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**Testimony**

**“FINDING THE RIGHT FREQUENCY: 5G DEPLOYMENT & AVIATION SAFETY”  
STATEMENT OF AIRLINES FOR AMERICA (A4A)  
BEFORE THE  
UNITED STATES HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE  
SUBCOMMITTEE ON AVIATION**

**FEBRUARY 3, 2022**

Airlines for America (A4A) appreciates the opportunity to testify today regarding the ongoing implementation and deployment of 5G C-band transmission and its impact on the aviation industry, supply chain and broader economy. Given the unprecedented impacts of the COVID-19 pandemic and the unpredictability caused by the ever-changing global disruption it has caused, it is notable that a non-pandemic issue would rise to be the most disruptive issue facing our industry.

While the last three months have been nothing short of a harrowing sequence of looming deadlines and impending government action, I am encouraged by the progress that has resulted from the collaborative actions taken by the stakeholders represented on the panels today. There is still much work to be done, and we are unfortunately only at the beginning of what is expected to be a long odyssey, but we are in a much better place today than where we were just a few short weeks ago.

Progress would not have been possible without the work of the White House, the National Economic Council (NEC), the Department of Transportation (DOT), the Federal Aviation Administration (FAA), Federal Communications Commission (FCC), aviation stakeholders and the telecommunications industry. In no small part, many in Congress have also lent their voice to raise concern and provide the leadership necessary to drive solutions. I would like to specifically thank Chairman DeFazio for his long-standing attention to this issue. He recognized the gravity of the situation well over two years ago, highlighting concerns to the FCC prior to the spectrum auction. Mr. Chairman, we are grateful for your actions on this matter.

From a commercial aviation perspective, we are acutely focused on finding a set of solutions that allows 5G to expand to the C-band while also protecting aviation from any operational restrictions. It is imperative the data sharing, testing and honing of safety assurance tools continues at a rapid pace. The breadth and complexity of the operating changes to the aviation environment caused by these events, along with the impacts on human factors, desperately call for a methodical, predictable and routine set of solutions to stabilize our operating framework. This should be the mutual goal for all stakeholders.

### **Background**

In 2017, the FCC signaled its intention to auction C-band spectrum that would reallocate a portion of the 3.7-4.2 GHz frequency band, making the frequency spectrum from 3.7-3.98 GHz available for flexible use, including 5G in the C-band applications.

Before the FCC's auction, the FAA determined that C-band mobile telecommunications signals could interfere with low range radio altimeter operations. The interference concerns were material because radio altimeters are the only device on every aircraft that can directly measure the distance between the aircraft and the ground. Data from those radio altimeters also feeds into several other safety-critical flight control and warning systems that are needed in all phases of flight.



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Subsequently, the FAA and DOT jointly wrote to the National Telecommunications and Information Administration (NTIA) expressing interference concerns. Despite being aware of the concerns, the FCC auctioned the spectrum to new licensees in December 2020 in a manner that did not address the core aviation interference concerns.

Per the FCC order, starting on December 5, 2021, the telecom licensees were allowed and scheduled to activate their 5G in the C-band. The telecom licensees have subsequently voluntarily modified their deployments to work with the FAA and aviation stakeholders to address interference issues around U.S. airports. Those efforts are ongoing.

### **Aviation Safety**

Safety is the top priority of U.S. airlines. Through decades of work and collaboration, air travel is the safest mode of transportation both domestically and globally. For airlines, our first commitment is to the safety of our passengers, our crewmembers and the public. Commercial aviation has achieved historical levels of safety due, in part, to technology investments made to enhance landing safely and which rely on the radio altimeter, such as Enhanced Ground Proximity Warning Systems, auto throttle, Head-Up Display, stability augmentation, tail strike warning, windshear warning, braking scale and pointer.

Consistent with our culture of safety, through a series of meetings and filings with the FAA, the broader aviation industry has long conveyed its safety concerns with the FCC's actions and the potential consequences. These concerns include radio altimeters providing erroneous information to a variety of critical onboard aircraft systems when the aircraft is in the vicinity of 5G C-band broadcasting towers, especially for flights operating in Instrument Meteorological Conditions (IMC). The aviation industry has also consistently attempted to engage the FCC to discuss aviation safety risk mitigations and allow for the safe and efficient deployment to 5G technology. A timeline of these engagements is attached below.

As a result of the FCC's decision to not address aviation safety concerns, the FAA has taken their own actions to address the aviation safety risks of 5G in the C-band. The FAA determined that "radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the [5G C-Band]." The FAA issued an Airworthiness Directive (AD) requiring revisions to airplane flight manuals (AFM) to incorporate limitations prohibiting certain radio altimeter-dependent operations when the operation is in the presence of 5G C-band interference from known or suspected 5G C-band deployments near airports, which the FAA identifies through Notices to Air Missions (NOTAMs). Accordingly, operational prohibitions are the new operating baseline at airports with nearby 5G C-band deployments under low visibility conditions, resulting in extreme operational impacts. However, pursuant to its Alternative Methods of Compliance (AMOC) process, the FAA has permitted (on a time-limited basis) certain aircraft that are equipped with radio altimeters capable of functioning without adverse interference to operate without restrictions at airports with known 5G C-band deployments.

However, we continue to be concerned with the operational uncertainty of a monthly AMOC process that requires a reevaluation of the approved airports each time the telecom companies provide new 5G C-band tower locations, which could result in the loss of access to a previously covered airport. In the near term, we believe the FAA should continue its collaboration with stakeholders to find and implement permanent, efficient and more accurate risk evaluation tools and mitigations, including fixes to 5G in the C-band deployment as well as FAA's notification and limitations process.



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### **Initial Aviation Impact Analysis**

Shortly after the FAA issued its AD, A4A surveyed our members to assess the potential impact of the FAA actions and found:

The expected costs to the flying public, shippers and airlines would be significant as the AD would materially disrupt airline operations. For example, if the AD were applied in arrears to A4A members' 2019 operations, approximately 345,000 passenger flights, 32 million passengers and 5,400 cargo flights would have been impacted in the form of delayed flights, diversions or cancellations. A4A estimates that U.S. passenger airlines would incur an incremental \$1.7 billion in operating costs annually. Separately, A4A cargo operators estimate that the directive would have cost them \$400 million annually resulting from the disruption to their time-sensitive operations.

Further, the FAA AD would exact a heavy toll on passenger and shippers in the form of lost wages and productivity as well as higher operating costs. According to the FAA, the value of air travelers' time is worth \$47.10 per hour. In 2019, the actual duration of the average flight arrival delay was 64 minutes. Based on this, A4A estimates the annual impact cost to passengers to be approximately \$1.59 billion. At the time, we stressed that these estimates were also conservative as they did not address the ripple effect of delays throughout the system that result when flights are cancelled, diverted or delayed.

Additionally, the estimates only measured the direct impacts to airlines and their customers. The analysis did not account for the impact to lost business for hospitality providers (i.e., missed meetings, hotel stays, restaurants, lost wages from indirect service providers, etc.). The ripple effect would be felt well beyond the airline sector and significantly impact the broader economy.

### **Revised Aviation Impact Analysis**

As more information was disseminated throughout January, it became clear the harm to aviation that would result from deployment of 5G in the C-band near airports would be substantially worse than originally anticipated for two key reasons.

First, most of the 50 airports that were identified by the FAA for relief would still be subject to flight restrictions. Unless major hubs are cleared for aircraft to fly, the vast majority of the traveling and shipping public would essentially be grounded. This means that on any given day, more than 1,100 flights (both passenger and cargo) and 100,000 travelers would be subjected to cancellations, diversions or delays.

Second, flight restrictions would not be limited to poor weather operations. As outlined above, because radio altimeters provide critical information to other safety, flight control, alerting and navigation systems in modern airplanes, multiple modern safety systems on aircraft would be deemed unusable causing a much larger problem than what was known in early January. Airplane manufacturers also informed operators that there are huge swaths of the operating fleet that would need to be indefinitely grounded. In addition to the chaos caused domestically, this lack of usable widebody aircraft could potentially strand tens of thousands of Americans overseas.

As of late January, the FAA has codified the manufacturer's concerns on four fleets of large aircraft, severely limiting or curtailing their operations at NOTAM-affected airports regardless of weather conditions, and more directives are expected.



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The impact of these additional variables, along with the ripple effects they would create across passenger and cargo operations, our workforce and the broader economy would simply be incalculable and untenable. Airline customers rely on airlines to transport time-sensitive perishable products such as pharmaceuticals, vaccines, organs, critical supply chain parts and many other high-value items. Every one of the passenger and cargo carriers would also be struggling to get people, shipments, planes, and crews where they need to be. We were on the precipice of the nation's commerce grinding to a halt. Thankfully, the ongoing coordination and progress has allowed us to avoid these massive economic and operational disruptions for the most part.

#### **Clearing the 'Air' & 'Airwaves'**

Some in the media and other observers have tried to portray this situation as a conflict between the airline industry and the telecommunications industry. That is simply not the case. In fact, airlines fully support 5G – but it needs to be deployed in a manner that allows 5G and aviation to coexist safely. We are grateful to our telecommunications colleagues and are hopeful they continue to play a critical role in sharing information with the FAA and FCC to help mitigate any interference issues. We cannot avoid significant disruption to the aviation system without their continued collaboration and transparency.

The truth of the matter is that both of our industries have been thrust into this avoidable economic calamity by a government process that failed to provide an adequate amount of interagency communication, understanding and recognition of decisional consequences. The circumstances and challenges we face currently could and should have been directly addressed prior to the spectrum auction.

#### **International Examples: It's Not What You Do, It's How You Do It**

Much has been said and inferred regarding 5G deployment internationally. The FAA has noted that international examples versus U.S. 5G deployment are apples-to-oranges comparisons. As opposed to the process cited above, other countries reportedly heeded aviation concerns and addressed them through various mitigations prior to 5G C-band technology deployment.

On its dedicated 5G website, the FAA cites France as an example for comparison to the U.S. The FAA chart (attached) indicates the resulting deployment of 5G C-band in the U.S. is significantly distinguishable from deployment of 5G C-band in France because the FCC licensed the use of the spectrum at exponentially higher power levels. The allocated frequencies are also generally farther away from the radio frequency band used by radio altimeters. We understand that many other countries have also effectively utilized a combination of exclusion zones around airports, lower power levels and directional changes to antennas to mitigate interference.

There is no reason to believe these types of mitigations could not have been contemplated and implemented at the on-set of the regulatory process through proper inter-governmental communication channels.

#### **Lessons Learned**

The Committee and Congress should be aware that it will likely take years, not days or weeks, to fully and permanently mitigate the interference issues caused by deployment of 5G in the C-band. The interference issues have created a complex web of aircraft-by-aircraft, runway-by-runway, radio altimeter-by-radio altimeter determinations on a flight-by-flight basis. They have created a complicated matrix of variables and uncertainty in the operational deployment of aircraft assets and as we have seen, will still cause



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cancellations, delays and diversions even under the best of scenarios. In some cases, we are simply hoping for good weather so flights can be cleared to land at their intended destinations.

The U.S. aviation industry should not be in this position and the process that led to this operational nightmare should be held up as cautionary tale of government communication and coordination gone awry. It is not a partisan problem; it is a government process problem that desperately needs to be addressed. One can assume there will be a 6G, 7G and many other spectrum utilization issues in the future; those efforts should be seamlessly integrated into the broader economy without causing seismic disruptions to critical industry segments. Unfortunately, there are no easy answers for the current dynamic, but there a framework can be put in place to make sure this never happens again to our industry, or any other for that matter.

### **Conclusion**

We appreciate all the actions taken by various stakeholders to avert catastrophic disruption to the traveling and shipping public, the global supply chain and the U.S. economy. The day-to-day unpredictability remains a significant challenge for airlines, but the work over the course of the last few weeks is an important step toward achieving a permanent solution that will allow the U.S. to continue leading the world in aviation safety while also expanding our nation's 5G network.

# **MYTH:** Aviation Raised 5G Concerns at the Last Minute

## **FACT:** Aviation Started Raising Concerns as Far Back as May 2018

### TIMELINE

## 2018

**March 2018** – The Mobile Now Act is enacted, authorizing the Federal Communications Commission (FCC) through notice and comment on the feasibility of allowing commercial wireless services, licensed or unlicensed, to use or share use of the frequencies between 3700 megahertz and 4200 megahertz.

**April 2018** – **FCC** issues public notice encouraging the public to comment on potential for more intensive use of the 3.7-4.2 GHz Band to submit those filings in this docket.

**May 2018** – **A4A** files comments in response to FCC public notice raising radio altimeter and satellite communication (SATCOM) interference concerns.

**July 2018** – **FCC** issues Order and Notice of Proposed Rulemaking on Expanding Flexible Use of the 3.7 to 4.2 GHz spectrum band.

**October 2018** – **AVIATION SPECTRUM RESOURCES, INC. (ASRI)** files comments to FCC reiterating aviation industry concerns on the potential impact to radio altimeter and SATCOM.

## 2019

**October 2019** – **AEROSPACE VEHICLE SYSTEMS INSTITUTE (AVSI)** files “Behavior of Radio Altimeters Subject to Out-Of-Band Interference” report in FCC rulemaking docket, raising the potential for interference issues affecting the 4.2-4.4 GHz band start for commercial aircraft.

**November 22, 2019** – **HOUSE TRANSPORTATION AND INFRASTRUCTURE (T&I) COMMITTEE** Chair DeFazio sends letter to FCC warning of potential interference to radio altimeters from 5G deployment in the C-Band.

## 2020

**February 21, 2020** – **AVIATION INDUSTRY COALITION** sends ex parte letter and presentation to FCC raising safety concerns.

**February 28, 2020** – **FCC** issues Order to move forward with auctioning “C-band” spectrum.

**May 2020** – **AVIATION INDUSTRY COALITION** files petitions for reconsideration of the FCC Order.

**October 7, 2020** – **RADIO TECHNICAL COMMISSION FOR AERONAUTICS (RTCA)** completes a six-month assessment of interference from 5G network emissions with radio altimeter performance, revealing a “major risk that 5G telecommunications systems in the 3.7-3.9 GHz band will cause harmful interference to [radio] altimeters on all types of civil aircraft.”

**December 2020** – **AVIATION INDUSTRY COALITION** submits letter of support for petition for reconsideration.

**December 1, 2020 – DEPARTMENT OF TRANSPORTATION (DOT) AND FEDERAL AVIATION ADMINISTRATION (FAA)** submit joint letter voicing interference concerns to the National Telecommunications and Information Administration (NTIA) and request NTIA to submit their letter to the FCC public docket. NTIA did not submit the letter to the FCC docket.

**December 7, 2020 – HOUSE T&I COMMITTEE** Chair DeFazio sends letter to FCC asking the agency to delay its C-Band auction.

**December 8, 2020 – FCC** begins auction of the 3.7-3.98 GHz frequency band.

## 2021

**February 2021 – FCC** completes \$81 billion auction of the 3.7-3.98 GHz frequency band and subsequently issues licenses to AT&T and Verizon to begin deployment on December 5, 2021.

**May 2021 – AVIATION INDUSTRY COALITION** sends letter to FCC supporting aviation petition for reconsideration and responding to Cellular Telecommunications Industry Association (CTIA) FCC filing.

**July 2021 – AVIATION INDUSTRY COALITION** sends letter to DOT raising imminent safety risk facing aviation industry.

**August 2021 – AVIATION INDUSTRY COALITION** sends presentation to FCC raising safety concerns and asking for a taskforce to resolve concerns.

**November 2, 2021 – FAA** issues Special Airworthiness Information Bulletin alerting manufacturers, operators and pilots that action might be required to address potential interference with aircraft radio altimeter caused by the rollout of 5G wireless broadband on December 5, 2021.

**November 3, 2021 – FAA AND FCC** announce that AT&T and Verizon have agreed to delay the 5G C-band deployment from December 5, 2021 to January 5, 2022.

**November 5, 2021 – AVIATION INDUSTRY COALITION** sends letter to National Economic Council (NEC) urging it to “work with the FCC and FAA to convene a joint industry working group and continue to delay the deployment of 5G technologies in this band until the safety and efficiency of the [National Air Space] is ensured.”

**November 19, 2021 – HOUSE T&I COMMITTEE** Chair DeFazio and Aviation Subcommittee Chair Larsen send letter to FCC urging the agency not to go through with any 5G C-band deployments until the FAA conducts a risk assessment that proves no further “mitigations are necessary or that all necessary mitigations are in place,” and requesting FCC to provide FAA with any technical data related to aviation and 5G broadband service.

**November 24, 2021 – AT&T AND VERIZON** issue a proposal committing to adopt “additional precautionary measures” for 6 months to mitigate the potential impact of 5G on radio altimeters.

**December 3, 2021 – AIA AND OTHER AVIATION STAKEHOLDERS** circulate a counterproposal to the telecom industry’s November 24 mitigation proposal.

**December 7, 2021 – FAA** issues two Airworthiness Directives (ADs) identifying safety concerns and outlining potential flight restrictions. The ADs state that “radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band).”

**December 22, 2021 – A4A, AEROSPACE INDUSTRIES ASSOCIATION (AIA) AND CTIA** announce agreement to work together in coordination with the FAA and FCC to “identify a path forward.”

**December 23, 2021** – **FAA** issues second Special Airworthiness Information Bulletin and a Safety Alert for Operators regarding the “Risk of Potential Adverse Effects on Radio Altimeters when Operating in the Presence of 5G C-Band Interference.”

**December 30, 2021** – **A4A** files emergency petition with the FCC to stay initiation of the deployment of 5G around certain airports until a solution can be identified.

## 2022

**January 4, 2022** – **WHITE HOUSE** announces agreement with AT&T and Verizon to delay the 5G C-band deployment by two weeks from January 5 to January 19, 2022 and to reduce the 5G signal power and not activate transmitters in close proximity to up to 50 priority airports for six months through July 5, 2022.

**January 17, 2022** – **A4A** sends a letter – signed by the CEOs of the leading cargo and passenger airlines – to National Economic Council Director Brian Deese, Transportation Secretary Pete Buttigieg, FAA Administrator Steve Dickson and FCC Chairwoman Jessica Rosenworcel urging immediate action to address major disruptions to the traveling and shipping public as a result of the deployment of new 5G service near airports scheduled to begin on January 19.

**January 18, 2022** – **WHITE HOUSE** announces agreement with AT&T and Verizon to deploy 5G on January 19, 2022 except around key airports and to continue working with the federal government on safe 5G deployment at those locations.

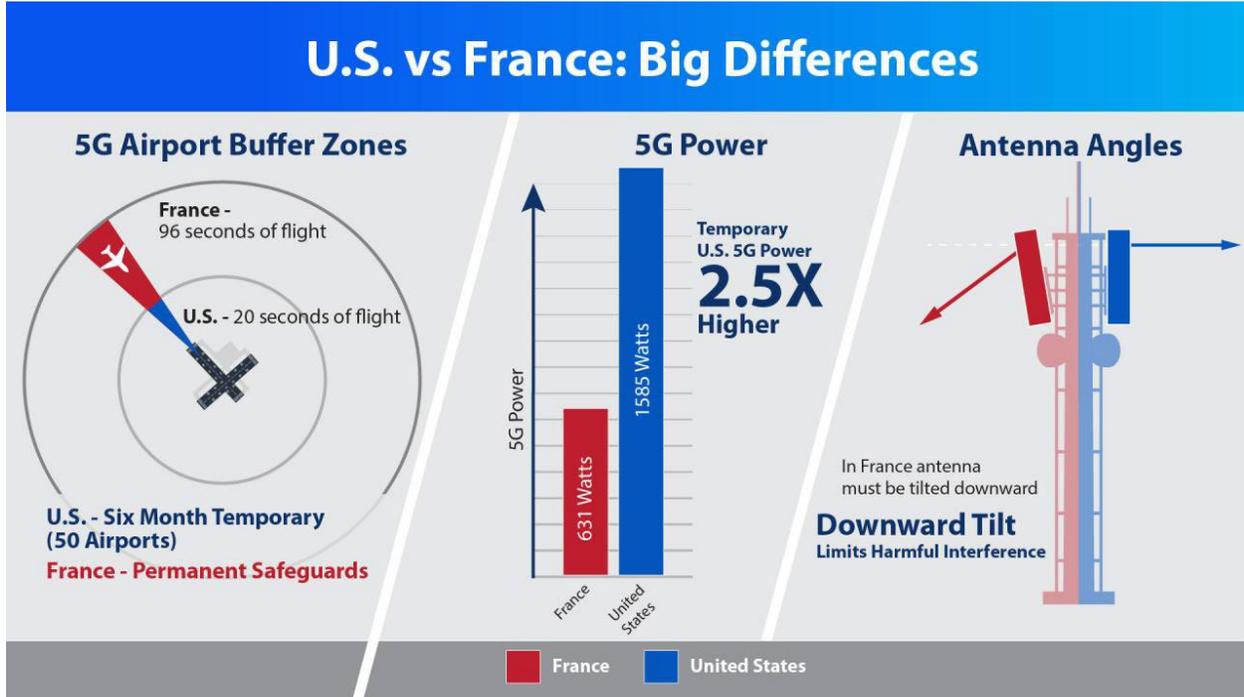


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## FAA Comparison Chart



Source: [FAA.gov/5G](https://www.faa.gov/5G)