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Optimizing the 4 GHz Band for America's Economic and National Security

A Roadmap for American Leadership in AI, Wireless Innovation, and Spectrum Modernization

September 2026

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Executive Summary

Commercializing the 4 GHz band (4.4-4.94 GHz) will be key to U.S. efforts to lead the world in wireless and next-generation AI innovation. The band sits in prime mid-band territory, can support the wide channels required for future advanced network capabilities, and is already aligned with existing global 5G and 6G standards and device ecosystems. As AI traffic spikes and 6G moves from concept to reality in coming years, the United States will need new large, contiguous blocks of full-power commercial spectrum. The 4 GHz band is a prime opportunity for the U.S. to lead in this next generation of wireless innovation, AI infrastructure, and investment, while preserving critical government missions.

A Clear Government Priority

Encouragingly, Congress and the Administration have already recognized the strategic importance of the band. The Working Families Tax Cut Act identified the band as a future commercial band, and the President's 6G Memorandum reinforced its importance to America's long-term wireless strategy.[1] NTIA Administrator Arielle Roth has stressed that this is a 400-megahertz opportunity and has already approved study plans for the dozen government agencies potentially affected. The time is ripe to expedite the government's review with the same urgency and technical rigor demonstrated by the FCC and FAA in delivering the successful Upper C-Band framework. The U.S. wireless industry fully shares NTIA's focus on holding stakeholders' "feet to the fire to see plans approved, studies completed, and the band ultimately identified for reallocation."[2]

Existing Government Use Presents Opportunities for More Efficient Use

A preliminary review of the government's use of this band supports the Administration's approach. This large, 500+ megahertz band is used today for a range of military and government missions. Preliminary analysis suggests many incumbent systems possess characteristics—including narrow bandwidths over wide tuning ranges, highly directional operations, or geographically concentrated deployments—that lend the underlying spectrum to more intensive commercial utilization without compromising their existing missions. While some systems may need to be relocated, the military focus of much of the band—which is often concentrated at specific training facilities and installations—results in the 4 GHz band being available for other uses in many major urban and suburban areas. A preliminary study and real-time drive test measurements corroborate that there is significant spectrum available in this band.

There are Well-Established Tools to Expand Commercial Access

NTIA's upcoming review provides a once-in-a-generation opportunity to modernize this critical band's management to be more spectrally efficient, advancing our national and economic security. Transitioning the band will require targeted system-by-system engineering reviews to preserve missions, while clearing a large block for commercial use. This should not be a one-size-fits-all approach, as current systems each have their own characteristics and needs. The government will need to determine what systems can be repacked, retuned, modernized, or simply geographically coordinated around. The good news is policymakers do not have to invent a new playbook to achieve this. The AWS-3 process demonstrated that complex federal systems can be studied and optimized to co-exist with commercial operations at far lower cost than initial estimates. The wireless industry is committed to collaborating with government partners to replicate that success here.

The Next Sixty Days Are Critical to U.S. AI and Wireless Readiness in 2030

4 GHz is not a standalone initiative. It is a cornerstone of America's licensed spectrum pipeline alongside Upper C-Band, 2.7 GHz, and lower 7 GHz. The U.S. has a small window of time both domestically and globally to ensure we are positioned to lead in 6G and AI infrastructure. NTIA cleared plans to study the 4.4 GHz band in July. NTIA should move aggressively to build on its initial work kicking off the formal study of the 4 GHz band by advancing the study this fall with well-defined targets: spectrum identification by 2028 and an FCC auction by 2030. By doing so, the United States can give federal users sufficient time and resources to evaluate their operations and give our allies and equipment makers the certainty they need to start building 4 GHz into their plans. Doing so will unlock major benefits for consumers, jobs, affordable broadband competition, and U.S. leadership in wireless and AI.

Success ultimately will depend not only on domestic spectrum policy, but also on building a globally harmonized ecosystem that lowers equipment costs, accelerates innovation, and strengthens American technology leadership. That is why finalizing U.S. support for global use of the 4 GHz band at WRC next year is also time sensitive. The U.S. should publicly support global identification of the band well in advance of the November CITEL Meeting so that we can assemble a strong regional proposal before WRC-27. This will ensure we can internationally champion the development of a new U.S.-led innovation band, countering China's spectrum ambitions.

Why 4 GHz?

Ideal Mid-Band Spectrum

The 4 GHz band occupies the “sweet spot” of the radio spectrum. It provides a balance of coverage and capacity, allowing operators to deliver high-performance wireless service. These propagation characteristics make the band well-suited for advanced wireless services, home broadband, and emerging AI-enabled applications.

Large Contiguous Channels

Future networks will require significantly wider channels to support AI-driven applications, new sensing capabilities, industrial automation, and rapidly growing traffic generated by connected devices and intelligent machines. With more than 500 megahertz of spectrum under study, the 4 GHz band offers one of the few realistic opportunities to create the wide contiguous licensed channels needed for future AI-native 6G deployments.

Established Commercial Ecosystem

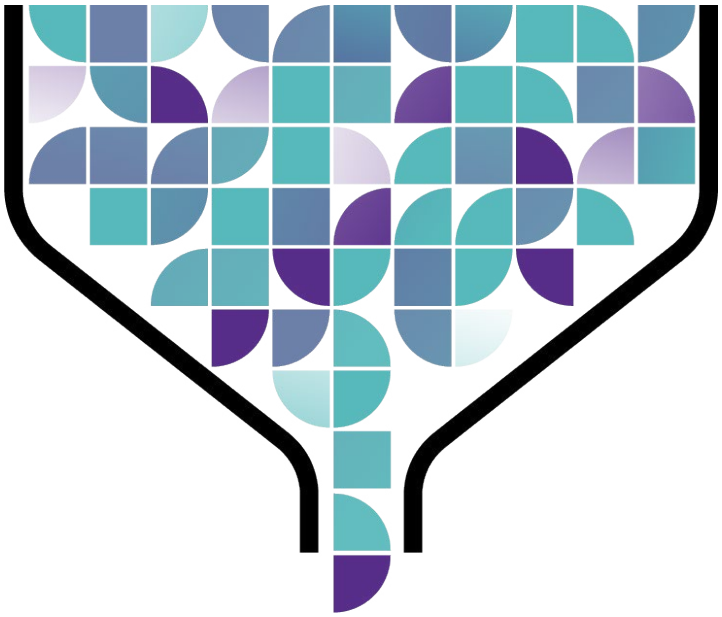
Unlike many spectrum opportunities that require years of standards development, the 4 GHz band already benefits from an established global ecosystem. The band is supported through existing 3GPP standards, commercial chipsets, and network equipment. Leveraging this ecosystem can reduce deployment costs and accelerate commercialization.

A Global Opportunity

Domestically, Congress, the White House, and NTIA have already identified the band as a priority. Internationally, WRC-27 provides an opportunity for the United States to drive global focus on the band. Early U.S. leadership can encourage even greater international harmonization, expanding equipment availability, lowering device costs, and reinforcing America’s leadership in wireless innovation.

4 GHz is Key to Unlock AI and 6G Innovation

America's wireless networks are entering a new era of rising demand driven by surging consumer and enterprise use. Wireless traffic continues to reach new record levels, and AI is set to add a new layer of growth and complexity—more devices generating data, more applications requiring real-time feedback, and more traffic moving between and among users, devices, edge compute, and cloud infrastructure.[3] The next generation of AI applications will not be limited to prompts and responses on a screen. AI agents, intelligent vehicles, drones, robots, wearables, and industrial systems will all rely on wireless networks to sense, communicate, decide, and act in the physical world with a significant spike in bi-directional wireless data traffic.



AI data traffic growing 3x faster. But without more spectrum,

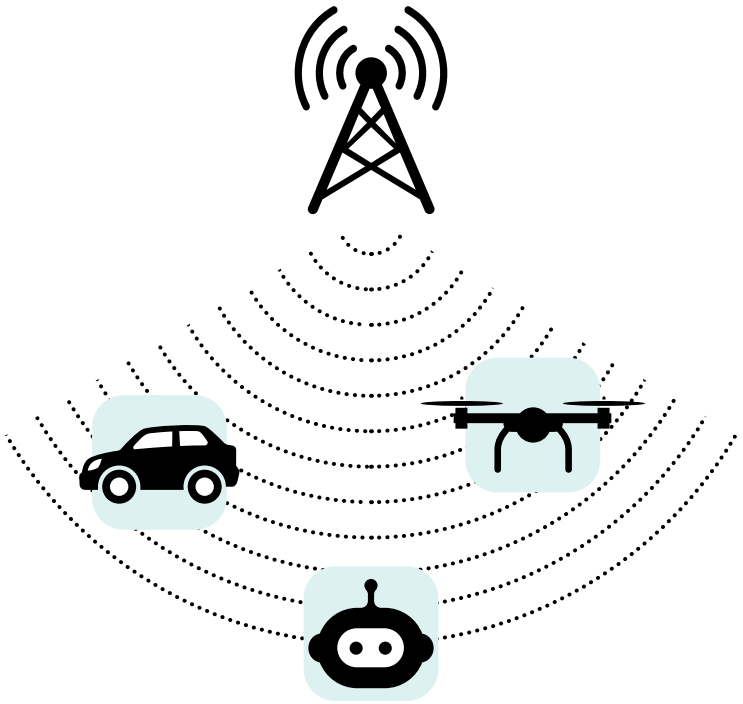
1/3

of AI traffic will go unmet by end of decade

An AI Bottleneck Risk

Without additional commercial spectrum, especially in high-capacity mid-band frequencies, these new AI workloads coupled with today's already surging wireless broadband traffic risk turning spectrum availability into a future constraint on U.S. AI leadership. Accenture projects America's wireless networks will be unable to support nearly one-third of AI demand if more spectrum is not available by the decade's end, a bottleneck that could hobble innovation and cost the U.S. economy $1.4 trillion.[4] Projections show U.S. networks will require approximately 820 megahertz of additional mid-band spectrum to meet this demand, which closely mirrors the 800 megahertz future spectrum pipeline identified in the Working Families Tax Cut Act.[5]

6G NETWORKS WILL HELP SENSE SURROUNDINGS WITH SUFFICIENT BANDWIDTH



Large Channels Key to Meeting AI Needs

AI-native wireless networks will need wide channels in large contiguous blocks to provide higher throughput, lower latency, and more efficient network operation. Advanced sensing functionalities for both national security and commercial uses will require channels roughly 200 megahertz wide or wider. This is because—beyond traditional communications—AI-native 6G networks will perceive the environment with high-resolution sensing and help coordinate time-sensitive decisions at machine speed, lessening the need for cameras, sensors, and compute power on some devices. Robots on factory floors, utility inspection drones, intelligent transportation systems, and other AI applications will require reliable, high-capacity links that can handle rich sensor data and rapid response loops. Countries around the world are scrambling to identify these large spectrum bands optimized for tomorrow's needs

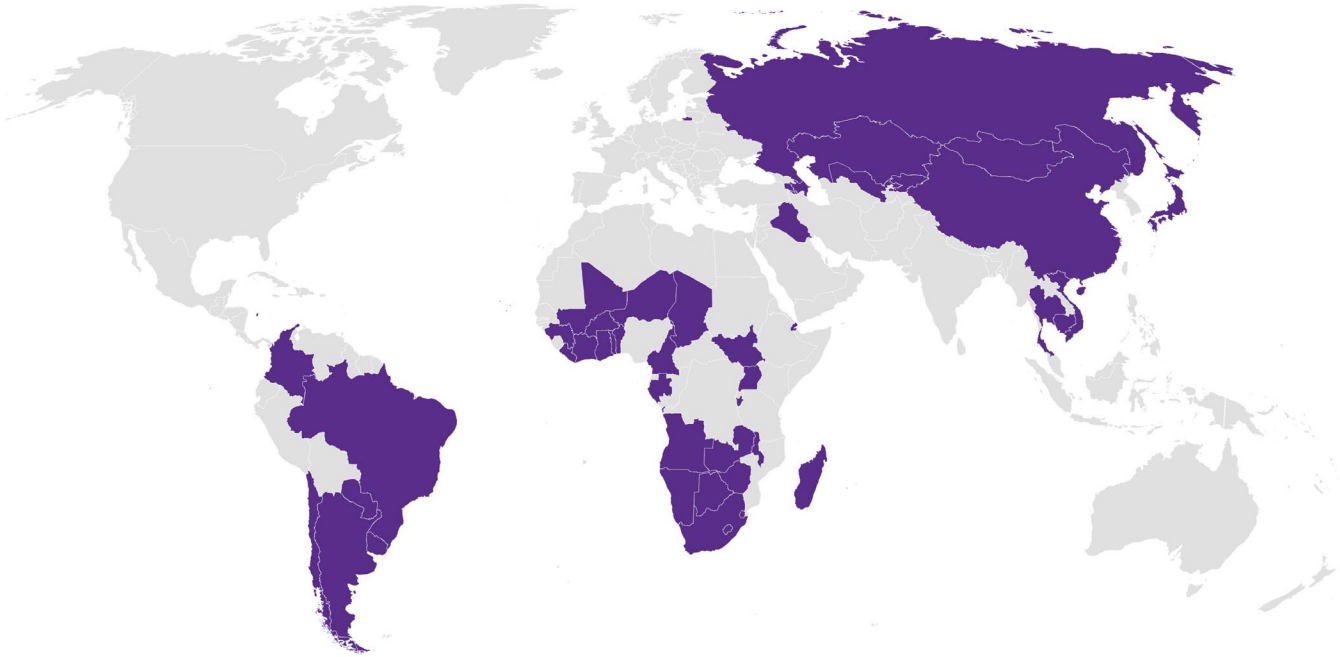
4 GHz Gives the U.S. the Opportunity to Lead Globally

The 4 GHz band is ready-made to support widespread global adoption, with wireless standards and existing device hardware already supporting the band. The U.S. has the opportunity to leverage this promising start with decisive steps to create a new robust global ecosystem led by U.S. innovation and investment.

4 GHz Has Strong International Harmonization Momentum

The 4 GHz band holds the potential for strong global adoption. Establishing U.S. commercial use of this band will set an international trend that will help lower device costs, increase network scale, and ensure U.S. global technological leadership. About 40 countries identified the upper portion of the 4 GHz band (4.8-4.99 GHz) for wireless use at WRC-19, and 14 more countries joined at WRC-23.[6] 11 operators have already deployed 4 GHz spectrum around the world, including operators in Japan and Hong Kong.[7]

OVER 50 COUNTRIES SUPPORT 4 GHZ SPECTRUM FOR 5G/6G



4 GHz is Already Supported by Wireless Standards and in Devices

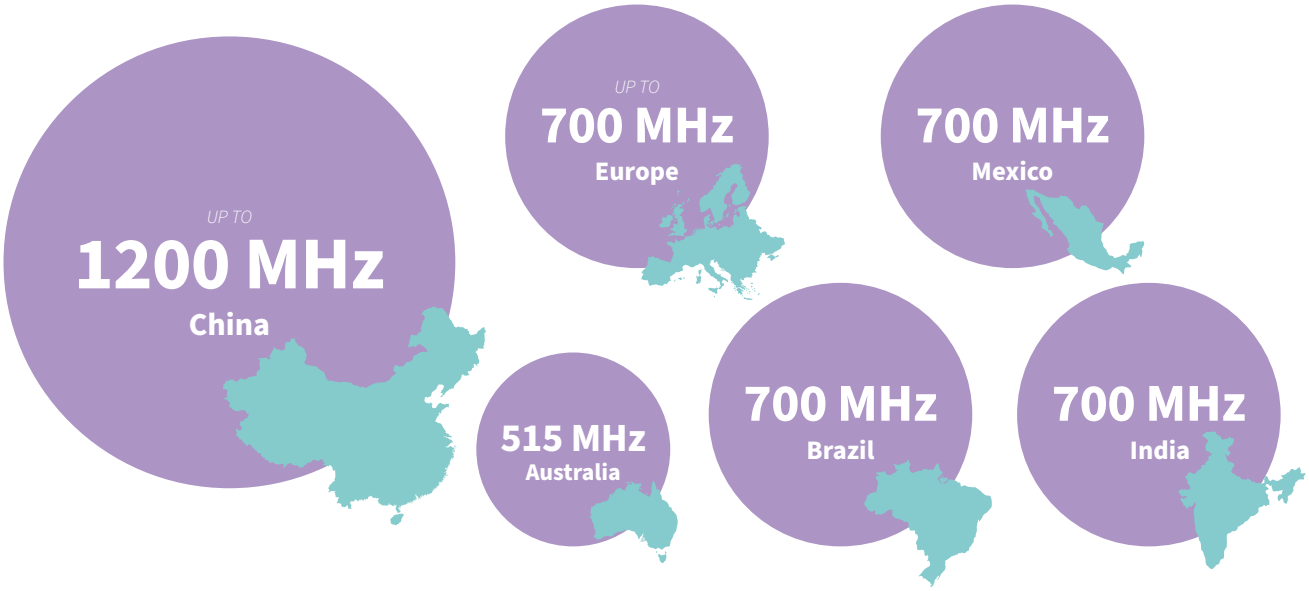
The 4 GHz band is incorporated in existing wireless standards—namely, 3GPP Band n79 (which covers 4.4-5.0 GHz). This means that foundational radio technologies, chipsets, and components are already available, providing a streamlined path to rapid commercial adoption. This alone would save several years of component development and market seeding time. About 1,500 wireless device models on the market are able to use this band today, including smartphones from Apple, Google, and Samsung.[8]

As wireless expert Peter Rysavy recently explained, the 4 GHz band is also well suited to use advanced antenna technology in existing radio access equipment, making it "considerably easier and faster to deploy in the near term."[9] These existing device and equipment ecosystems can scale quickly if the U.S. in turn moves quickly to commercialize the band and attract allies.

The U.S. Should Support 4 GHz At WRC-27 as the Alternative to China's Push for 6 GHz

China is making a strategic and aggressive push supporting licensed use in the 6 GHz band, backing the full 1200 megahertz for 6G services. This effort is a transparent attempt to isolate the United States, which has committed the entire band to unlicensed services like Wi-Fi.[10] The U.S. needs a compelling alternative to combat China's ambitions. This is why 4 GHz is of such importance to national competitiveness.[11] 4 GHz spectrum not only promises the much-needed bandwidth for advanced wireless services here at home, it also enables the U.S. government to offer a viable alternative globally to the 6 GHz band.

OTHER COUNTRIES ARE MAKING SIGNIFICANT AMOUNTS OF 6 GHZ SPECTRUM AVAILABLE



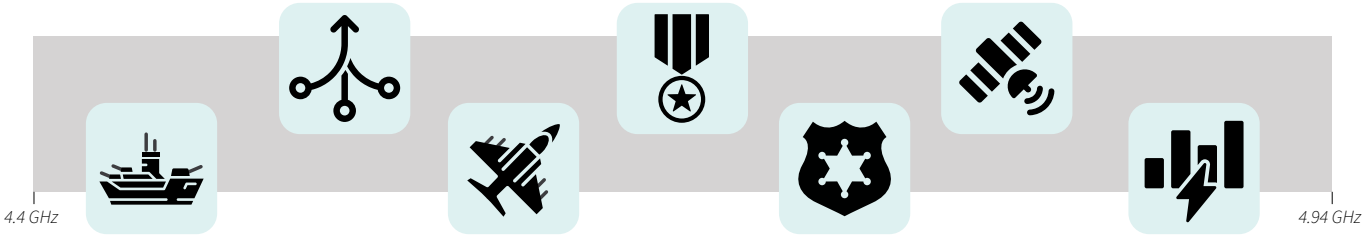
Much of the rest of the world is moving forward to auction at least the upper half of the 6 GHz band for initial 6G launches. As the European Commission's Radio Spectrum Policy Group explained, "the upper 6 GHz band will be the primary band suitable for the introduction of 6G in Europe by 2030.[12]

Conveniently, 4 GHz is already on the table at WRC-27, providing a ready-made option for the U.S. to rally like-minded countries around. Specifically, the U.S. should back WRC-27 Agenda Item 1.7, which proposes to earmark portions of the 4.4-4.8 GHz band for global 6G harmonization. Upcoming regional planning meetings will be key to building a global consensus. By supporting global commercialization of this band, the U.S. government can steer global standard setting and ITU negotiations toward prioritizing 4 GHz as a primary ecosystem for AI-native 6G deployments.

Overview of Current 4 GHz Operations

The 4.4-4.94 GHz band is currently allocated for federal government use. The bulk of the assignments are held by the Departments of War, Homeland Security, Justice, and Energy for a range of national-security, public-safety, and government communications. These operations include fixed and transportable point-to-point links, military command-and-control networks, aircraft and unmanned-system data links, ship-to-shore communications, flight testing and weapons-range telemetry, law-enforcement surveillance, and energy-system monitoring.

4 GHZ SUPPORTS MANY FEDERAL MISSIONS TODAY



Localized Operations

The vast majority of these government systems are well-known, well-understood, and limited in scope. The use of the band is generally concentrated at or around federal installations and other identifiable operating areas. In particular, military activity is centered largely at bases, test and training ranges, naval ports, coastal facilities, and weapons-development sites. Flight-test, drone-control, and telemetry operations are similarly associated with specific ranges and scheduled exercises. Ship-to-shore systems operate near naval facilities, while many fixed government microwave links connect known federal sites along defined paths.

The Integrated Battle Command System combines data from various sensors and radars across the battlefield and transmits composite intelligence to warfighters. It's use in the U.S. is for training purposes. The 4 GHz antenna is at far right.

Training Focus

Many of the systems using 4 GHz are intended for the active battlefield overseas. They are used in the U.S. primarily for training exercises at dedicated facilities. For example, the Navy and Army have domestic training sites using the Cooperative Engagement Capability and the Integrated Battle Command System, which utilize 4 GHz spectrum to combine data from various sensors and radars into a single composite view. Other systems support training exercises at weapons ranges, including telecommand of drones and weapons systems and video relay of weapons tests. These training uses are relatively contained and only occur over limited periods of time, well known in advance, facilitating coordination.

A PATH TO CO-EXISTENCE AND GREATER SPECTRUM UTILIZATION

The overall block of spectrum to be studied is over 500 megahertz, yet many of the existing government systems need only a few megahertz to operate effectively or only operate in specific times or places. This provides a good opportunity to rationalize and modernize this band to serve both current government and future commercial users.

The spectrum was long ago assigned to support military, homeland security, and other federal missions, and it has done so successfully for decades. But communications technology has evolved dramatically in the decades since. Advances in digital networking, signal processing, and spectrum management now create opportunities to accomplish the same missions with far greater spectral efficiency while strengthening, not compromising, federal capabilities.

Many Key Functions Operate With Targeted Spectrum Needs

Several key government incumbent systems in the 4.4-4.9 GHz range rely on relatively modest bandwidth. For example, 4 GHz radios used for applications like ship-to-shore Coast Guard communications and military reconnaissance drone payloads operate with channels no larger than 20 megahertz and as small as 3 megahertz wide.[13] Other key systems operate with similar channel sizes: The military's long-range AN/TRC-170 communications system uses selectable bandwidths of either 3.5 or 7.0 megahertz.[14] The Navy's Cooperative Engagement Capability (CEC) operates with channels that are 22 megahertz wide.[15] Point-to-point systems can vary in bandwidth but typically require relatively little spectrum given the high antenna gain.

These types of incumbent missions can likely be preserved through tighter channelization, repacking, or geographic coordination while still freeing large contiguous blocks for commercial wireless use.

The portable Tropospheric Scatter Microwave Radio Terminal (TRC-170) can bounce microwaves off the troposphere to provide long-range voice and data links beyond the line of sight.

Point-to-point microwave links use highly directional antennas

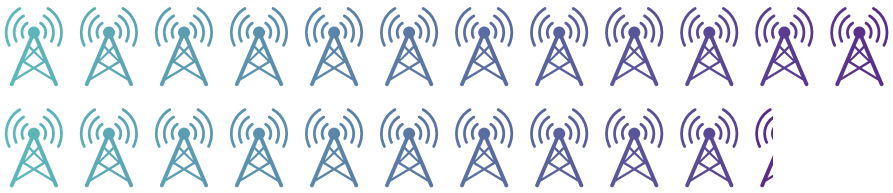
Similar Services Can Be Grouped Together More Efficiently

The most common government assignment in this band is fixed microwave links. Given the highly directional nature of point-to-point links, these systems can be more efficiently managed using less total spectrum than is dedicated to this use today. The potential for significant spectrum gains by repacking fixed links into more dedicated subbands is reinforced by past modernization efforts in other bands, as well as examination of the density of similar microwave bands. Compared to commercial systems in the upper 6 GHz band, the 4 GHz band is lightly used, with a miniscule 13 percent of the number of links (2,505 compared to 19,388), according to most recently available NTIA data.[16] 4 GHz link density is 8 times less than the 6 GHz band, highlighting one clear opportunity to consolidate federal use more efficiently.

4 GHZ LINK DENSITY

4 GHz = 4.64 LINKS PER MHZ

6 GHz = 32.31 LINKS PER MHZ

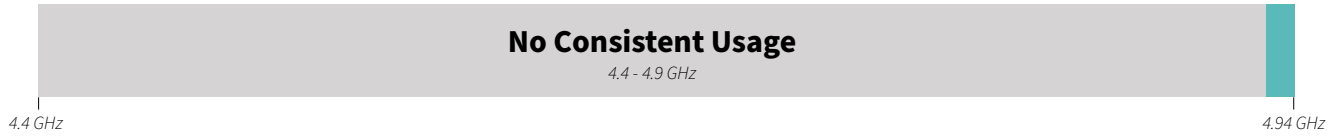


PRELIMINARY STUDIES REVEAL SPECTRUM AVAILABILITY

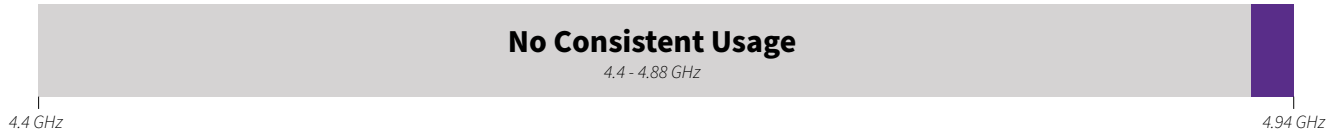
Real-world drive tests reinforce that the band is comparatively underutilized through much of the country today. Current use is highly mission-specific, geographically concentrated, and often intermittent. The tests reveal that much of the band lies fallow at most times. For example, there was virtually no current use recorded in Denver and Chicago in the bottom 480 megahertz of the 4 GHz block. This was not surprising given existing government usage is highly localized in non-urban military bases and other government facilities.

URBAN TESTS SHOW ONLY CONSISTENT USAGE ABOVE 4.88 GHZ

Chicago



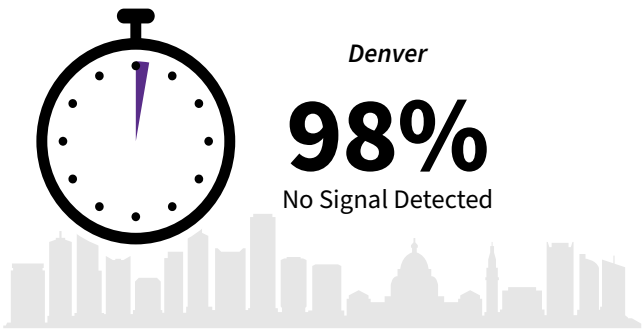
Denver



In Chicago, consistent government spectrum use was limited to only two channels over the course of a two-week study. And these signals were relatively narrow—approximately 8 and 10 megahertz wide—and isolated at the very top of the band (4.9-4.94 GHz). Emissions observed at lower frequencies were sporadic, extremely rare, and very brief. Overall, drive tests in Chicago saw no government spectral activity for more than 95 percent of time.

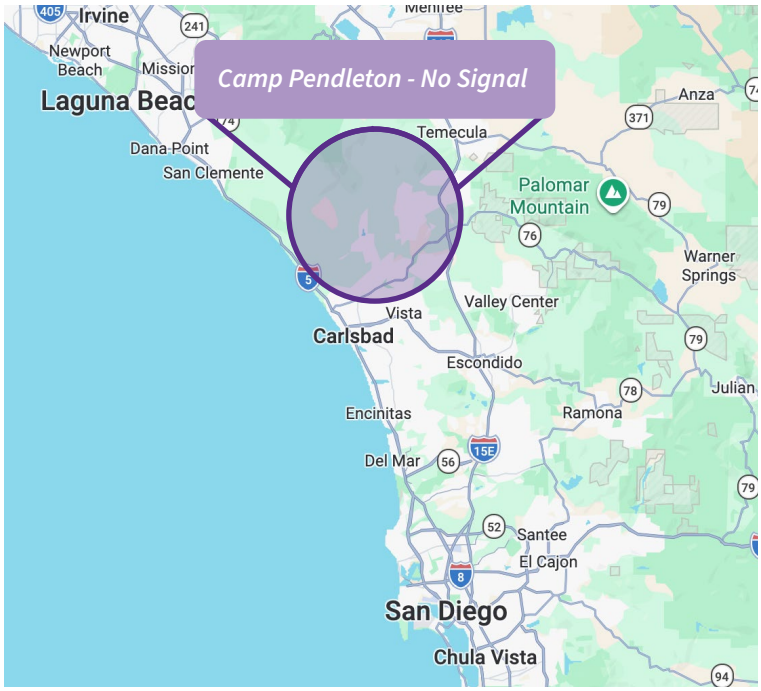
In Denver, drive tests revealed similar results. Only three signals were detected for more than a few minutes. Two of these channels were approximately 8 megahertz wide, while the other was 19 megahertz wide. Like Chicago, all were above 4.88 GHz. Overall, drive tests in Denver detected government emissions in the 4 GHz band less than 2 percent of the time.

SIGNALS WERE BRIEF, WHEN DETECTED AT ALL



San Diego/Norfolk

Even cities with considerable military presence only saw intensive use in very small geographic areas, reinforcing that geographic coordination, among other tools, could accommodate existing government use tied to specific installations. In Norfolk, Virginia, which hosts the U.S. Navy's Fleet Forces Command and the world's largest naval base at Naval Station Norfolk, persistent signals were present in the immediate area around the main naval facility, as expected. But band usage outside this base area was more limited than expected, and there were actually no emissions detected at test locations just 10 miles away from the base. The test also reveal that usage varies greatly by military installation. Unlike Norfolk, the Marine Corps base at Camp Pendleton outside San Diego saw no 4 GHz usage..



These drive test results help show why 4 GHz holds such promise and help document the potential in the band. We recognize that such tests may not capture all types of federal use today. For example, microwave links are unlikely to be captured in a drive test. That is why NTIA's review—which will be informed by the agencies' own engineering experts and will capture mission importance, reliability, and operational requirements of potentially classified systems—is so important.

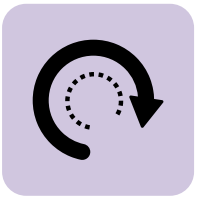
PROVEN TOOLS CAN ENSURE WIN-WIN OPPORTUNITIES

The relatively light usage of the band provides policymakers with strong options to minimize the impact on government operations while opening up a significant amount of spectrum for future commercial use.

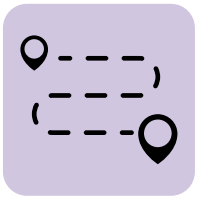
The Proven Tools to Maximize the 4 GHz Band

This process will require a system-by-system examination of the most effective and efficient tool to deliver on the promise of the 4 GHz band. Some government operations may require coordination, using established mechanisms to protect incumbents in specific geographic areas or timeframes. There may be opportunities to consolidate training facilities and other operations in more remote facilities. Other systems can be retuned to a new portion of the band with other government users. Still others may be relocated to other government spectrum bands or upgraded with more efficient technologies. The band study may benefit from a sub-band by sub-band assessment as well as a system-by-system one to best preserve federal functions and maximize the commercial opportunity.

Protect



Retune



Relocate

Upgrade

The Spectrum Relocation Fund (SRF) Can Finance Modernization of the Band

The SRF provides the mechanism to turn 4 GHz commercialization from a policy aspiration into an executable plan. The SRF was designed to help federal agencies cover the costs to accommodate newly auctioned commercial use. FCC auction proceeds fund approved transition plans and have funded outlays of over $5.7 billion to date.[17] For 4 GHz, that means agencies could receive resources to retune equipment, consolidate point-to-point links, move systems to comparable bands or facilities, and implement coordination tools needed to preserve mission capability while clearing large contiguous blocks for full-power licensed use. This framework supports a true win-win outcome: federal users get funding to modernize operations, and the country gains the wide, contiguous 4 GHz spectrum blocks needed for AI-native 6G networks without treating government missions and commercial leadership as competing priorities.

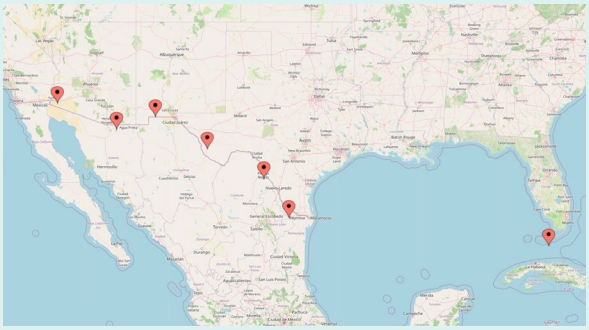
SYSTEM-AT-A-GLANCE

The Tethered Aerostat Radar System (TARS) provides an illustrative example of the options available in the upcoming review. Blimps tethered to seven ground stations can detect planes or boats over 200 miles away. This system augments existing radar systems and is focused on low-flying aircraft seeking to avoid detection from traditional radar systems. The blimp radar function is in the L-Band (below 1.4 GHz), and the 4 GHz band is used to link the blimp's radar to the U.S. Customs and Border Protection's operations centers. Specifically, TARS uses an air-to-ground datalink in the 4.5-4.8 GHz range, communicating with ground stations in relatively remote locations.

Coexistence with TARS may be possible using a number of established tools. The best approach may be straightforward geographic protection of those existing locations, particularly in remote areas. Another alternative may be to modify the TARS to add fiber cables along the balloons' mooring—as is done with smaller tactical aerostats in more populated areas today—to free up spectrum resources altogether. The systems may also have wide tuning ranges, allowing for reconfiguration through software and channelization instead of having to procure new hardware to reduce the amount of spectrum needed to support border protection efforts.

TARS uses balloons moored at about 10,000 ft as radar platforms to monitor suspicious air traffic along the southern border.

TARS LOCATIONS



TARS operates ground stations at specific locations along the border.

Next Steps: Maximizing the Opportunity

The Administration has a path to score a major victory for national and economic security by acting quickly on the 4 GHz band.

LEVERAGING THE UPPER C-BAND WIN

One of the most promising aspects of the 4 GHz band review is that adjacent spectrum user concerns have already largely been addressed, thanks to the hard work done by the FCC and the FAA over the past few years. The 4 GHz band under review sits above the altimeter band, from 4.2 to 4.4 GHz, and the co-existence investment made to unlock the upper C-Band (below 4.2 GHz) will pay similar dividends to future 4 GHz operations above the altimeter band. This simplifies the government's review and allows stakeholders to piggyback and expand on the investment being made in aviation safety.

A 60-megahertz guard band, mirroring the one established in the Upper C-band proceeding between altimeters and wireless operations below 4.2 GHz, would ensure the same protection to altimeters from new wireless operations above.[18] Other government operations compatible with altimeters can potentially be placed within that guard band, as is already done today.

> ***"The FAA is confident that aviation can safely coexist with expanded wireless access…. [C]ommercial aircraft will equip with next-generation technology several years earlier than otherwise would have been feasible."***
>
> *- Federal Aviation Administration Statement, July 2026*[19]

4 GHZ PROCESS CAN LEVERAGE ALTIMETER UPGRADES

CASE STUDY: THE AWS-3 SUCCESS STORY

The 2015 AWS-3 transition process provides an important precedent for 4 GHz because it shows that complicated federal bands with multiple systems and agencies can be systematically repacked, relocated, or coordinated to free up valuable commercial spectrum. That process was not simple: federal officials studied and optimized 94 government systems across 17 agencies, evaluating which systems could move, which could be retuned or modernized, and which would need continued protection in defined locations or circumstances. Through that disciplined process, the government was able to preserve core federal missions while clearing then-record-setting spectrum for licensed wireless use.

Just as importantly, the AWS-3 experience demonstrates that initial federal clearing estimates can substantially overstate the ultimate burden. Early projections proved far higher than actual costs by about a factor of six. Careful engineering, targeted funding, and agency-by-agency planning can produce an effective transition that preserves government missions while freeing up valuable spectrum—and likely at a lower cost than is initially estimated.

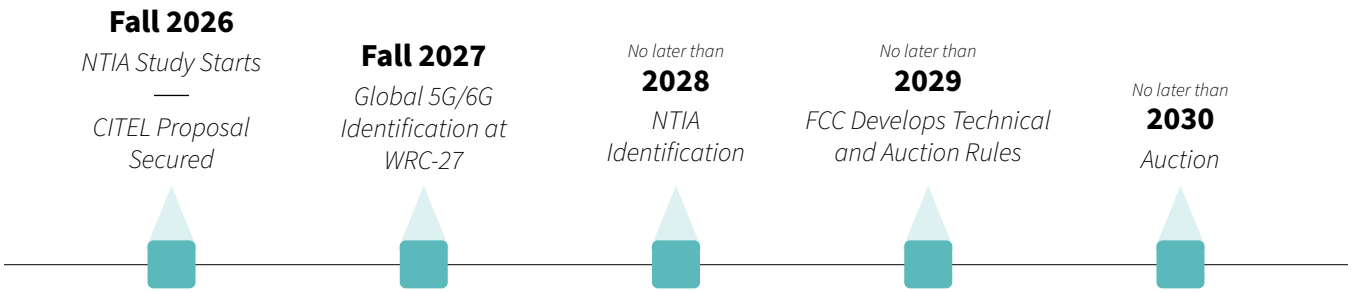
94
government systems were studied and optimized

Coordination across
17
government agencies

6x
amount by which initial estimates overstated relocation costs

THE 4 GHZ LEADERSHIP TIMELINE

Timing is of the essence because AI-native 6G standardization decisions are being made now. 3GPP's first 6G release, Release 21, is moving from study into specification work, with package approval moving in phases starting next year. If the United States wants to leverage 4 GHz to help define the global 6G ecosystem, the band must be identified early enough to influence radio requirements, band classes, device filters, power assumptions, and network deployment models. The 4 GHz band is the U.S.'s best near-term opportunity to accommodate advanced AI applications and sensor technologies. By acting quickly, the U.S. can blunt any global advantage for those nations relying on 6 GHz access for initial 6G services.



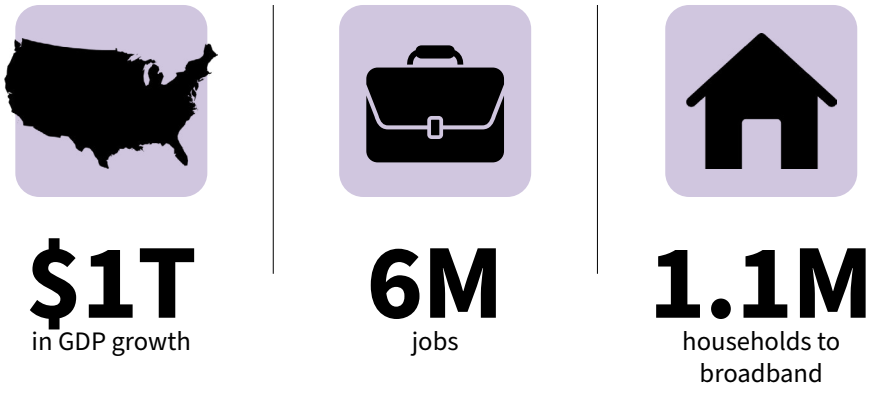
This sequencing gives federal users time to develop transition plans and SRF cost estimates, gives allies and the vendor ecosystem confidence that wide 4 GHz channels will be available in the United States, and gives operators enough runway to incorporate the band into 6G network planning.

4 GHZ WILL CREATE JOBS AND AFFORDABLE SERVICES

Making a significant portion of the 4 GHz band available for commercial use would be a major economic boon. We already see significant economic benefits from prior mid-band spectrum auctions, having extended access, increased speeds, deepened competition, and disrupted the fixed broadband market. Studies indicate if an additional 400 megahertz were repurposed for commercial use, deploying and using that spectrum would generate more than $1 trillion in GDP growth, and more than 6 million jobs.[20]

The same spectrum would also help connect more American households to affordable high-speed broadband. Additional mid-band capacity improves both mobile service and expands the availability of fixed wireless access offerings. 400 megahertz could connect roughly 1.1 million additional households to broadband, providing families broadband for the first time and others an affordable competitive broadband option.

400 Megahertz of Spectrum Will Generate Over:



Economic benefits compound across the broader economy. More commercial mid-band spectrum means more network investment, more construction and maintenance work, more equipment demand, and more capacity for industries that depend on mobile connectivity—from AI and advanced manufacturing to logistics, telehealth, video, AR/VR, and connected transportation. A 400-megahertz-wide 4 GHz band would support both sides of the U.S. innovation agenda, expanding affordable connectivity for consumers today while creating the spectrum foundation for the AI-enabled services, jobs, and productivity growth of the next decade.

4 GHZ AND THE SPECTRUM PIPELINE

America's wireless leadership will not be secured through a single spectrum auction. Congress has directed the identification of approximately 800 megahertz of additional spectrum for future commercial use, and the Administration has made rebuilding the nation's spectrum pipeline a priority. Meeting that mandate will require a sustained series of licensed spectrum opportunities that keeps pace with growing consumer demand, AI infrastructure, and the evolution toward 6G.

The 4 GHz band would be a major downpayment on that pipeline. Its combination of available bandwidth, favorable propagation characteristics, international momentum, and potential availability makes it uniquely well suited to provide the hundreds of megahertz of licensed mid-band spectrum that next-generation networks will require. Moving decisively on 4 GHz would represent one of the most consequential steps the United States can take now to establish the spectrum foundation for 6G.

But a pipeline, by definition, cannot depend on a single band. Upper C-Band, 2.7 GHz, and lower 7 GHz are critical pieces of the nation's spectrum strategy and 6G leadership plan. Together with 4 GHz, these bands can provide the scale, diversity, and sustained supply of licensed spectrum necessary to meet Congress's 800-megahertz mandate, keep pace with rapidly growing demand, and ensure that U.S. networks have the spectrum resources needed to lead in 6G.

Ultimately, these opportunities are complementary rather than interchangeable. Upper C-Band demonstrates the Administration's ability to move spectrum from study toward reallocation and auction, with an auction planned for next year. The 2.7 GHz band offers another prime opportunity to augment existing licensed mid-band spectrum, and the FCC recently announced plans to auction the band in 2028.

The lower 7 GHz band can play a particularly important complementary role in the longer-term 6G roadmap. Europe is moving toward making this spectrum a core part of its 6G future, creating an opportunity for the United States to harmonize with allies, help drive a global equipment ecosystem, and counter China's substantial head start in the 6 GHz range.

Taken together, this is a clear spectrum strategy. These bands will provide the sustained supply of licensed spectrum necessary to strengthen economic competitiveness, support AI-driven growth, expand affordable broadband competition, and preserve U.S. leadership in next-generation wireless technologies.

Endnotes

1 *See* "Working Families Tax Cut Act" (née "One Big Beautiful Bill Act") Public Law No: 119-21, H.R. 1 – 119th Congress, July 4, 2025, available at https://www.congress.gov/bill/119th-congress/house-bill/1/text (calling for repurposing 500 megahertz of federal spectrum for licensed, full-power auction and requiring study of 4.4-4.9 GHz); President Donald J. Trump, "Winning the 6G Race," Presidential Memoranda (Dec. 2025), https://www.whitehouse.gov/presidential-actions/2025/12/national-security-presidential-memorandum-nspm-8-0bda/ (calling on NTIA to "immediately begin" study of the 4.4-4.94 GHz band to determine whether portions can be "reallocated f or full-power commercial licensed use cases.")

2 Remarks of Assistant Secretary Arielle Roth at the 2026 CTIA Summit (May 2026), https://www.ntia.gov/speech/testimony/2026/remarks-assistant-secretary-arielle-roth-2026-ctia-summit.

3 For wireless traffic, *see* CTIA, "2026 Annual Survey Highlights" (Sept. 2026), https://www.ctia.org/news/2026-annual-survey-highlights; for AI discussion, see CTIA, "Wireless & AI: Driving the Future of Innovation" (May 2026), https://www.ctia.org/news/wireless-ai.

4 Accenture, "The Looming Spectrum Crisis" (March 2025), https://www.ctia.org/news/the-looming-spectrum-crisis.

5 The Brattle Group, "How Much Licensed Spectrum is Needed to Meet Future Demands for Network Capacity?" (April 2023), https://www.ctia.org/news/how-much-licensed-spectrum-is-needed-to-meet-future-demands-for-network-capacity.

6 Countries from all three ITU regions are now signed onto the footnote identifying the band for IMT use, with strongest representation in Asia and Africa. *See* ITU RR 5.441B, and discussion at Karlis Bogens, "Main WRC-23 results with respect to terrestrial services," ITU RRS Americas 2024 presentation (July 2024), https://www.itu.int/en/ITU-R/seminars/rrs/rrs-24-americas/Plenaries/1.%20Plenaries%20Monday%2022-Tuesday%2023_July/2.%20RR%20WRCs%20Monday%2022%20July/K_Bogens%20main%20WRC-23%20results%20and%20WRC-27%20terrestrial_19072024.pdf.

7 GSA, "Midband Spectrum May 2026," https://gsacom.com/paper/midband-spectrum-may-2026/.

8 1,450 devices are 5G band n79 capable as of April 2026. GSA, "Midband Spectrum May 2026," https://gsacom.com/paper/midband-spectrum-may-2026/.

9 Rysavy Research, "The Case for 4 GHz" (July 2026), https://rysavy.com/wp-content/uploads/2026/07/2026-07-31-case-for-4ghz-rysavy-research.pdf.

10 *See* 119th Congress Hearing, "Securing U.S. Leadership of Communications Technology" (March, 2026), https://www.congress.gov/event/119th-congress/house-event/119043.

11 *See* ibid., particularly comments of George John during questioning, explaining that "You see this dichotomy of countries that continue to do mobile IMT in 6 gigahertz, and then the others that are doing Wi-Fi. And I think the key difference nowadays is when we were advocating for WRC-23, we said yes, 6 gigahertz unlicensed, but we didn't have alternative spectrum to point toward. I think the narrative has changed quite a bit in this Administration. Thanks to you all, the Spectrum Auction Authority being restored and renewed focus on additional bands that could be available for IMT."

12 European Commission Radio Spectrum Policy Group, "Opinion on 6G Spectrum Roadmap" (June 2026), https://radio-spectrum-policy-group.ec.europa.eu/document/download/75f0d0e2-9c82-469c-859d-0f48eedf082c_en?filename=RSPG26-004final-DRAFT-RSPG_Opinion_6G_Spectrum_Roadmap_PC.pdf.

13 *See* Doodle Labs, "Case Studies: Teal" (visited Aug. 2026), https://doodlelabs.com/case-studies/teal-drones/; Doodle Labs, "Case Studies: Ship to Shore" (visited Aug. 2026), https://doodlelabs.com/case-studies/ship-to-shore/; Various relevant Mesh Rider datasheets, available at Doodle Labs, "Product Index" (visited Aug. 2026), https://kb.doodlelabs.com/-product-index.

14 *See* Federation of American Scientist Military Analysis Network, "AN/TRC-170(V)2 Tropospheric Scatter Microwave Radio Terminal" (visited Aug. 2026), https://man.fas.org/dod-101/sys/ac/equip/an-trc-170.htm.

15 *See* FCC, "The 4.9 GHz Band Transferred from Federal Government Use" WT Docket No. 00-32, Notice of Proposed Rulemaking (Rel. Feb. 29, 2000).

16 NTIA spectrum compendium, 4400-4500, 4500-4800, 4800-4940; Analysis for 6 GHz Relocation, Comsearch, p. 7, February 11, 2020 https://www.fcc.gov/ecfs/document/10224810516518/1.

17 NTIA, "2024 Commercial Spectrum Enhancement Act (CSEA) Report" (Dec. 2025) https://www.ntia.gov/report/2025/2024-commercial-spectrum-enhancement-act-csea-report.

18 Based on information in the recent FAA altimeter upgrade rulemaking. *See* FAA, "Requirements for Interference-Tolerant Radio Altimeter Systems," Notice of Proposed Rulemaking, 91 Fed. Reg. 459 (2026), Table 3 Proposed Minimum Requirement for RA System Interference Tolerance, https://www.federalregister.gov/documents/2026/01/07/2026-00051/requirements-for-interference-tolerant-radio-altimeter-systems. Under the FCC's base station EIRP definitions, it is likely the guard band could be smaller while meeting the FAA's altimeter protection requirements.

19 FAA Statement on 5G (July 2026), https://www.faa.gov/newsroom/faa-statement-5g.

20 *See* NERA Economic Consulting, "The Economic Impact of Each Additional 100 Megahertz of Mid-band Spectrum for Mobile," (2025) https://www.ctia.org/news/the-economic-impact-of-each-additional-100-mhz-of-mid-band-spectrum-for-mobile.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