

spectrum sensing is not necessary. These other rule provisions include: 1) reserving two vacant UHF channels for wireless microphones and other low power auxiliary service devices in all areas of the country, and 2) allowing operators of the venues of large events and productions/shows that use large numbers of wireless microphones on an unlicensed basis to register the sites of those venues with the Commission to receive the same geographic spacing protections afforded licensed wireless microphones.

13. The Commission also adopted changes to the requirements for the databases that TV band devices must contact to contain lists of available channels. Specifically, it required that communications between TV bands devices and TV bands databases, and between multiple databases, are secure. The Commission found that it is important and necessary for TV bands devices and TV bands databases to incorporate reasonable and reliable security measures to minimize the possibility that TV bands devices will operate on occupied channels and cause interference to licensed services and to protect the operation of the databases and the devices they serve from outside manipulation. The Commission noted that virtually all online transactions involving financial or other confidential information currently use security measures to protect against unauthorized viewing and/or alteration of information being sent and to ensure that only authorized users have access to information. It therefore expects that device manufacturers and database administrators will have access to and be able to incorporate the reliability and security measures needed to protect the contents of databases and communications between databases and TV bands devices or other databases. In addition, the Commission required that all information that required by the Commission's rules to be in a TV bands device database be publicly available, including fixed TV bands device registration and voluntarily submitted protected entity (*e.g.*, cable head ends) information. Although much of the data will come from Commission databases that already are public sources, errors could result from the inadvertent entry of incorrect data, or as a result of a party deliberately entering false data. The Commission found it is appropriate to permit public examination of protected entity registration information to allow the detection and correction of errors.

14. The Commission made certain changes to the technical requirements for TV band devices. It adopted a power spectral density (PSD) limit, which is a measure of transmitter power per unit of bandwidth. In the absence of a PSD limit, multiple devices with transmit bandwidths of significantly less than the width of a TV channel (6 megahertz) could share a single channel, resulting in a total transmitted power within a channel significantly greater than the power limits for fixed or personal/portable devices. A PSD limit will prohibit high power concentrations in a single channel, which will reduce the interference potential to TV stations and other services in the TV bands. The Commission also adopted changes to the measurement procedure for TV bands device emissions that fall into a TV channel adjacent to the operating channel to ensure that consistent measurement results are obtained regardless of the bandwidth of the transmitted signal.

15. The Commission also removed the prohibition on TV bands devices operating within the border areas near Canada and Mexico. It found that TV stations in Canada and Mexico could be protected by including them in the TV bands device database rather than by a blanket exclusion on TV bands device operation within the border areas.

F. Report to Congress

16. The Commission will send a copy of the Second Memorandum Opinion and Order, including this FRFA, in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act.²⁴ A copy of the Second Memorandum Opinion and Order and FRFA (or summaries thereof) will also be published in the Federal Register.²⁵

²⁴ See 5 U.S.C. § 801(a)(1)(A).

²⁵ See 5 U.S.C. § 604(b).

**STATEMENT OF
CHAIRMAN JULIUS GENACHOWSKI**

Re: Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Second Memorandum Opinion and Order, ET Docket No. 02-380

As President Obama recently said, “our nation’s success depends on strengthening America’s role as the world’s engine of discovery and innovation.” Today, the Commission takes a big step to open a new platform for American innovation. This is important. It will enhance our economy and strengthen our global competitiveness, lead to billions of dollars in private investment and to valuable new products and services – some we can imagine, and many we can’t.

It is another implementation of an important recommendation of the National Broadband Plan, which emphasized the vital role of spectrum to our economic future and the need for spectrum efficiency, spectrum recovery, and smart spectrum policy. As the National Broadband Plan explained, both licensed and unlicensed spectrum are important for a vibrant mobile ecosystem.

Today’s focus is on unlicensed spectrum, which offers unique opportunities to innovators and entrepreneurs. Today’s Order marks the Commission’s first significant release of unlicensed spectrum in 25 years.

This new unlicensed spectrum will be a powerful platform for innovation. And as we’ve seen time and again, when we unleash American ingenuity, great things happen.

We know from experience that unlicensed spectrum can trigger unexpected but hugely beneficial innovation. For example, years ago, there was a band of low-quality spectrum that was lying fallow. Nobody could figure out what to do with this so-called “junk band,” so the FCC decided to free it up as unlicensed spectrum.

The result was a wave of new technologies – baby monitors, cordless phones, and eventually a real game changer: Wi-Fi. Today, Wi-Fi is a multi-billion industry and an essential part of the mobile ecosystem.

As compared to the airwaves we released for unlicensed use in 1985, this “white spaces” spectrum is far more robust – traveling longer distances and through walls, making the potential for this unlicensed spectrum much greater.

One analyst estimates white spaces applications could generate more than \$7 billion in economic value annually.

We know what the first major application will be: super Wi-Fi. Super Wi-Fi is what it sounds like: Wi-Fi, but with longer range, faster speeds, and more reliable connections.

We can also expect, as we’ve seen now with Wi-Fi, enhanced performance from the mobile devices using licensed spectrum that we’ve come to rely on so heavily.

The FCC has already granted experimental licenses to a handful of cities, giving us an idea of the myriad ways super Wi-Fi will be put to use.

In Claudeville, Virginia, they are providing broadband access to a remotely located elementary school. In

Wilmington, North Carolina, they are trialing “smart city” applications to manage traffic and monitor water quality at nearby wetlands. In Logan, Ohio they are using the white space to deliver Telemedicine to health care providers. Plumas County, California is utilizing “Smart Grid” technologies for its electricity network.

We’re seeing “machine-to-machine” Internet uses of this spectrum that could be its own harbinger of benefits to come.

These are just some of the applications we know about. But again what may be even more exciting are the applications that American innovators and entrepreneurs will invent.

One last point. Today’s Order is important not only for the innovation, investment and economic benefit it will unleash, but because of the competitive edge it will offer.

U.S. companies have already invested in research and development of super Wi-Fi technologies. Now they can take this technology out of the labs and onto the market.

Other countries have been looking at Super Wi-Fi. By giving the green light now, the United States will be the first nation to deploy this technology. We can have the investment here, the intellectual property developed and the products launched here, and then export our products globally – all contributing to U.S. job creation and economic growth.

**STATEMENT OF
COMMISSIONER MICHAEL J. COPPS**

Re: Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186;; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Second Memorandum Opinion and Order, ET Docket No. 02-380

It's been a long time coming, but it looks like white spaces' time has indeed come. This is a truly major step to make more spectrum available for wireless broadband. I have long advocated the full-scale development of white spaces technology to maximize the spectrum resource. In the absence of innovative technological solutions, too much spectrum—and prime spectrum below 1 GHz, at that—will lie fallow. When we last addressed white spaces on November 4, 2008, a momentous day in many ways, we left too many questions unresolved about the use of white spaces within the broadcasting spectrum. A lot has changed since then, including a focused commitment to ensuring that every American has access to affordable, value-laden, opportunity-creating broadband. Now we finally resolve the difficult questions and set ourselves on a course to unleash the tremendous potential of the white spaces.

Throughout the implementation of the National Broadband Plan, I have emphasized the countless ways that transformative broadband technology intersects with nearly all aspects of our everyday lives. The opportunities created by white space technologies are endless: whether it's increasing the reach of broadband to unserved and underserved populations, including Tribal Lands; whether it's giving local governments tools for implementing smart city, eco-friendly wireless applications; whether it's providing robust wireless coverage for school children, inside and outside the classroom. The possibilities are just about limitless.

We began our work on white spaces mindful of these opportunities, but with a focus on how to address the needling challenges of avoiding potential interference with other occupants of the TV spectrum—including broadcasters, cable headends and wireless microphone users, licensed and unlicensed. I am proud of our Office of Engineering and Technology staff for confronting the hard questions head on, and bringing us an item that provides a technologically-sound way forward. Here again, hero status goes to Julie Knapp and his team for persevering, asking all the right questions, doing the rigorous testing and analysis, and bringing us an item that is both visionary and balanced. Unlicensed spectrum is no longer just about garage door openers, and it is the type of clever, outside-the-box thinking demonstrated here that is exactly the kind of thinking that the United States needs to encourage if it is to continue to lead in technology innovation.

Recognizing the importance of licensed wireless microphones to electronic news gathering and the reality that many venues—Broadway theaters, sports arena, churches and schools—have come to rely on unlicensed wireless microphones, we have gone to great lengths to accommodate their needs. In fact, we take the bold step of setting aside two reserve channels nationwide, where wireless microphones can operate without the potential of interference from white spaces devices. In addition to the reserve channels, wireless microphones have other channels available in the TV bands that are not available for white spaces devices. For large events that need more than the channels available in a given area for wireless microphones, we will allow users to register the time, place and duration in the TV Bands Database. The Commission will ensure transparency in this process, and—in order to register—will require large users to demonstrate that all other spectrum above Channel 7 is unavailable for wireless microphone use. I believe that this approach will not only ensure adequate spectrum for both wireless microphones and white spaces devices, but also encourage wireless microphone manufacturers to make much-needed improvements to equipment efficiency and interference resistance.

One of the great lessons that I quickly learned here at the FCC is the power of technology to turn

scarcity into abundance. Now is the time for us to implement a framework that allows innovators and entrepreneurs to use technology to bring the promise of under-used white spaces spectrum from the test mode to widespread use. We are providing that golden opportunity today, and I look forward to seeing new devices widely-available in consumer markets next year.

A great example of white spaces potential was demonstrated last week when the Hocking Valley Community Hospital in Ohio—working with Google and Spectrum Bridge—became the first hospital to utilize white spaces for the purposes of telemedicine. Down in Wilmington, North Carolina, using an 18-month experimental license from the FCC, Mayor Bill Saffo has unveiled a municipal wireless white spaces network that transmits video of traffic along highways, monitors water level and quality, saves energy by remotely turning off lights at ball parks and provides public Wi-Fi in some areas. I hope and expect to see examples like these popping up all over the country.

Again, thanks to Julie Knapp and his team for their tireless work in bringing us today's Order. They have given us a workable balance that promotes wireless broadband use of the white spaces, allows venues to continue to use wireless microphones and protects the operations of broadcasters. The American people will reap real benefits from your work here. Of course, your work is not yet done. We have wisely delegated the technical issues surrounding the creation of the TV Bands Database administrators to OET. I hope this will move expeditiously and that we can get that Database management up-and-running within the next two months. Thanks to the Chairman for his leadership here and to all my colleagues who have supported this step, asked great questions and made good suggestions to improve the item. Finally, let's recognize the vast stakeholder input we have enjoyed here—although to say we always "enjoyed it" might be just a tad of a stretch. Absent the robust dialogue and input we have had from so many stakeholders, this would be a lesser item.

STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL

Re: Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Second Memorandum Opinion and Order, ET Docket No. 02-380

I am pleased to support today's order resolving the petitions for reconsideration of our historic – and unanimous – November 2008 vote to make a portion of the unused spectrum in the TV bands available for unlicensed wireless devices. This proceeding started under the leadership of Chairman Michael Powell in 2002. Foreseeing the wonderful consumer benefits and the huge opportunity for job growth associated with this spectrum, many of us, including me, for years have been strong advocates for unlicensed use of the TV “white spaces.” And, it's no secret that, for some time now, I have emphasized the importance of concluding this proceeding as soon as possible. Although our work is not entirely complete, we have taken another important step.

The potential uses for this spectrum are limitless. Moreover, the protocol developed in this proceeding for “smart use” of this spectrum has great potential for enabling access to and improving efficiency in other frequency bands. The white spaces formula – unlicensed spectrum distribution, limitless potential applications and a path for continued development of advanced smart technologies – illustrates another reason why neither open access nor net neutrality rules need be mandated. The ubiquitous availability of white spaces provides consumers a competitive alternative to existing broadband providers, an additional check against potential anti-competitive mischief, and a means to relieve spectrum congestion in licensed bands. Furthermore, as with Wi-Fi, the *unlicensed* nature of white spaces use will accelerate its deployment and adoption much faster than if this spectrum was auctioned (if that were even practical to begin with). Our action thus helps to bring more broadband to consumers as quickly as innovation, rather than the government, will allow.

Although we have eliminated the *requirement* that TV band devices that incorporate geo-location and database access must listen and adjust for other signals, I am pleased that we emphasize the importance of the continued development of this sensing capability. Because sensing holds great promise to improve spectral efficiency and provide “smart” access to other bands, I thank the entrepreneurs that are investing in the costly research and development to continue to improve this technology.

In addition, I look forward to coordinating closely with our talented colleagues in the Office of Engineering and Technology on completing our next task: getting the TV bands geo-location databases up and running. Certainly it is important that we proceed to this next step as quickly as possible, which will bring greater certainty to the entities that tell us they are standing ready to build the technologies for this spectrum band. Given that we have eliminated the sensing requirement, however, it will be just as important to proceed with great care. We all agree that we have a duty to create an effective tool, as well as to ensure that we “do no harm” to incumbent users or, ultimately, consumers.

Finally, as the use of mobile data increases, providers will need to increase their backhaul capacity, including microwave backhaul, to accommodate the expected exponential increase in traffic. Increasing the availability of microwave will serve as an additional choice for backhaul services. This, too, is an issue that I've been speaking about for some time now, most recently at last month's open meeting. Therefore, I appreciate today's express commitment to pursue the question of whether we can accommodate licensed rural backhaul in the white spaces. Specifically, Commission staff will evaluate this possibility and will formulate and submit a recommendation to the Commissioners by the end of the year. I will continue to stay engaged on this issue, and look forward to learning more.

First, I thank the commissioners and chairmen who worked on these ideas years ago. I also applaud Chairman Genachowski's leadership and the contributions of my fellow commissioners here

today. These issues are complicated, yet they were easier to grasp and resolve because the process was collegial and consensus-based. Thank you also to Julie Knapp, Alan Stillwell, and all of our colleagues in the Office of Engineering and Technology and Ruth Milkman and her team in the Wireless Telecommunications Bureau. We are grateful for your guidance, insights and creativity.

**STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN**

Re: Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Second Memorandum Opinion and Order, ET Docket No. 02-380

Today, I join the chorus of support that every Commissioner, who has voted during the history of this proceeding, has expressed for permitting the development of unlicensed services in the TV White Spaces. The National Broadband Plan, and the 14th Mobile Services Report, made it clear that licensed communications companies, find it difficult to develop a profitable business plan, to serve the communications needs of many sparsely populated rural areas. As pilot programs in Claudville, Virginia and Wilmington, North Carolina demonstrate, when unlicensed services are allowed to take advantage of the enhanced propagation characteristics of the TV spectrum, these services can successfully bring affordable wireless broadband services, to both sparsely populated rural areas and low-income communities in urban areas. I am excited to see that companies such as Dell, Google, Microsoft, Motorola, and Nokia, have expressed such optimism about developing products and services for the TV White Spaces.

I was pleased to see that we revisited the Commission's decision, from 2008, to prohibit the operation of TV White Space devices in geographic areas near the borders of Canada and Mexico. Many tribal communities are located near these borders, in rural areas, that are the most difficult for commercial wireless firms to serve. Consequently, these tribal communities are among those that stand to benefit the most from the wireless broadband services that the TV White Space device manufacturers plan to deliver. As the 2008 Order pointed out, we should be concerned about Canadian and Mexican licensed operations. But, as the Tribal Digital Village persuasively demonstrated, the straightforward solution, which is consistent with the rules we adopt today, is to include information on the Canadian and Mexican stations in the TV White Space database as protected services.

As you know, there were a number of contentious issues in this proceeding. Julie Knapp, and the talented staff in the Office of Engineering and Technology, took a thoughtful and measured approach to strike the proper balance, between the interests of the TV White Space advocates, public safety agencies, and wireless microphone users. I am confident that this agency will continue to take approaches that promote the development of TV White Space devices and services.

**STATEMENT OF
COMMISSIONER MEREDITH A. BAKER**

Re: Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, Second Memorandum Opinion and Order, ET Docket No. 02-380

I am excited about today's TV White Spaces item. I believe it represents real progress in enabling and empowering innovation and entrepreneurship in cutting edge technologies. Today's item is a solid building block for spectrum policy. It is a win for American leadership in the wireless space that has the potential to transform the way we use congested spectrum, to take the "mobile revolution" to new levels. I hope that the pioneering work that has been done to engineer TV Band devices will lead to similar approaches for other spectrum bands. There are "white spaces" in all parts of the spectrum and we need to use them more effectively.

Today, we clarify the conditions under which unlicensed devices can use TV white spaces. It is a defining step in a process that began many years ago. The ample record reflects the wide range of views in this complicated area. I take them all very seriously. The item before us reflects the staff's hard and careful analysis and strikes an appropriate balance.

There is still work ahead of us. I hope other users of the TV Bands, like wireless mics, will make every effort to ensure that the technology solutions they develop and deploy use the spectrum, which is necessarily constrained in certain parts of the country, as efficiently as possible. In this regard, in particular, I believe there is much that can and should be done.

There are three areas in this item where I hope we will take additional action in the near future to advance our spectrum policy and ensure its alignment with the needs and requirements of the millions of people across the country that use wireless technologies every day.

First, I support the approach we are taking today with respect to the development of a TV Band geolocation database. A robust, reliable and secure database is critical to the successful deployment of TV Band devices. We are giving appropriate latitude to the Office of Engineering and Technology to develop the regulations and requirements that will govern the TV Band Database. I hope Julie and his team can complete their work on a timely basis. I look forward to working on the details with them. It is important to define an approach that includes adequate safeguards to ensure that the database is as accurate, user-friendly and accessible as possible. Setting appropriate standards for database maintenance while leaving the database architecture open for customization and advanced services fosters the twin goals of empowering innovation and ensuring that novel uses of white spaces don't harmfully interfere with incumbent users.

In this regard I reiterate my view that for this and any form of dynamic spectrum access to work, our guiding principle must always be that we do not harm legitimate incumbent operations. Broadcasters' rights, in particular, must be respected and protected. We must ensure oversight and enforcement of our rules applicable to the band, including the rules governing the operation of the database.

Second, I hope that equipment developers and device manufacturers will continue their work on sensing technologies and take advantage of the flexible approach outlined in the item. I appreciate the well-articulated concern that requiring *both* sensing and database consultation could have a chilling effect on the initial deployment of white space devices. However, I am hopeful that the widespread commercial deployment of sensing technologies will play a critical role in increasing access to spectrum not only in the TV white spaces but in other spectrum that from time-to-time or in certain locations lies fallow.

Sensing technologies have shown great promise in other contexts, including Department of Defense research, and I look forward to finding ways to encourage and advance their deployment for commercial purposes.

Finally, it is important that we address additional proposals to set aside TV channels in rural areas for fixed licensed backhaul in the very near future. The ability of both new and incumbent wireless providers to provide 4G wireless services ubiquitously is dependent upon a robust wireless infrastructure that is too often lacking in rural areas. The prospect of fixed licensed backhaul in the TV bands holds great merit and I would hope that we could move forward along the lines that have been proposed as soon as we have completed our official analysis of TV spectrum availability.

I would like to add my thanks to Julie and Ruth and their teams who have been working on this item for so many years. Today we have taken a real step forward.