

**STATEMENT OF  
COMMISSIONER JESSICA ROSENWORCEL  
FEDERAL COMMUNICATIONS COMMISSION  
BRINGING THE CONNECTED FUTURE TO ALL AMERICANS  
MAY 11, 2012 – JANUARY 3, 2017**

It has been an honor, a privilege, and a wild ride serving as Commissioner at the Federal Communications Commission. It has provided me with a front row seat at the digital revolution. Every day I have been able to see how communications technology is remaking every aspect of civic and commercial life.

This experience has convinced me—truly, madly, deeply—that *the future belongs to the connected*. No matter who you are or where you live in this country, you need access to modern communications to have a fair shot at 21st century success.

I am proud of the work I have done at the FCC to expand access to digital age opportunity. I am proud that these efforts—described in more detail below—have laid the foundation for a more safe, prosperous, and connected future for all.

*The future of public safety.* The very first sentence of the Communications Act directs the FCC to make available “to all the people of the United States . . . rapid, efficient, Nation-wide, and world-wide wire and radio communication service” in order to promote the “safety of life and property[.]” Giving modern meaning to this decades-old public safety pronouncement is a challenge. But I am proud to have been able to do so with my work addressing the future of 911.

You may only make one 911 call in your life, but it will be the most important call you ever make. In my time at the FCC I visited two dozen 911 call centers across the country—from Alaska to Arkansas, California to Colorado, Nevada to New Jersey, Vermont to Virginia and many more in between. They represent the front line of our nation’s public safety systems. Before any police radio crackles, fire engine blares, or ambulance races—you need to reach a 911 operator.

The challenge for the future of 911 is one that is common to other areas of communications. The ways we connect are changing at a blistering pace. But by and large, our nation’s emergency systems were built for an earlier era. In fact, they were developed and are still optimized for traditional landline phones.

This is a problem. But during my tenure I sought to draw attention to this issue—and develop solutions.<sup>1</sup> As a result, public safety officials and carriers are on course to provide texting to 911. They are also working together to provide dispatchable location

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<sup>1</sup> Jessica Rosenworcel, *Bring Wireless 911 Up To Date*, THE HILL (Jan. 14, 2014), <http://thehill.com/opinion/op-ed/195446-bring-wireless-911-up-to-date>; Jessica Rosenworcel and Betty Wafer, *Action Needed to Advance the Next Generation 911*, THE HILL (June 30, 2016), <http://thehill.com/blogs/congress-blog/technology/285943-action-needed-to-advance-the-next-generation-911>.

technology so that for every wireless call to 911—indoors and outdoors—first responders can find you.<sup>2</sup> This is a big and important update to 911 and I am proud that the solution I forged on this matter is a bipartisan one. I also worked with public safety officials to highlight funding challenges—from the diversion of 911 fees for purposes unrelated to emergency communications<sup>3</sup> to the need for support programs for next generation 911 under the Middle Class Tax Relief and Job Creation Act.<sup>4</sup>

*The future of education technology.* E-Rate is the nation’s largest education technology program. It provides support for Internet access in schools and libraries in every state. But when I joined the agency this program—which should be a force to usher in the dynamic learning possibilities of the digital age—was frozen in the dial-up era. Speeds were slow, bandwidth was limited, and its technology model was dated. So I visited E-Rate beneficiaries from Florida to Alaska—and what I learned was striking. At the time, roughly half of E-Rate schools were accessing the Internet at 3 Megabits or less—too slow for streaming high-definition video and not fast enough for the most innovative teaching tools. Moreover, I found that with these bandwidth limitations only 5 percent of high schools were offering computer science courses. As a policymaker—and a parent—this struck me as just wrong.

So I began a campaign for *E-Rate 2.0*<sup>5</sup> and led the charge for updating this program at the FCC.<sup>6</sup> As a result, the program has been rebooted, reinvigorated, and recharged. It now has clear capacity goals—with sights set on Gigabit speeds. It has a modernized technology model, with a new premium on Wi-Fi to facilitate one-to-one learning environments. It also has an updated budget—with an eye to the future of education. These changes are expected to provide 20 million more students with high-speed service in their classrooms and libraries. They will increase the odds that all Americans have the opportunity to gain the digital skills they need to compete, no matter who they are, where they live, or where they go to school.

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<sup>2</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at APCO Emerging Technologies Policy Conference (Dec. 4, 2013), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-324537A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-324537A1.pdf); Statement of FCC Commissioner Jessica Rosenworcel, *Wireless E911 Location Accuracy Requirements*, Fourth Report and Order, PS Docket No. 07-114 (Jan. 29, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331757A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331757A4.pdf).

<sup>3</sup> Jessica Rosenworcel and Lance Terry, *Point of View: Moving Next Generation 911 Forward*, THE OKLAHOMAN (Sept. 24, 2016), <http://newsok.com/article/5519488>.

<sup>4</sup> Rosenworcel & Wafer, *supra* note 1.

<sup>5</sup> Rep. Anna Eshoo and Jessica Rosenworcel, *Transforming Education Digitally*, POLITICO (June 3, 2013), <http://www.politico.com/story/2013/06/fcc-classrooms-digital-school-future-092153>; Julián Castro and Jessica Rosenworcel, *High Speed Internet Access a Classroom Necessity*, SAN ANTONIO EXPRESS NEWS (June 25, 2013), <http://www.mysanantonio.com/opinion/commentary/article/High-speed-Internet-access-a-classroom-necessity-4621487.php>.

<sup>6</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at SXSW Edu Conference & Festival (March 6, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-325951A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-325951A1.pdf).

As terrific as FCC progress on E-Rate was, I recognized that in a world where students rely on digital content in the classroom, they also need access to broadband when they go home.<sup>7</sup>

Today, seven in ten teachers assign homework that requires access to broadband. But FCC data suggest that as many as one in three households do not subscribe to broadband service. Where these numbers overlap is what I call the *Homework Gap*.

The Pew Research Center has demonstrated that the Homework Gap is real. According to its research as many as 5 million households with school-aged children lack Internet access. Being a student in one of these households makes it difficult to get basic schoolwork done. Applying for a scholarship is challenging. And while low-income families are adopting smartphones with Internet access at high rates, small hand-held devices are not optimal for researching, typing a paper, applying for jobs, or for furthering your education.

I am proud to have drawn attention to this problem—because I think it’s the cruelest aspect of our new digital divide.<sup>8</sup> But I am prouder still of the FCC efforts I championed to help bridge this gap and close this divide.<sup>9</sup> In particular, the FCC modernized the Lifeline program. This program has supported basic phone service in low-income households in every state for three decades. But a program focused strictly on voice telephony is retrograde. Data is the dial tone of the digital age. So the FCC updated the Lifeline program and going forward beneficiaries will be able to choose broadband service. This simple change will help bridge the digital divide—and close the Homework Gap.

More can be done to address the Homework Gap, however. Carriers across the country are pitching in by making available low-cost broadband service. Libraries in everywhere from Missouri to Maine are loaning out wireless hotspots—and letting students borrow connectivity for schoolwork. Communities are mapping out where free online access is available for student use. Rural school districts—like Coachella, California—are putting Wi-Fi on buses and turning ride time into connected time for

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<sup>7</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Texas Computer Education Association (Feb. 4, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331901A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331901A1.pdf); Jessica Rosenworcel, *How to Close the ‘Homework Gap,’* MIAMI HERALD (Dec. 5, 2014), <http://www.miamiherald.com/opinion/op-ed/article4300806.html>; Jessica Rosenworcel, *Limited Internet Access a Challenge for Detroit Kids*, DETROIT FREE PRESS (Mar. 17, 2015), <http://www.freep.com/story/opinion/contributors/2015/03/16/internet-broadband-access/24849353/>; Jessica Rosenworcel, *The Cleveland Homework Gap, When There Is No Internet at Home*, CLEVELAND.COM (Apr. 22, 2016), [http://www.cleveland.com/opinion/index.ssf/2016/04/the\\_cleveland\\_homework\\_gap\\_whe.html](http://www.cleveland.com/opinion/index.ssf/2016/04/the_cleveland_homework_gap_whe.html).

<sup>8</sup> See Cecilia Kang, *Bridging a Digital Divide That Leaves Schoolchildren Behind*, NY TIMES (Feb. 22, 2016), [http://www.nytimes.com/2016/02/23/technology/fcc-internet-access-school.html?\\_r=0](http://www.nytimes.com/2016/02/23/technology/fcc-internet-access-school.html?_r=0)

<sup>9</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Taking the Pulse of the High School Experience in America, Hispanic Heritage Foundation (Apr. 29, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-333274A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-333274A1.pdf).

homework. I am proud to have called attention to these efforts<sup>10</sup>—and believe they deserve expansion.<sup>11</sup> Moreover, providing more reliable and consistent broadband access for all students will help turn them from digital consumers into digital creators. That’s vitally important for opportunity in the current economy and the coming age of artificial intelligence and automation.

*The future of broadband.* Broadband is not just a technology, it’s a platform for opportunity. Extending its reach across this country is our new manifest destiny because it is an essential part of modern economic and cultural life. It is no longer a luxury—it is a necessity.

In order to build a bigger future for broadband, I am proud to have supported the effort to update our nation’s broadband definition from 4 Megabits to 25 Megabits. But I continue to believe that it’s time to stop dreaming small. We need to dream big and set audacious broadband goals. I am proud I was the first to call for a new broadband standard of 100 Megabits.<sup>12</sup> I think anything short of that shortchanges our children, our digital economy, and our future.

I am also proud to have been a consistent supporter of network neutrality. Our Internet economy is the envy of the world. What produced this dynamic engine of entrepreneurship and experimentation is a foundation of openness. Sustaining the openness that has made us innovative, fierce, and creative is vitally important. Moreover, I believe we have a duty to protect what has made the Internet the most dynamic platform for free speech ever invented. That is why I supported network neutrality rules to prevent online blocking, throttling, and paid prioritization.

Though these policies were not without controversy, what is uncontroverted is that in response to our work on network neutrality, 4 million Americans wrote the FCC to make known their ideas, thoughts, and deeply-held opinions about Internet openness. They lit up our phone lines, clogged our e-mail inboxes, and jammed our online comment system. That might be messy, but whatever our disagreements on network neutrality, I hope we can agree that’s democracy in action and something we can all support.

During my tenure at the FCC, the agency took steps to accelerate the nationwide movement to high-capacity, fiber optic networks—and away from traditional copper phone systems. This movement, better known as the transition to Internet Protocol, or IP transition, involves the update of essential broadband infrastructure across the country. This is a good thing. But it also poses some challenges. For decades, communications

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<sup>10</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Broadband Imperative and the Homework Gap, State Education Technology Directors Association, (Sept. 8, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-341150A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-341150A1.pdf).

<sup>11</sup> Sen. Tom Udall and Jessica Rosenworcel, ‘Homework Gap’ Hurts Poor, Rural Students, LAS-CRUCES SUN NEWS (Oct. 22, 2016), <http://www.lcsun-news.com/story/opinion/commentary/2016/10/22/homework-gap-hurts-poor-rural-students/92490198/>.

<sup>12</sup> Statement of FCC Commissioner Jessica Rosenworcel, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans*, 2015 Broadband Progress Report, GN Docket No. 14-126 (Jan. 29, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331760A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331760A4.pdf).

policies have been tied to the provision of telephony. Yet these old policies are not always a natural fit for a new broadband-centric world. If we blindly migrate them to our new networks we may impede the very investment in modern infrastructure we seek to foster. Rather than support a wholesale migration of old regulatory policies into the new world, I proposed a simple framework based on the enduring values in communications law.<sup>13</sup> Specifically, I proposed that new deployment should be judged not through the prism of old, detailed regulations but instead through the four essential values that have always informed communications policy—public safety, universal access, competition, and consumer protection. I am proud that these four guideposts have become the FCC framework for assessing network change<sup>14</sup>—and I believe they are a thoroughly modern way to support the deployment of infrastructure in the future.

While at the FCC, I saw up close the challenge of bringing broadband to our rural communities. Financing, constructing, and operating these facilities in remote areas is not easy. Tough terrain, trying weather, and limited populations make deployment harder than in more populated locales. But I also saw the creative spark that high-speed service brings to rural communities. In rural Montana and Tennessee, I saw how telemedicine not only saved lives, but kept communities intact by making it possible for elderly residents to age in place. In rural Iowa, I saw a startup center with big bandwidth incubating ideas for the farming economy in its backyard. As a result, I believe connectivity is critical today for rural America to thrive. That is why I am proud to have pressed for the reform and update of our nation’s high-cost universal service fund—to facilitate broadband deployment in our most rural communities.<sup>15</sup>

*The future of wireless policy.* Few of us go anywhere today without mobile devices in our palms, pockets, or purses. But as commonplace as wireless service may feel in our lives now, the truth is we are just getting started. Over the next few years, worldwide demand for mobile service is expected to grow by 10 times. As the Internet of Things emerges, wireless functionality will become a part of everything in our economy—and everything we do.

During my time at the FCC, I have been able to witness this change up close. I saw very clearly that the choices we make today about our airwaves are critical for the future. Spectrum is the consummate scarce resource. The way we zone our skies for its use is among the most important tasks entrusted to the FCC.

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<sup>13</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Practising Law Institute, 30th Annual Telecommunications Policy and Regulation Institute (Dec. 13, 2012), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-317923A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-317923A1.pdf) (Rosenworcel PLI Remarks).

<sup>14</sup> Statement of FCC Commissioner Jessica Rosenworcel, *Technology Transitions*, GN Docket No. 13-5 *et al.*, Order (Jan. 30, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-14-5A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-5A4.pdf).

<sup>15</sup> Statement of FCC Commissioner Jessica Rosenworcel, *Connect America Fund*, WC Docket No. 10-90 *et al.*, Report and Order, Order and Order on Reconsideration, Order, and Further Notice of Proposed Rulemaking, (Mar. 23, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-33A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-33A4.pdf).

I have had the honor of working on traditional wireless auctions<sup>16</sup> at the agency as well as the unique experience of laying the groundwork for the world’s first spectrum incentive auction.<sup>17</sup>

It also has been a privilege to develop ideas about how the FCC—working with Congress—can build a better *spectrum pipeline*. This is important because spectrum is the lifeblood of the new economy. Ensuring the supply is reliable and consistent is essential to support technological innovation and growth.

To this end, during my time at the agency, I championed the notion that we need a federal spectrum policy based on carrots, rather than sticks.<sup>18</sup> This is because federal authorities have extensive spectrum assignments. They are used for critical missions throughout the government that are dependent on wireless services—like protecting us from attack, managing our air traffic, and monitoring our water supply. But our traditional process of assessing the efficiency of these uses and reclaiming underutilized airwaves in an effort to repurpose them for auction and commercial service is slow and clunky. It’s ill-suited for the pace at which data demands are growing on existing wireless facilities. We need to replace it with a more modern system that ensures that federal authorities see gain—and not just loss—when their airwaves are reallocated for new mobile broadband use.

To do this, I proposed a variety of ideas,<sup>19</sup> including incentives that would provide federal authorities with a cut of the revenue from the commercial auction of the airwaves they clear. These funds, in turn, could be used for relocation as well as projects lost to funding cuts. I also proposed updating the Spectrum Relocation Fund to provide incentives for government authorities to share airwaves with agencies being relocated. In addition, I recommended changes to the Miscellaneous Receipts Act, a law that has the perverse effect of preventing negotiations between federal agencies and winning bidders in wireless auctions. This would allow the FCC to auction imperfect rights and permit winning bidders to negotiate directly with federal authorities remaining in the band in order to help meet their wireless needs.<sup>20</sup> This could speed repurposing of our airwaves and provide commercial carriers with incentives to help update federal systems that are past their prime. To facilitate these ideas, I encouraged the development of *spectrum currency*—a uniform system of valuation for federal spectrum assignments that could be

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<sup>16</sup> Statement of FCC Commissioner Jessica Rosenworcel on the AWS-3 Auction (Jan. 29, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331773A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331773A1.pdf).

<sup>17</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Silicon Flatirons: The Next Ten Years of Spectrum Policy (Nov. 13, 2012), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-317319A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-317319A1.pdf).

<sup>18</sup> Jessica Rosenworcel, *A Federal Wireless Policy Built on Carrots, Not Sticks*, THE HILL (June 27, 2013), <http://thehill.com/blogs/congress-blog/technology/308011-a-federal-wireless-policy-built-on-carrots-not-sticks>.

<sup>19</sup> Statement of FCC Commissioner Jessica Rosenworcel Before the United State Senate Committee on Commerce, Science & Transportation, “Wireless Broadband and the Future of Spectrum Policy” (July 29, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-334645A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-334645A1.pdf).

<sup>20</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at GSMA: The Mobile 360 Series – North America (Sept. 22, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329510A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329510A1.pdf).



overseen by the Office of Management and Budget in order to better understand incentives and the opportunity cost of continued federal use.

In addition to developing ideas for the spectrum pipeline, I am proud to have been the first to call for FCC action to develop 5G spectrum technologies.<sup>21</sup> Though the United States has led the world in deployment of the current generation of wireless technology—known as 4G—I made clear we need to do more than rest on our laurels.<sup>22</sup> I encouraged the exploration of millimeter wave band spectrum early<sup>23</sup> and enthusiastically supported FCC efforts to develop new possibilities in the 28 GHz, 37 GHz, 39 GHz, and 64-71 GHz bands. This action puts the FCC in a position to lead the world in deploying millimeter wave band spectrum—and incorporating its use into 5G services.

I also strove to provide real-world examples of the possibilities forward-thinking spectrum policy can generate. It's easy to get lost in the wonkish details of wireless policy. But I am proud to have repeatedly offered ideas and engaged in dialogue about how a more connected wireless future can help do things—like cut commute times with traffic sensors, improve public safety with video capability in the helmets of firefighters,<sup>24</sup> and monitor the health of our cities by helping improve garbage collection, prevent flash floods, and even reduce childhood asthma.<sup>25</sup>

*The future of unlicensed spectrum and Wi-Fi.* I believe the future of spectrum policy requires a focus on not just licensed spectrum—but also unlicensed spectrum. Unlicensed spectrum—like Wi-Fi—democratizes Internet access, encourages permissionless innovation in the Internet of Things, and contributes \$140 billion in economic activity annually. This is good stuff. Nonetheless, historically the legislative process has overlooked the value of unlicensed spectrum because it gets low marks in the scoring process at the Congressional Budget Office. But this dated accounting misses the mark—because the future benefits of unlicensed spectrum throughout the economy are so great. Similarly, at the FCC, unlicensed spectrum has too often been an afterthought—when it deserves to be in policy primetime.

During my time at the agency, I am proud that I tirelessly called attention to the benefits of increasing opportunities for unlicensed spectrum.<sup>26</sup> I believe good spectrum

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<sup>21</sup> Jessica Rosenworcel, *The Race to 5G Is On*, recode (Oct. 27, 2014), <http://www.recode.net/2014/10/27/11632314/the-race-to-5g-is-on>.

<sup>22</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at 4G Americas Technology Briefing (Oct. 14, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329909A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329909A1.pdf).

<sup>23</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at The Marconi Society Annual Symposium, National Academy of Sciences (Oct. 2, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329734A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329734A1.pdf) (Rosenworcel Marconi Symposium Remarks).

<sup>24</sup> Jessica Rosenworcel, Commissioner, FCC, “Five Ideas for the Road to 5G,” Remarks at Leadership Forum on 5G: The Generation of Wireless (Feb. 9, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-337655A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-337655A1.pdf).

<sup>25</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Mobile World Congress (Feb. 22, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-337855A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-337855A1.pdf). (Rosenworcel Mobile World Congress Remarks)

<sup>26</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Moving Wi-Fi Forward, The Newseum (May 6, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-326941A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-326941A1.pdf).

policy requires both licensed and unlicensed airwaves.<sup>27</sup> Moreover, as any wireless user can attest to, the airwaves used for Wi-Fi today are getting crowded—putting a premium on identifying additional spectrum for unlicensed growth. To this end, I am proud to have introduced the concept of the *Wi-Fi dividend*.<sup>28</sup> This notion is simple but powerful: in any legislative or regulatory effort to increase the licensed spectrum pipeline there should be a cut for unlicensed, or the Wi-Fi dividend.<sup>29</sup>

I pressed the FCC to put the Wi-Fi dividend into practice. I was an early advocate for expanded Wi-Fi in the lower 5 GHz band—and when the agency eventually put this in place, it doubled the airwaves available for unlicensed in this band virtually overnight.<sup>30</sup> Consistent with the Middle Class Tax Relief and Job Creation Act, I encouraged the FCC to lay the groundwork for unlicensed activity in guard bands in the re-imagined 600 MHz band. In time, I believe this will create exciting new possibilities for unlicensed activity in low-band spectrum. The FCC’s work on the 3.5 GHz band includes a Wi-Fi dividend, as part of a unique three-tiered system of access that mixes incumbent federal use with licensed and unlicensed use.<sup>31</sup> In addition, the FCC’s millimeter wave spectrum efforts include a Wi-Fi dividend, with a swath of high-band spectrum at 64-71 GHz reserved for unlicensed use—meaning new and exciting possibilities for Wi-Gig innovation.<sup>32</sup>

I continue to believe that there are additional opportunities for unlicensed spectrum that we should seize. This includes testing to see if increased Wi-Fi activity in the upper 5 GHz band can be made compatible with automobile systems that plan to use these airwaves for safety purposes.<sup>33</sup> I am proud that I have worked in a bipartisan fashion to help spur this testing—and I am hopeful they will yield new Wi-Fi potential.<sup>34</sup>

*The future of consumer protection.* Every year the FCC receives hundreds of thousands of consumer complaints and inquiries. But when I arrived at the FCC, the intake process for these queries was clunky, hard-to-decipher, and brimming with the special online charm of the turn-of-the millennium Internet.

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<sup>27</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at The Future of Unlicensed Spectrum, Computer History Museum (Sept. 11, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329359A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329359A1.pdf).

<sup>28</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at SXSW Interactive (Mar. 16, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-332532A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-332532A1.pdf).

<sup>29</sup> Jessica Rosenworcel, *We Need More Wi-Fi*, MORNING CONSULT (June 20, 2016), <https://morningconsult.com/opinions/need-wi-fi/>.

<sup>30</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Wi-Fi in the 5GHz Fast Lane, The National Press Club (Mar. 7, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-325938A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-325938A1.pdf).

<sup>31</sup> Rosenworcel Mobile World Congress Remarks, *supra* note 25.

<sup>32</sup> Statement of FCC Commissioner Jessica Rosenworcel, *Use of Spectrum Bands Above 24 GHz for Mobile Services*, GN Docket No 14-177 *et al.*, Report and Order and Further Notice of Proposed Rulemaking (July 14, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-89A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A4.pdf). (Rosenworcel July 2016 5G Statement)

<sup>33</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at The Road to Giga-Bit Wi-Fi, New America Foundation (Jan. 12, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-337249A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-337249A1.pdf).

<sup>34</sup> Michael O’Rielly and Jessica Rosenworcel, *Driving Wi-Fi Ahead: the Upper 5 GHz Band* (Feb. 23, 2015), <https://www.fcc.gov/news-events/blog/2015/02/23/driving-wi-fi-ahead-upper-5-ghz-band>.



This changed—for the better—during my time at the agency. The FCC replaced its old complaint and inquiry process with a simple interface with better answers and real assistance for consumers. But what lies ahead in the future is even better. Over time the agency will be able to take the information gleaned from this new platform and use it to inform rulemaking activity. I am proud that I saw these possibilities early and called for this change<sup>35</sup> because I believe that in a data-driven world we should always use the consumer facts we have on hand to inform and inspire FCC policy. Moreover, over time I believe the agency should combine this consumer data platform with other public information it collects in machine-readable formats. This will allow others to slice and dice our numbers and identify consumer trends that deserve attention.

With respect to more discrete issues, I am proud that I have been a critic of FCC decisions involving robocalls.<sup>36</sup> During my time at the agency they represented the single largest category of complaints—and no excuses—it is time to fix this scourge.<sup>37</sup> I am also proud to have been an advocate for rebates for cramming, which is when unwanted charges show up on your phone bill. Cramming is digital age pick pocketing and when it happens consumers deserve their money back. In addition, I am proud that I was the first to call out malicious and willful interference with Wi-Fi when hotels began to block guests from using their own connections under the guise of network security.<sup>38</sup> This was not right or fair—and I am glad that the FCC eventually put a stop to it.

*The future of innovation.* The pace of technological change is dizzying. In an instant, innovation can invert so much of what we think we know. I believe this means policymakers should challenge themselves to come up with new ways to induce smart policy and not just rely on the same old regulatory crutches. I am glad I was able to proffer some of my own during my time at the FCC.

I wrote extensively about *government sandboxing*.<sup>39</sup> Software developers often code sandboxes into their programs. This code allows others access to a portion of a program without harming the host platform. This means developers can experiment within the four corners of this virtual sandbox, without risking damage at large scale. It means that innovators no longer have to perfect new concepts in obscurity only to bet the farm on launches of large yet unproven ideas. Instead, they can set up small experiments—sandboxes—to tinker with their projects and expose them to real world conditions.

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<sup>35</sup> Rosenworcel PLI Remarks, *supra* note 13.

<sup>36</sup> Statement of FCC Commissioner Jessica Rosenworcel, Approving in Part, Dissenting in Part, *Rules and Regulations Implementing the Telephone Consumer Protection Act of 1991*, CG Docket No. 02-278, WC Docket No. 07-135, Declaratory Ruling and Order (June 18, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-15-72A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-72A4.pdf).

<sup>37</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Robocall Strike Force Meeting (Oct. 26, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-341920A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-341920A1.pdf).

<sup>38</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at State of the Net Conference (Jan. 27, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331702A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331702A1.pdf).

<sup>39</sup> Jessica Rosenworcel, *Sandbox Thinking*, DEMOCRACY JOURNAL (Fall 2014), <http://democracyjournal.org/magazine/34/sandbox-thinking/>.

Sandboxing encourages entrepreneurial thinking and iterative learning. It's a philosophy that risk-averse Washington policymakers need to adopt.<sup>40</sup> During my tenure at the FCC the agency embraced sandboxing in key proceedings—and has been learning from the results.<sup>41</sup> It tested channel sharing with two broadcasting stations in California to prove that this could be technically feasible in the future 600 MHz band. It also identified communities in Florida and Alabama where it would test policies related to the IP transition—rather than introducing them nationwide all at once. In addition, changes made to the FCC's experimental licensing process will create more dynamic sandboxes for wireless innovation. As a result, more developers can test new services in research settings—impacting everything from rocket launching technologies to patient-monitoring systems.

I also called for regulators to make greater use of contests to foster new innovation. Working with Marty Cooper, the father of the cell phone, I proposed Race to the Top, Spectrum Edition.<sup>42</sup> With the demand on our airwaves growing, we developed a creative solution—beyond the usual calls for more spectrum in the pipeline. Instead, we looked to technology itself to help manage accelerating demands on our airwaves. Specifically, we called for Washington to issue a challenge and reward the first person to make spectrum use below 5 GHz as much as 100 times more efficient. In return, they would receive their own small slice of airwaves for mobile broadband.<sup>43</sup> This idea received legislative attention—and spurred fresh interest in technology investments that improve spectrum efficiency.

In addition, I called for adding contests to broaden Smart Cities initiatives.<sup>44</sup> In short, the future of 5G technology depends on development both in our airwaves and on the ground. But I think the latter gets too little attention. So I proposed that we reward cities that put in place the next generation infrastructure necessary to make it happen, including dense networks of small cells with fiber backhaul. On top of this, I proposed the broadband and wireless equivalent of LEED certification for next generation connected buildings, building on work first developed in New York. I believe both efforts can inspire facilities deployments that will spur new wireless innovation.

I also proposed a new Honors Engineering program at the FCC to refresh our technical ranks and draw young engineers into public service.<sup>45</sup> I am hopeful that this kind of innovative program will be put in place in the future.

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<sup>40</sup> Commissioner Jessica Rosenworcel, Commissioner, FCC, Remarks at IEEE Globecom 2013 (Dec. 11, 2013), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-324651A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-324651A1.pdf) (Rosenworcel 2013 IEEE Remarks).

<sup>41</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Democracy Symposium (Sept. 30, 2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329682A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329682A1.pdf).

<sup>42</sup> Jessica Rosenworcel and Marty Cooper, *Here's How to Expand Wireless Spectrum*, THE MERCURY NEWS (Sept. 24, 2014), <http://www.mercurynews.com/2014/09/24/marty-cooper-and-jessica-rosenworcel-heres-how-to-expand-wireless-spectrum/>.

<sup>43</sup> Rosenworcel Marconi Symposium Remarks, *supra* note 23.

<sup>44</sup> Rosenworcel July 2016 5G Statement, *supra* note 32.

<sup>45</sup> Rosenworcel 2013 IEEE Remarks, *supra* note 40.

*The future of women and STEM.* It's been said before but it's true: the number of women in technology is simply too few. During my time at the FCC, both in Washington and on the road, this basic fact was apparent over and over and over again. This is a problem. Our new economy is built on communications technology. In fact, science, technology, engineering, and math are the fastest growing fields in the new economy. There are three times as many job opportunities in STEM fields than in any other field. Yet the Bureau of Labor Statistics tells us that while women hold half the jobs in the country, they hold less than a quarter of jobs in STEM fields.

I've done the math. This doesn't compute well for the future—and it needs to be fixed—as a matter of equity, as an economic imperative, and simply because it's the right thing to do. I'm proud of my work to help remedy this situation in a variety of fora—including efforts with L'Oreal For Women in Science, Women in Consumer Electronics,<sup>46</sup> and Girls Who Code. No matter where I go or what I do, it is something I will proudly continue. As the mother of a little girl—and little boy—I believe this is a future worth fighting for.

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Finally, I am grateful to my colleagues at the FCC—Chairman Tom Wheeler, Commissioner Mignon Clyburn, Commissioner Ajit Pai, Commissioner Michael O'Rielly, Chairman Julius Genachowski, and Commissioner Robert McDowell—for their friendship. I am also thankful for their commitment to public service and dedication to thoughtful policymaking. In addition, I am grateful to the staff of the agency, who are the real heroes of the FCC. Their understanding of communications law is abundant, their knowledge of network engineering and economics is without equal, and their commitment to the public interest is deep and unyielding. But above all, I am grateful to the American people who entrusted me with this extraordinary opportunity to participate in history and lay the groundwork for a more connected future.

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<sup>46</sup> Jessica Rosenworcel, Commissioner, FCC, Remarks at Women in Consumer Electronics, Rubin Museum of Art (June 23, 2015), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-334094A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-334094A1.pdf).