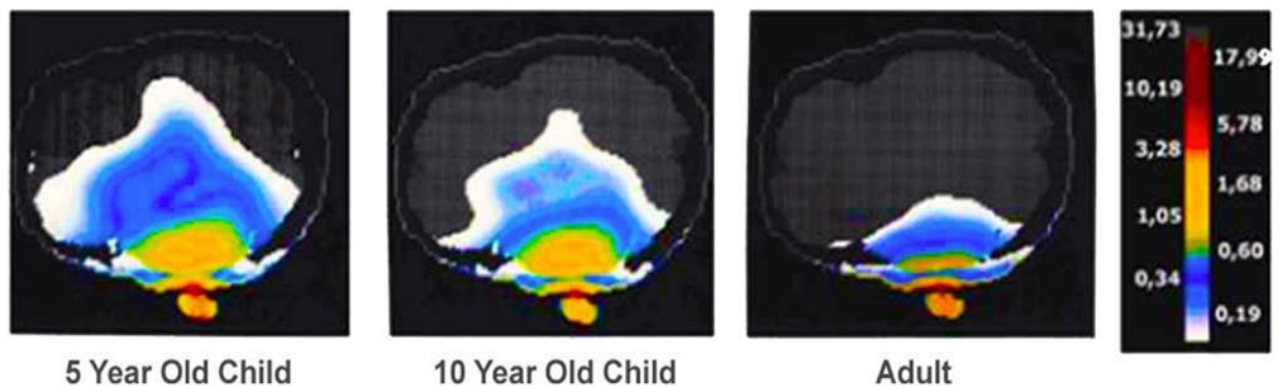
BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

<sup>157</sup> Wireless technologies, non-ionizing electromagnetic fields and children: Identifying and reducing health risks,” Devra Davis PhD, MPH, Linda Birnbaum PhD, Paul Ben-Ishai PhD, Hugh Taylor MD, Meg Sears MEng, PhD, Tom Butler PhD, MSc, Theodora Scarato MSW, bCurr Probl Pediatr Adolesc Health

a. **From cell phones:**<sup>158</sup>

[INTENTIONALLY LEFT BLANK]

## Children are more vulnerable to RF microwave radiation.



Depth of absorption of cell phone radiation in a 5-year old child, a 10-year old child, and in an adult from GSM cell phone radiation at 900 MHz. Color scale on right shows the SAR in Watts per kilogram. Source: [Exposure limits: the underestimation of absorbed cell phone radiation, especially in children](#)

- b. **American Academy of Pediatrics:** children are disproportionately affected by cell phone radiation due to their lower bone density and amount of fluid in the brain allowing for absorption of greater quantities of RF radiation than in adults.<sup>159</sup>

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Care, 2023 Feb;53(2):101374 <https://doi.org/10.1016/j.cppeds.2023.101374>; see also, *Children and Wireless Radiation*, <https://ehtrust.org/educate-yourself/children-and-wireless-faqs/>.

<sup>158</sup> Exposure limits: the underestimation of absorbed cell phone radiation, especially in children, Gandhi, Morgan, Augusto de Salles, Han, Heberman, Davis, October 14, 2011, <https://pubmed.ncbi.nlm.nih.gov/21999884/>.

<sup>159</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 21, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf). <https://bioinitiative.org/>.

- c. **Greater risk for fetuses:** risk of “degeneration of the protective myelin sheath that surrounds brain neurons.”<sup>160</sup>
- d. **School-age children:** risk of “[d]igital dementia.”<sup>161</sup>
- e. **Childhood leukemia,** increased risk.<sup>162</sup>
- f. **Potential dangers of cell towers near schools.**<sup>163</sup>
  - i. **Elementary school children** exposed to high RF radiation from mobile phone base stations 200 meters from their schools “had a significantly higher risk of type 2 diabetes mellitus” than those exposed to lower RF radiation.<sup>164</sup>
  - ii. **Adolescent school children** exposed to high RF radiation from mobile phone base stations within 200 meters from their schools had “delayed fine and gross motor skills, spatial working memory and attention” than those exposed to lower RF radiation.<sup>165</sup>
  - iii. **A ten-year old child** testified of his cardiac condition being caused by exposure to RF radiation from a router in the library where he was being tutored.<sup>166</sup>

11. **Neurobehavioral Symptoms Near Cell Towers.** The following chart shows a worsening of symptoms when closer to a cell tower but a lessening of symptoms when farther away from a cell tower.<sup>167</sup>

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<sup>160</sup> *Why children absorb more microwave radiation than adults: The consequences*, Morgan, Kesar and Davis, *Journal of Microscopy and Ultrastructure*, Vol. 2, Issue 4, December 2014, 197-204, <https://www.sciencedirect.com/science/article/pii/S2213879X14000583>.

<sup>161</sup> Ibid.

<sup>162</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, 2007, at 19, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2007\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2007_Key_Scientific_Studies.pdf).

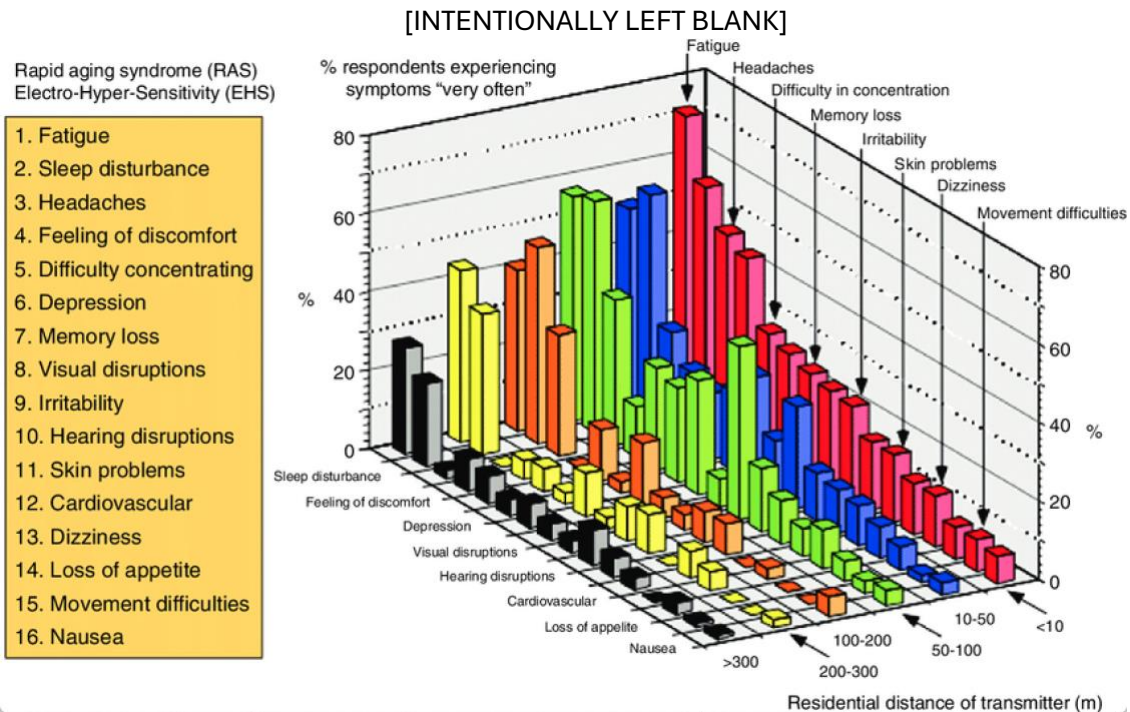
<sup>163</sup> Dr. Magda Havas: WiFi in Schools is Safe. True or False? <https://www.youtube.com/watch?v=6v75sKAUFdc>.

<sup>164</sup> *Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations (MPBS) with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus*, Sultan Ayoub Meo et al, *International Journal of Environmental Research and Public Health*, 2015; [https://www.researchgate.net/publication/283726472\\_Association\\_of\\_Exposure\\_to\\_Radio-Frequency\\_Electromagnetic\\_Field\\_Radiation\\_RF-EMFR\\_Generated\\_by\\_Mobile\\_Phone\\_Base\\_Stations\\_with\\_Glycated\\_Hemoglobin\\_HbA1c\\_and\\_Risk\\_of\\_Type\\_2\\_Diabetes\\_Mellitus](https://www.researchgate.net/publication/283726472_Association_of_Exposure_to_Radio-Frequency_Electromagnetic_Field_Radiation_RF-EMFR_Generated_by_Mobile_Phone_Base_Stations_with_Glycated_Hemoglobin_HbA1c_and_Risk_of_Type_2_Diabetes_Mellitus).

<sup>165</sup> Meo, S. A., Almahmoud, M., Alsultan, Q., Alotaibi, N., Alnajashi, I., & Hajjar, W. M. (2018). *Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health*, *American Journal of Men's Health*; <https://pubmed.ncbi.nlm.nih.gov/30526242/>.

<sup>166</sup> *Child With Heart Problems From Wireless: 5G Health Risks California SB 649 Hearing*, [https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i\\_7milpwGx4xMFq](https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i_7milpwGx4xMFq).

<sup>167</sup> *Cell Tower Health Effects*, Physicians for Safe Technology, <https://mdsafetech.org/cell-tower-health-effects/>.



Symptoms experienced by people near cellular phone base stations; RF radiation affects the blood, heart and autonomic nervous system.<sup>168</sup> Source: Santini, et al (France): *Pathol Biol.* 2002;50:S369-73; Dr. Magda Havas, PhD.

12. **RF Radiation Effects.** A group of toxicology researchers from multiple universities concluded that overall, high frequency RF radiation even below the FCC limits “can result in: carcinogenicity (brain tumors/glioma, breast cancer, acoustic neuromas, leukemia, parotid gland tumors), genotoxicity (DNA damage, DNA repair inhibition, chromatin structure), mutagenicity, teratogenicity, neurodegenerative diseases (Alzheimer’s Disease, Amyotrophic Lateral Sclerosis), neurobehavioral problems, autism, reproductive problems, pregnancy outcomes, excessive reactive oxygen species/oxidative stress, inflammation, apoptosis, blood-brain barrier disruption, pineal gland/melatonin production, sleep disturbance, headache, irritability, fatigue, concentration difficulties, depression, dizziness, tinnitus, burning and flushed skin, digestive disturbance, tremor, cardiac irregularities, adverse impacts on the neural, circulatory, immune, endocrine, and skeletal systems” and “from this perspective, **RF is a highly pervasive cause of disease.**”<sup>169</sup>

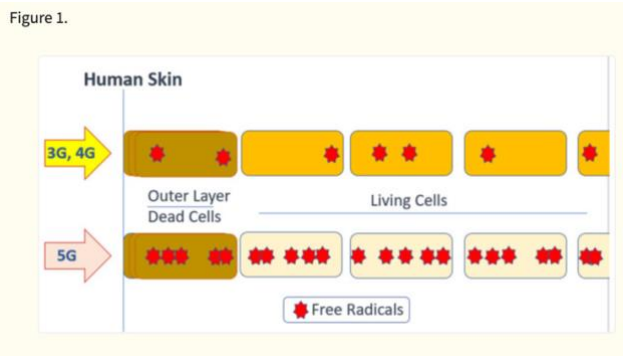
13. **5G’s Biological Effects.** Contrary to claims that 5G’s higher frequencies (millimeter waves) simply “bounce” off the skin, researchers have documented that the coiled portion of the skin’s sweat duct can be regarded as a helical antenna in the sub-THz band and the skin, our largest organ, can intensely absorb the higher 5G frequencies.<sup>170</sup> The millimeter wave

<sup>168</sup> Dr. Magda Havas, [https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of\\_fig2\\_258313941](https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of_fig2_258313941).

<sup>169</sup> Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, “Adverse health effects of 5G mobile networking technology under real-life conditions,” *Toxicology Letters*, Vol 323, 2020, pp. 35-40, ISSN 0378-4274, <https://doi.org/10.1016/j.toxlet.2020.01.020>.

<sup>170</sup> N. Betzalel, Y. Feldman and P. B. Ishai, “The Modeling of the Absorbance of Sub-THz Radiation by Human Skin,” in *IEEE Transactions on Terahertz Science and Technology*, vol. 7, no. 5, pp. 521-528, Sept. 2017, doi: 10.1109/TTHZ.2017.2736345, <https://ieeexplore.ieee.org/document/8016593>.

technology of 5G will not only directly and adversely affect the skin and eyes [e.g., skin cancer, cataracts], but will, in turn, cascade into systemic signaling effects within the body, “on the nervous system, heart and immune system.”<sup>171</sup> The free radicals accumulating on the skin from 5G (see figure below) cause oxidative stress which can lead to DNA strand breaks, cancer and atherosclerosis.<sup>172</sup>



14. **Clumping of blood cells.** A Feb 2025 study found that when an otherwise healthy person is in close proximity to a cell phone, red blood cells clumped together (rouleaux formation), which leads to blood abnormality, less oxygen transport, and potential blockages, stroke and heart problems.<sup>173</sup>
15. **“The 5G Appeal”** to the United Nations to halt the proliferation of 5G, warning of potential biological effects, was signed by experts on these effects -- 252 scientists and professionals from 43 countries, 40 scientists of which are from 15 U.S. states, including scientists and

<sup>171</sup> Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, “Adverse health effects of 5G mobile networking technology under real-life conditions,” *Toxicology Letters*, Vol 323, 2020, pp. 35-40, ISSN 0378-4274, <https://doi.org/10.1016/j.toxlet.2020.01.020>; J J B, A R M, S M J M. A New Look at Three Potential Mechanisms Proposed for the Carcinogenesis of 5G Radiation. *J Biomed Phys Eng.* 2020 Dec 1;10(6):675-678. doi: 10.31661/jbpe.v0i0.2008-1157. PMID: 33364204; PMCID: PMC7753259, <https://pmc.ncbi.nlm.nih.gov/articles/PMC7753259/#ref7>.

<sup>172</sup> J J B, A R M, S M J M. A New Look at Three Potential Mechanisms Proposed for the Carcinogenesis of 5G Radiation. *J Biomed Phys Eng.* 2020 Dec 1;10(6):675-678. doi: 10.31661/jbpe.v0i0.2008-1157. PMID: 33364204; PMCID: PMC7753259, <https://pmc.ncbi.nlm.nih.gov/articles/PMC7753259/#ref7>; Russell C L. 5 G wireless telecommunications expansion: Public health and environmental implications. *Environmental Research.* 2018;165:484–95. doi: 10.1016/j.envres.2018.01.016.

<sup>173</sup> “Hypothesis: ultrasonography can document dynamic in vivo rouleaux formation due to mobile phone exposure,” Robert R. Brown, Barbara Biebrich, *Front. Cardiovasc. Med.* , 10 February 2025 Sec. *Atherosclerosis and Vascular Medicine*, Volume 12 - 2025 | <https://doi.org/10.3389/fcvm.2025.1499499>; see also, <https://ehtrust.org/cellphones-and-your-blood-what-you-need-to-know/>.

medical professionals from Columbia and Harvard.<sup>174</sup> Other scientists have joined in consensus statements.<sup>175</sup>

16. **International Association of Fire Fighters** passed a resolution in 2004 that disapproved of cell towers on or near fire stations until safety can be proven.<sup>176</sup>
17. **Increases in brain cancer** in the U.S. have been reported, with scientists attributing a high probability on RF radiation from cell phone use.<sup>177</sup>
18. **Comprehensive overview** of the adverse biological effects on people and the environment is provided at [https://ehtrust.org/wp-content/uploads/EHT-5G-Health-and-Environment-Open-Letter-3\\_2021-3.pdf](https://ehtrust.org/wp-content/uploads/EHT-5G-Health-and-Environment-Open-Letter-3_2021-3.pdf).

### **Chronic Disease and Clusters Near Wireless Facilities:**

1. **Near Duluth, MN**, a woman suffered 51 strokes after a nearby cell tower was “upgraded,” in addition to experiencing nausea, blind spots in her vision, orientation and balance difficulties.<sup>178</sup>
2. **Clusters of sickness near cell towers (not exhaustive).**
  - a. **In Pittsfield, MA**, many residents have been constructively evicted from their houses after a 115-foot 4G cell tower was installed in their area in 2020. Seventeen residents reported “headaches, ringing in the ears, dizziness, heart palpitations, nausea, and skin rashes,” and a child who had “to sleep with a bucket next to her bed in case she needs to throw up.”<sup>179</sup> These were just some of the findings of the **Board of Health** of Pittsfield, MA which then issued an emergency cease and desist order in April 2022 to turn off the cell tower which it concluded was injuring those residents, citing thousands of scientific, peer-reviewed studies of known adverse biological effects. Most of the residents have evacuated their homes.<sup>180</sup> One of those who remained has since died of cancer. Because the telecom carrier threatened to sue, the Board of Health was compelled to rescind the order. The

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<sup>174</sup> <http://www.5gappeal.eu/the-5g-appeal/>; see also, Dr. Martin Blank, PhD, Dept of Physiology and Cellular Biophysics, Columbia University, announcing the appeal early on and warning on wireless radiation, <https://www.youtube.com/watch?v=HgECRrabuZQ>; see also, <https://childrenshealthdefense.org/defender/5g-rollout-harm-regulation-profit/>.

<sup>175</sup> <https://phiremedical.org/wp-content/uploads/2020/11/2020-Non-Ionising-Radiation-Consensus-Statement.pdf>.

<sup>176</sup> <https://www.iaff.org/cell-tower-radiation/>.

<sup>177</sup> See, e.g., [Brain Tumor Rates Are Rising in the US: The Role of Cellphone & Cordless Phone Use; The Incidence of Meningioma, a Non-Malignant Brain Tumor, is Increasing in the U.S.; New review study finds that heavier cell phone use increases tumor risk; Expert report by former U.S. govt. official: High probability RF radiation causes brain tumors; Cell phone and cordless phone use causes brain cancer: New review; and https://ehtrust.org/scientific-documentation-cell-phone-radiation-associated-brain-tumor-rates-rising/](#).

<sup>178</sup> <https://childrenshealthdefense.org/defender/marcia-haller-cell-tower-rf-radiation-sickness/>.

<sup>179</sup> <https://ehtrust.org/family-injured-by-cell-tower-radiation-in-pittsfield-massachusetts/>.

<sup>180</sup> <https://ehtrust.org/cease-and-desist-order-against-verizon-cell-tower-by-board-of-health-pittsfield-ma/>, see below the fold for link to the Order, p.12.

residents filed suit against the city but lost on federal preemption, i.e., **no legal recourse for health claims** under Section 704 of the Telecommunications Act.

- b. **In Ripon, CA** when a cell tower was placed on the property of an elementary school, 4 children (ages 6-11) got cancer (brain, liver, kidney) and 4 teachers got breast cancer.<sup>181</sup> One of the children who contracted brain cancer (glioblastoma) when he was 10 years, after about 30 surgeries to save his life, died in Aug 2024.<sup>182</sup> After the 4<sup>th</sup> student was diagnosed with cancer, the tower was removed.<sup>183</sup> Since the tower was removed, it was reported that there were no more instances of cancer at the school.<sup>184</sup>
- c. **In an Idaho town** after 5G cell towers were installed, it was reported that a cluster of residents developed atrial fibrillation (a-fib). One of those residents who had undergone surgery for a-fib brought an action in the 9<sup>th</sup> Circuit against the telecom carrier under the Americans with Disabilities Act to provide accommodation under the Act.<sup>185</sup>

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<sup>181</sup> See beginning of video at [https://www.youtube.com/watch?v=-9TMTexPb\\_0&t=128s](https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s) .

<sup>182</sup> See the lists of treatments and surgeries that this child endured before he died, <https://www.gofundme.com/f/support-the-ferrulli-family-in-memory-of-mason>.

<sup>183</sup> <https://mdsafetech.org/2019/03/25/cell-tower-to-be-removed-after-4th-ripon-student-diagnosed-with-cancer/>.

<sup>184</sup> See beginning of video at [https://www.youtube.com/watch?v=-9TMTexPb\\_0&t=128s](https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s) .

<sup>185</sup> <https://childrenshealthdefense.org/press-release/chd-files-in-series-of-lawsuits-seeking-disability-accommodation-for-people-injured-by-rf-radiation-from-cell-towers/> and <https://childrenshealthdefense.org/defender/henry-hank-allen-chd-verizon-lawsuit-radiofrequency-radiation-cell-towers/>.