

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
Expanding Access to Mobile Wireless Services) WT Docket No. 13-301
Onboard Aircraft)

REPLY COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

CTIA – The Wireless Association® (“CTIA”) respectfully submits these reply comments in response to the Commission’s Notice of Proposed Rulemaking examining mobile communications services aboard aircraft.¹ Following the submission of initial comments, CTIA and its members have been working collaboratively with foreign in-flight providers to analyze issues raised in the *Notice* and to foster greater understanding of matters raised in the record. CTIA conducted three separate, multi-hour workshops for CTIA carrier, device manufacturer and infrastructure provider members together with in-flight wireless providers and proponents. These “deep dive” sessions have been extremely valuable, illuminating the current technical analyses conducted to date, and enabling a critical examination of the assumptions and methodologies underlying such studies. CTIA stands ready to continue to this work with interested stakeholders.

While the meetings between CTIA and its members and in-flight providers have enabled the useful sharing of information and discussion of key issues, critical questions remain:

- Commenters’ proposals to use existing Airborne Access Systems (“AAS”) operating on foreign-authorized commercial spectrum bands in the United States require further examination of whether commercial and government terrestrial operations (and government airborne operations) would be impacted.

¹ *Expanding Access to Mobile Wireless Services Onboard Aircraft*, Notice of Proposed Rulemaking, 28 FCC Rcd 17132 (2013) (“*Notice*”).

- Similarly, the domestic operation of AAS equipment on U.S. spectrum bands with multiple air interfaces has not been studied and necessitates a rigorous review, which at least one foreign in-flight provider acknowledges.
- Even if further study demonstrates that the introduction of in-flight service on licensed commercial mobile spectrum will not result in interference to terrestrial operations and government airborne operations, critical licensing and other issues must be addressed. Indeed, AT&T's announcement that it plans to offer an in-flight connectivity service shows that the FCC need not introduce a new licensing and regulatory framework to introduce additional competitive mobile broadband service into the aircraft cabin.

I. QUESTIONS REMAIN REGARDING THE USE OF FOREIGN AAS EQUIPMENT IN THE U.S.

Today, AAS equipment operates abroad on commercial mobile frequency bands that are different than U.S. commercial mobile bands, and commenters' proposals to use foreign AAS equipment into the United States raise novel interference questions. The European Conference of Postal and Telecommunications Administrations ("CEPT") studies did not consider these concerns, and other questions arose as part of the CTIA workshops with the in-flight proponents.² Together, these issues caution against premature authorization of foreign system operations in the U.S.

Uplink/downlink dichotomies. AAS equipment licensed in foreign markets operates on bands that do not align with commercial mobile service bands in the U.S. For example, European AAS equipment operates on the 1800 MHz band, where 1805-1880 MHz is designated as downlink. This downlink spectrum overlaps in the U.S. with the PCS uplink band, 1850-1915 MHz. This uplink/downlink dichotomy on the same frequencies creates the potential for the

² See, e.g., Comments of AeroMobile Communications Limited, WT Docket No. 13-301, at 23-24, 27 (Feb. 14, 2014) ("AeroMobile Comments"); OnAir S.A., WT Docket No. 13-301, at 11-15 (Feb. 14, 2014) ("OnAir Comments"); Panasonic Avionics Corporation, WT Docket No. 13-301, at 15-17 (Feb. 14, 2014) ("Panasonic Comments").

airborne network control unit (“NCU”) to interfere into PCS base station receive antennas in the 1850-1880 MHz range.

Different air interfaces. An examination of the different cross-system interference effects of the various air interfaces used in the U.S. – for example, PCS CDMA (Verizon Wireless, Sprint), PCS UMTS (AT&T), and PCS GSM (T-Mobile) – also has not occurred. As CTIA noted previously,³ the CEPT studies focused only on GSM and LTE at 1800 MHz and UMTS at 2100 MHz, but did not examine how differing air interfaces would interact – and in the U.S. air interfaces will likely vary in any given geographic area and even in the same spectrum band. Even if the U.S. air interfaces are not served by the airborne picocell initially, the airborne NCU still must be designed to properly mask these three unserved air interfaces. This entails analyzing the required power to effectively jam all air interface variants, and then analyzing the downlink interference effects into the most sensitive air interface for noise floor rise impacts. To CTIA’s knowledge, these analyses have not been conducted.

Impact on U.S. government operations. Foreign AAS equipment licensed for the 1800 MHz band operates in the 1710-1785 MHz/1805-1880 MHz bands, much of which overlaps with spectrum used in the U.S. in the 1755-1850 MHz band for critical government operations, including for airborne operations. While 1755-1780 MHz will be transitioning to commercial use as AWS-3, in the near-term it will continue to be used by the federal government and some of these government operations will remain in portions of the band.⁴ Whereas the Commerce Spectrum Management Advisory Committee (“CSMAC”) examined ways in which low power terrestrial commercial uplink operations can co-exist with air-to-ground government operations

³ See Comments of CTIA – the Wireless Association®, WT Docket No. 13-301, at 5-8 (Feb. 14, 2014) (“CTIA Comments”).

⁴ See *Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, FCC 14-31, at ¶¶ 2, 13, 34, 37, 91, 210-11, 219-22 (Mar. 31, 2014).

in the 1755-1850 MHz band,⁵ AAS operations on those frequencies in the U.S. would involve questions including *air-to-air* interference with U.S. government operations,⁶ which to CTIA's knowledge has not occurred.

Antenna modeling limitations. The interference models referenced by in-flight proponents during the recent meetings with CTIA and its members appear to be predicated on the assumption that all ground-based antennas are oriented horizontally. In reality, however, many antennas (both here and abroad) are deployed using an upward tilt to overcome mountains, buildings, or other challenging terrain. Any future interference analyses must affirmatively address this upward tilt to ensure that in-flight operations do not impact base stations on the ground.

Flawed leakage assessments. The previous studies used near-field approaches to calculate leakage out of the aircraft and into terrestrial systems, but these approaches do not adequately capture the antenna gain effects of the aircraft and may not be accurate in estimating far-field gain effects – particularly with respect to interference into PCS CDMA networks. As a result, the existing studies may underestimate the worst case peak interference to terrestrial networks. Thus, leakage out of the aircraft also requires closer examination.

These band differences and modeling limitations must be addressed and found not to cause harmful interference to licensed commercial and government users before existing AAS equipment can be authorized in the U.S.

⁵ See, e.g., Commerce Spectrum Management Advisory Committee, Working Group 5, 1755-1850 MHz Airborne Operations, Final Report (Sept. 16, 2013), http://www.ntia.doc.gov/files/ntia/publications/wg5_1755-1850_final_reportl-09-16-2013.pdf.

⁶ While the *Notice* proposes to require an airline operating an AAS in the 1755-1850 MHz band to turn it off or otherwise disengage transmission in the band before reaching the U.S., see *Notice* at ¶ 63, presumably the NCU would still operate to raise the noise floor within the cabin to prevent devices from attempting to communicate using these frequencies. It is unclear how such an elevated noise floor might impact airborne U.S. government operations.

As the Commission considers these issues, it also must weigh the proposed benefit of any such action. In the near term, operations would at best be limited to international flights that have AAS equipment installed, and only those passengers with devices capable of operating on international commercial mobile frequencies would benefit.⁷

II. QUESTIONS REMAIN REGARDING IN-FLIGHT OPERATIONS ON U.S. SPECTRUM BANDS

The record shows that further study is needed to examine the impact of U.S.-specific AAS operations, as the existing CEPT studies do not analyze the potential interference issues with respect to AAS operations on U.S. spectrum bands or all of the air interfaces deployed by U.S. carriers.⁸ Indeed, AeroMobile acknowledges that AAS equipment operating pursuant to U.S. standards is a long-term proposition, noting that “[d]evelopment and implementation of additional U.S.-specific standards will take considerable time given the extensive technical and regulatory work the [sic] must be conducted for both telecommunications and civil aviation purposes.”⁹

As noted above, the CEPT studies did not account for the varying air interfaces deployed in the U.S. Any review must account for the fact that air interfaces in this country will vary by band, licensee, and license area. Interference into CDMA networks in particular requires further study in the U.S. market.¹⁰ In addition, interference studies must take into account that many antennas in the U.S. are deployed using an upward tilt, depending on location.

⁷ See, e.g., Panasonic Comments at 16.

⁸ See, e.g., CTIA Comments at 2, 4-8; see also Notice at ¶ 33 (noting that the CEPT report released earlier this year “focused only on European commercial mobile spectrum bands”).

⁹ See AeroMobile Comments at 24.

¹⁰ See CTIA Comments at 6.

Consistent with the *Notice*,¹¹ CTIA urges that any studies addressing the interference consequences of operating AAS equipment over U.S. commercial mobile spectrum bands and air interface technologies be introduced into the record for consideration and further study.¹² To date, no such studies have been submitted. Until further study and testing has been performed for these different parameters, it is not possible to make interference assessments for the U.S. market.

III. IN ADDITION TO INTERFERENCE CONCERNS, CRITICAL LICENSING AND OTHER ISSUES REMAIN

Even if further study demonstrates that the introduction of in-flight service on licensed commercial mobile spectrum will not result in interference to terrestrial operations and government airborne operations, critical licensing and other issues must be addressed. In particular, the Commission must refrain from foreclosing market-based solutions that allow carriers to provide their own in-flight services. The recent announcement by AT&T to launch a high-speed 4G LTE-based in-flight connectivity service shows that commercial mobile providers are interested in entering the airborne market, and the FCC should not undermine their ability to use their licensed spectrum in doing so.¹³ AT&T's announcement shows that the Commission need not introduce a new licensing and regulatory framework in order to introduce competitive mobile broadband service into the aircraft cabin.

¹¹ *Notice* at ¶ 33 (requesting “any tests or technical analyses that have been performed regarding the use of Airborne Access Systems over commercial mobile spectrum bands in use in the United States”).

¹² *See* CTIA Comments at 5-6. AeroMobile examines some U.S. frequencies that would need to be controlled by the AAS to inhibit interference to ground-based systems if existing European mobile bands were used for onboard connectivity, but it does not examine the use of U.S. mobile bands for on-board connectivity. *See* AeroMobile Comments at Attachment.

¹³ *See* AT&T, Press Release, Mobilizing the Sky: AT&T Building 4G LTE In-Flight Connectivity Service (Apr. 14, 2014) (announcing plans to “launch a high-speed 4G LTE-based in-flight connectivity service for airlines and passengers in commercial, business and general aviation,” which “will be capable of providing in-flight broadband for customers including fast, reliable Wi-Fi and onboard entertainment”), http://about.att.com/story/mobilizing_the_sky_att_building_4g_lte_in_flight_connectivity_service.html.

The Commission also must permit in-flight operations in the licensed commercial mobile spectrum bands only on a secondary, non-interference basis. And the Commission must enable a framework for mitigating any interference detected by carriers that may occur. Finally, the Commission also must address critical public safety and law enforcement concerns, including the applicability of the Communications Assistance for Law Enforcement Act (“CALEA”) to AAS operators and how access to 911 emergency services will work in an in-flight environment.

CONCLUSION

While CTIA looks forward to continuing to work with the Commission and other stakeholders to explore these issues, the Commission must first address the significant questions identified in this proceeding before it can consider adopting new rules governing mobile communications services aboard aircraft.

Respectfully submitted,

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