Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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

REPLY COMMENTS OF PANASONIC AVIONICS CORPORATION

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SUMMARY

Panasonic Avionics Corporation ("Panasonic") strongly supports the initiative of the Federal Communications Commission ("FCC" or "Commission") to bring the benefits of in-flight mobile broadband applications to U.S. consumers. The notice of proposed rulemaking ("*NPRM*") in the proceeding garnered support from a variety of stakeholders, including airlines, aircraft manufacturers, in-flight connectivity equipment integrators and service providers, and technology and telecommunications industry associations.

These interested parties generally agree that the FCC should develop rules to facilitate the provision of in-flight mobile connectivity ("IMC") using airborne access systems ("AASs") in U.S. airspace. IMC is fundamentally an extension of existing broadband mobile service – using a passenger's own mobile device and subject to the existing customer relationship with the its chosen carrier – accessed onboard aircraft in flight through AAS technology. Accordingly, the Commission should focus on the appropriate means to permit operation of AAS equipment within the aircraft cabin.

In addition to the specific technical and regulatory issues associated with AAS operations, this proceeding raises broader policy questions for the Commission. The statements of the Commissioners released with the NPRM are instructive in this regard. For example, it is clear that affording airlines the choice to offer IMC applications along with Wi-Fi to passengers will enhance competition and consumer choice in mobile broadband services. Despite the recent announcement of AT&T to develop a new air-ground connectivity service to provide an additional option to carry traffic to and from aircraft located in U.S. airspace, only IMC offerings provide consumers with alternative mobile broadband choices within the aircraft cabin.

The question of disruption caused by the potential availability of in-flight voice applications is being addressed in a companion proceeding before the Department of Transportation. These concerns are belied by years of airline experience on long-haul international routes and the fundamental principle that if airlines and their passengers do not want voice on aircraft then voice can be disabled (as some airlines have chosen) while still providing access to IMC text and data applications. Stated simply, this proceeding is about *choice* not voice.

Well-settled Commission policy also establishes that licensees and other spectrum users do not have an "absolute" or "exclusive" right to assigned spectrum and they may not object to secondary uses of their spectrum as long as no harmful interference results; particularly where, as here, the contemplated use actually extends the reach of their licensed services to their customers onboard aircraft in flight.

Finally, with respect to AAS access to portions of the 1800 MHz band, Presidential directives to enhance access to mobile broadband spectrum and sharing between U.S. government and commercial users support AAS use of 1800 MHz frequencies on an unprotected non-interference basis. Panasonic respectfully submits that all of these broader policy issues weigh heavily in favor of positive Commission action in this proceeding.

Panasonic urges the Commission to move forward expeditiously to enable IMC operations in U.S. airspace pursuant to existing international standards. The Commission can act quickly to bring the benefits of IMC to the United States by recognizing AAS authority issued to foreign airlines by their home licensing administrations, and by adopting technical rules under its Part 15 equipment authorization regime that incorporate existing standards. Additional consideration may be necessary, however, for the Commission to develop rules for domestic

IMC operations based on U.S. commercial mobile spectrum bands and air interfaces. Therefore, Panasonic urges the Commission to accept the offer of CTIA and other interested parties to conduct necessary work and submit recommendations to the Commission regarding IMC operations on U.S. domestic flights. By enabling IMC operations on international flights in the near term and addressing domestic IMC issues in a further phase of this proceeding, the Commission will bring the benefits of current IMC offerings to the U.S. traveling public at the earliest practicable time, while affording interested parties the opportunity to consider how to maximize the benefits of in-flight mobile broadband in the United States.

Panasonic applauds the Commission's commitment to bringing the significant public benefits of IMC to the United States, and Panasonic will continue to work with the Commission and other interested parties to address fully the policy, technical and regulatory issues associated with the introduction of existing and next-generation IMC offerings in the United States.

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Panasonic Avionics Corporation ("Panasonic"), the world's leader in in-flight entertainment and communications solutions, respectfully submits these reply comments in the above-captioned proceeding in which the Commission proposes to revise its rules to facilitate the introduction of in-flight mobile connectivity ("IMC") in the United States.[1] Panasonic strongly supports the near-term introduction of IMC offerings on international flights consistent with the Commission's objective to expand the availability of mobile broadband for U.S. consumers.

Panasonic believes that the Commission should initially permit IMC operations onboard international flights by recognizing the authority issued to foreign airlines by their licensing authorities and, for U.S. airlines, by adopting Part 15 rules that incorporate existing international standards governing the operation of airborne access systems ("AASs"). The Commission should also encourage interested parties to develop additional recommendations for IMC operations on U.S. domestic flights that may be incorporated into the rules. In doing so, the Commission will bring the benefits of IMC applications to the United States at the earliest practicable time while establishing a foundation for a regulatory regime to facilitate the expansion of in-flight mobile broadband for consumers onboard domestic flights.

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[1] *Expanding Access to Mobile Wireless Services Onboard Aircraft*, WT Docket No. 13-301, Notice of Proposed Rulemaking, FCC 13-157, 28 FCC Rcd 17132 (2013) ("*NPRM*").

I. Introduction

Panasonic, headquartered in Lake Forest, California, is committed to bringing the very best in-flight entertainment and communications solutions to U.S. and international airline customers and their passengers. Panasonic has developed the Global Communications Service ("GCS") system, comprised of (i) the "eXConnect" aeronautical broadband system, which provides worldwide coverage for high-speed Internet access onboard commercial airlines using a constellation of satellites operating in Ku-band frequencies; (ii) in partnership with AeroMobile, the "eXPhone" system, which provides airline passengers with mobile broadband applications, including text, data, and voice using subscriber mobile devices; and (iii) "eXTV," a real-time video offering that can be customized for individual customer airlines.

The Commission has actively facilitated the development of innovative in-flight connectivity technology for decades. From the early days of seat-back telephones to global satellite-based solutions to domestic air-ground implementations, the Commission has been on the cutting edge of in-flight connectivity to ensure that airlines and their passengers have access to the best available offerings. In this proceeding, the Commission has the opportunity to reestablish its leadership position with respect to advanced IMC technologies. By adopting existing standards for AAS operations on international flights and developing new provisions for domestic operations, the Commission will enhance the availability of mobile broadband applications for U.S. consumers.

However, no AAS equipment exists today that is designed to operate using the specific mobile spectrum bands and air interfaces used by U.S. wireless carriers. Additional technical and regulatory work may be appropriate to develop provisions governing IMC operations on U.S. domestic flights. Thus, the Commission should afford interested parties time to consider

such issues and make recommendations for additional rules to govern AAS operations on U.S. domestic flights.[2]

II. Discussion

In the *NPRM*, the Commission acknowledged the "increasing demand for mobile communications services on airborne aircraft," as well as the broad international adoption of the AAS systems necessary to provide IMC access.[3] On flights around the globe, AASs operate reliably and effectively without any known cases of harmful interference. Given the dramatic increase in consumer demand, the absence of interference from AAS operations, and the availability of new mobile broadband applications that enable the traveling public to remain connected at all times, authorizing IMC operations in the United States would strongly serve the public interest.[4] Panasonic believes that Commission's laudable objectives can be best achieved by recognizing AAS authority granted to international airlines and adopting a new Part 15 rule adopting technical parameters for AAS operations onboard U.S. airlines.

A. The Commission Should Enable IMC in the United States To Expand the Benefits of IMC to the U.S. Public and Further Other Important Policy Objectives

Authorization of IMC in the United States would increase competition, enhance consumer choice and advance an important, new broadband mobile technology in the in-flight context. Wi-Fi is currently the only in-flight connectivity solution available to the traveling public in U.S. airspace. By facilitating access to IMC, the Commission would allow additional

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[2] Although the 2100 MHz band incorporated into next-generation AASs could support U.S. domestic IMC operations, interested parties may seek to consider other bands to further facilitate access to IMC applications in the United States.

[3] *NPRM* at ¶¶ 22-23.

[4] *NPRM* at ¶ 56.

players to enter into the U.S. in-flight connectivity market, thereby increasing competition and consumer choice. Moreover, airlines would have the opportunity to provide either or both Wi-Fi and IMC, as well as to choose which IMC applications to offer, to enhance the overall passenger experience. IMC systems have operated for years with positive airline and passenger acceptance and there is no basis in the record to deprive U.S. consumers of this technology. Thus, a decision to allow IMC in U.S. airspace would serve to promote important competition policy and mobile broadband goals of the Commission.

Enhancing competition in in-flight mobile broadband is even more important in view of AT&T's recent announcement of a new air-ground connectivity offering. Although preliminary indications suggest that AT&T only seeks to develop and alternative to existing terrestrial and satellite-based off-board links to carry traffic to and from aircraft, its position as the largest domestic GSM-based mobile provider -- combined with a domestic air-ground offering -- could afford the company a significant advantage in the nascent U.S. IMC market even before the Commission can act in this proceeding. AT&T's announcement also should not be viewed as obviating the need to enhance the availability of mobile broadband by enabling IMC in the United States. The AT&T proposal appears to be a U.S. domestic off-board link solution that, unlike Panasonic's satellite-based eXConnect system, cannot support IMC offerings on long-haul international flights. Thus, the Commission should act even more expeditiously to ensure that IMC and other in-flight connectivity offerings fully satisfy the needs of U.S. consumers.

Despite potential concerns regarding "air rage" due to the availability of in-flight voice calls, in years of IMC operations on long-haul international flights there has never been an

incident of in-flight disruption as a result of voice on an AAS-equipped aircraft.[5] Importantly, the Department of Transportation ("DoT") has initiated a companion proceeding to address the issue of voice onboard U.S. commercial airlines.[6] Panasonic agrees with Chairman Wheeler, who has stated that the Commission's "mandate from Congress is to oversee how networks function" and a decision related to permitting or prohibiting specific IMC applications such as voice calls would not be within the FCC's technical expertise as an agency.[7] Moreover, because airlines can disable voice while still providing access to other IMC applications such as mobile text and data, concerns regarding voice should not be determinative in this proceeding.

At a minimum, the issues related to voice calls do not apply to foreign airlines that have implemented IMC offerings that include voice applications. Passengers and crew on these airlines enjoy the enhanced the travel experience afforded by access to all IMC applications, and the FCC should not deprive these consumers – including many U.S. wireless carrier subscribers – of this in-flight connectivity option. Moreover, the Commission should not prohibit voice calls on U.S. airlines serving international routes seeking to provide a competitive IMC offering. Consumers should not be deprived of an available IMC application simply because the aircraft

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[5] *See* OnAir Comments at 23-24. *See also Study of the Use of Cell Phones Onboard Aircraft*, Docket No. FAA-2012-0957, Notice of Availability and Request for Comments, 77 FR 54651 (rel. Sept. 5, 2012); *Study of the Use of Cell Phones Onboard Passenger Aircraft*, DOT/FAA/ AR-12/30 (rel. July 2012). In fact, demand for all mobile applications (voice, text and data) applications is growing rapidly and access to such communications applications greatly enhances the passenger experience.

[6] *See Advance Notice of Proposed Rulemaking on the Use of Mobile Wireless Devices for Voice Calls on Aircraft*, Docket No. DOT–OST–2014–0002 RIN 2105–AE30.

[7] Testimony of Thomas Wheeler, Chairman, Fed. Commc'ns Comm'n Before the Subcomm. on Commc'ns and Tech. Comm. On Energy and Commerce U.S. House of Representatives "Oversight of the Fed. Commc'ns. Comm'n," at 8 (Dec. 12, 2013).

on which they are traveling enters U.S. airspace or because they chose a U.S. airline rather than a foreign airline for a long-haul international flight.

Concerns regarding access to the spectrum used by AAS systems have also been raised. As the Commission is aware, the proposition that licensees have the right to use spectrum on an exclusive basis is contrary to well-established FCC policy. The D.C. Circuit flatly rejected licensee claims to absolute exclusivity, holding that "an exclusive licensee cannot object to secondary use of its spectrum as long as no harmful interference results."[8] Importantly, the criteria for shared, secondary use of spectrum established in that and subsequent Commission proceedings have also been applied in the context of access to U.S. government spectrum by commercial users.[9]

The record of this proceeding demonstrates that operation of AASs would not result in harmful interference to any co-frequency users of the spectrum. Moreover, AAS operations do not constitute a new, independent service that seeks access to spectrum assigned to entirely unrelated licensees. Rather, AAS technology enables terrestrial wireless carriers to reach their own subscribers who are traveling onboard an aircraft. A subscriber's mobile device is unable to

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[8] *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, ET Docket No. 98-153, 18 F.C.C.R. 3857 at ¶ 74 (citing *AT&T v. FCC*, 270 F.3d 959, 964 (D.C. Cir. 2001).

[9] *See generally* http://www.ntia.doc.gov/report/2012/assessment-viability-accommodating-wireless-broadband-1755-1850-mhz-band; *see also* Commerce Spectrum Management Advisory Committee Working Group 5, 1755-1850 MHz Airborne Operations, *Air Combat Training System, Small Unmanned Aircraft Systems, Precision-Guided Munitions, Aeronautical Mobile Telemetry*, Final Report (Mar. 4, 2014), *available at* http://www.ntia.doc.gov/files/ntia/ publications/wg5_final_report_posted _03042014.pdf and subworking group reports.

access IMC applications without carrier consent through an international roaming agreement. Thus, the concerns regarding the use of licensed spectrum for AAS operations are unfounded.

Similarly, access to portions of the 1800 MHz band would not adversely affect U.S. government operations or commercial in the band.[10] Although the *NPRM* accurately stated the 1755 to 1850 MHz band was allocated on an exclusive basis for use by the U.S. federal government,[11] the Commission subsequently released a *Report and Order* reallocating the 1755 to 1780 MHz band for shared federal/non-federal use because it has been identified for transition from federal to commercial use.[12] Recognizing the increasing consumer demand for mobile broadband, the White House encourages "shared access to spectrum that is currently allocated exclusively for Federal use" and states that "[w]here technically and economically feasible, sharing can and should be used to enhance efficiency among all users and expedite commercial access to additional spectrum bands, subject to adequate interference protection for Federal users."[13] Indeed, NTIA notes that "spectrum sharing is a vital component of satisfying the growing demand for access to spectrum and that both federal and non-federal users will need to adopt innovative sharing techniques to accommodate this demand."[14]

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[10] Mobile device uplinks would operate in the 1710-1785 MHz band and AAS picocell downlinks would operate in the 1805-1875 MHz band.

[11] *NPRM* at ¶ 63.

[12] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, GN Docket No. 13-185 (rel. Mar. 31, 2014).

[13] Memorandum for the Heads of the Executive Departments and Agencies, *Expanding America's Leadership in Wireless Innovation* (rel. June 14, 2013).

[14] U.S. Department of Commerce, An Assessment of the Viability of Accommodating Wireless Broadband in the 1755-1850 MHz Band at iii (Mar. 2012).

AAS operations are ideal for spectrum sharing in the 1800 MHz band. Unlike ubiquitous terrestrial mobile wireless networks operating at maximum power levels and providing broad geographic coverage which cannot readily share spectrum with U.S. government operations,[15] AASs are low-power transceivers and command airborne mobile devices to operate at their lowest power state. This results in power levels equivalent to traditional Part 15 unlicensed devices in the vicinity of a small number of commercial air traveling at cruise altitude along international air routes away from U.S. government operations in the band.

Importantly, shared access to the 1800 MHz band can occur today under Part 15 of the rules because that band is identified for unlicensed device operations. Unlicensed devices are permitted to operate in this spectrum because the Commission has determined that their low-power transmissions would have no adverse impact on incumbent operations, including U.S. government systems and services. Thus, AAS operations with power levels akin to Part 15 devices within the vicinity of the aircraft should not adversely affect U.S. government operations in the 1800 MHz band.

B. The Commission Should Recognize Foreign Airline AAS Authorizations as a Matter of Policy

Panasonic believes that the most expeditious way for the Commission to enable existing IMC offerings in the United States would be to permit existing AAS equipment onboard foreign aircraft to continue operating while in U.S. airspace and to permit U.S. airlines to operate AASs on international flights, subject to compliance with existing international standards. The

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[15] *See generally id. available at* http://www.ntia.doc.gov/report/2012/assessment-viability-accommodating-wireless-broadband-1755-1850-mhz-band; *see also* Commerce Spectrum Management Advisory Committee Working Group 5, 1755-1850 MHz Airborne Operations, *Air Combat Training System, Small Unmanned Aircraft Systems, Precision-Guided Munitions, Aeronautical Mobile Telemetry*, Final Report (Mar. 4, 2014), *available at* http://www.ntia.doc.gov/files/ntia/publications/wg5_final_report_posted _03042014.pdf.

Commission should recognize the authority granted to foreign airlines by their licensing administrations as a matter of FCC policy, consistent with international comity and legal principles embodied in the Chicago Convention governing international civil aviation, and adopt a new Part 15 rule for AAS operations onboard U.S.-registered aircraft.

IMC is available to passengers and crew onboard airborne AAS-equipped aircraft outside of U.S. airspace pursuant to authority granted by a foreign airline's registering nation. It is unnecessary for the Commission to formally relicense existing AAS operations or impose service-related obligations while such foreign aircraft traverse U.S. airspace. In addition, the AASs have been certified as compliant with international standards by the U.S. Federal Aviation Administration ("FAA") or European Aviation Safety Agency ("EASA"). Thus, the Commission can be assured that AAS operations are consistent with applicable standards without the need for duplicative licensing or certification.[16]

Panasonic agrees with Aviation Spectrum Resources, Inc. ("ASRI") that the Commission has discretion under the legal principles embodied in the Chicago Convention to authorize foreign airlines to operate an AAS within U.S. airspace. Although the Commission may not be required to recognize foreign AAS licenses under U.S. law or direct application of the treaty, the Chicago Convention does not prevent the FCC from exercising independent authority to recognize foreign AAS licenses. Article 18 of the ITU Radio Regulations provides an independent basis for license recognition by establishing that an aircraft's registering nation is responsible for aircraft station licensing. Panasonic believes that, like other regulators around

[16] Indeed, to the extent the Commission concludes that AASs can operate on a non-interference basis in U.S. airspace, Panasonic submits that it is incumbent on the Commission to permit operation of AAS equipment that has been certified by the FAA or EASA onboard foreign aircraft.

the world, the Commission has discretion to recognize foreign aircraft licenses under international treaty principles and the Communications Act.[17] This approach would avoid duplicative licensing of foreign airlines in the United States and reduce the risk of duplicative and possibly disparate national licensing of U.S. airlines traveling abroad, particularly in light of the broad international recognition afforded airline licensing around the globe.

This approach is fully consistent with that adopted by many countries around the world in accordance with generally accepted principles of international civil aviation. For example, Ofcom recently issued new regulations authorizing next generation AASs to operate on a license exempt basis within UK territory according to internationally harmonized standards.[18] Although a notice of variation (of an aircraft station license) is issued to UK aircraft to confirm operating authority while traveling outside UK airspace,[19] the exemption approach is consistent with recognition of foreign IMC authorizations. Similarly, the Commission can adopt a policy of mutual recognition for foreign IMC authorizations.

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[17] Although the Communications Act affirmatively deprives the Commission of jurisdiction to license radio stations onboard foreign ships but is silent on this point with respect to foreign aircraft, it is unclear that Section 303(f) of the Communications Act contemplates FCC licensing jurisdiction over equipment confined within a foreign aircraft cabin (as opposed to equipment that transmits radio signals off the aircraft) that is subject to the jurisdiction of a foreign licensing administration. While such operations certainly must not cause harmful interference to U.S. systems and services (*see* Section 306 of the Act), Panasonic submits that "reaching into" a foreign aircraft cabin to exert licensing jurisdiction raises significant international legal issues and may not be advisable as a matter of U.S. policy given the potential impact on U.S. commercial and government aircraft operations abroad.

[18] Ofcom, Decision to make the Wireless Telegraphy (Mobile Communications Services on Aircraft) (Exemption) Regulations 2014 (Apr. 17, 2014), *available at* http://stakeholders.ofcom.org.uk/binaries/consultations/mca-exemption/statement/statement.pdf.

[19] Panasonic agrees that some form of operating authority should be adopted by the Commission to ensure AAS operating authority for U.S. aircraft traveling abroad. However, Panasonic believes that Part 15 authority for operation of equipment within the cabin of U.S.-registered aircraft would provide sufficient authority just as it does for Wi-Fi access points.

C. The Commission Could Incorporate Existing IMC Standards into Part 15 of Its Rules

To support AAS operations on U.S. airlines, and to the extent a more formal rules-based approach is deemed appropriate for foreign airlines, Panasonic suggests that the Commission modify Part 15 of its rules to permit AASs to operate on an unlicensed basis. Given the non-interfering nature and power levels akin to Part 15 unlicensed devices, permitting AAS operations under Part 15 would advance the Commission's objective to encourage innovation in wireless communications by increasing the availability of in-flight mobile broadband on aircraft while minimizing the potential for interference with other spectrum users.[20]

1. Part 15 Provides a Viable Basis for Introducing IMC in the United States

As the Commission has acknowledged and the record of this proceeding confirms, AAS operations would create no cognizable risk of interference to current U.S. wireless licensees and other spectrum users.[21] As a result, AAS equipment can be authorized to operate under the Commission's Part 15 rules. A Part 15 approach would reflect the non-interference nature of AAS operations and require compliance with well-developed technical parameters.

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[20] Panasonic respectfully submits that the comprehensive Part 87 aircraft station licensing framework proposed in the *NPRM* is less desirable than the alternative authorization frameworks noted above. In particular, a Part 87 approach involves duplicative licensing for foreign airlines, raises complex regulatory status and spectrum access issues, and does not accurately reflect the commercial and operational implementation of current IMC offerings.

[21] *NPRM* at ¶ 11 (observing that operation under standards developed by the EU's European Conference of Postal and Telecommunications Administrations ("CEPT") have "successfully allowed the noninterfering use of mobile communications services on airborne aircraft utilizing Airborne Access Systems"), ¶ 15 ("We are not aware of any reported cases of harmful interference to terrestrial systems stemming from the use of Airborne Access Systems since airlines began offering mobile communications services on airborne aircraft.").

The Commission has adopted Part 15 rules to accommodate the unique operational characteristics of other radio equipment with similarly *de minimis* interference potential. Most recently, the Commission decided to harmonize the technical rules for level probing radars ("LPRs") with European standards under Part 15 of the rules.[22] LPRs are analogous to AASs because both are low-power transceivers operating pursuant to technical standards developed in Europe, which use spectrum bands different from those typically utilized in the United States.[23] LPRs are also not sold to the general public for consumers use, but rather operate in controlled circumstances that limit any potential for interference to other systems and services. The Commission's decision to facilitate LPR operations in the United States under Part 15 provides direct precedent for a similar approach to enable AAS operations.

Like the existing IMC standards, a new Part 15 rule should specify the emission limits for picocells and Network Control Units ("NCUs") and associated mobile devices in particular bands as outlined in CEPT Reports 16 and 48,[24] and Panasonic submits herewith a draft set of Part 15 rules for the Commission's consideration.[25] The draft Part 15 rules proposed by Panasonic differ from the international requirements in two non-material ways. First, the rules

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[22] 47 C.F.R. § 15.256.

[23] *See Amendment of Part 15 of the Commission's Rules to Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz, Amendment of Part 15 of the Commission's Rules to Establish Regulations for Level Probing Radars and Tank Level Probing Radars in the Frequency Bands 5.925-7.250 GHz, 24.05-29.00 and 75-85 GHz*, ET Docket 10-23, Report and Order (FCC 14-2) at ¶ 11 (rel. Jan. 15, 2014).

[24] Report from CEPT to the European Commission in response to the EC Mandate on Mobile Communication Services on board aircraft (MCA), CEPT Report 016 (Mar. 30, 2007), *available at*: http://www.erodocdb.dk/Docs/doc98/official/pdf/CEPTREP016.PDF (CEPT MCA Report 16); Report from CEPT to the European Commission in response to the Second Mandate to CEPT on mobile communication services on board aircraft (MCA), CEPT Report 48 (Mar. 8, 2013), *available at*: http://www.erodocdb.dk/Docs/doc98/official/pdf/CEPTREP048.PDF (CEPT MCA Report 48).

[25] *See* Exhibit A**,** attached.

are crafted to prohibit AAS operations below 3,048 meters (~10,000 feet) rather than 3,000 meters required elsewhere around the world. Second, there is no provision for NCU operations in the 1800 MHz band since there are no terrestrial BTS pilot signals/downlinks in the band to shield.[26]

Panasonic also believes that the Commission need not require certification of AASs under Part 2 of its rules because AAS equipment is subject to stringent airworthiness certification requirements under FAA (for U.S.-manufactured aircraft) and EASA (for European-manufactured aircraft) requirements. Panasonic understands that equipment must be certified for compliance with applicable standards and then recertified for use onboard every single aircraft type on which it is deployed. The first type of civil aviation certification equates to Part 2 certification, and the second type of certification is designed to confirm operating parameters and electromagnetic compatibility with other aircraft systems and is performed repeatedly on a per aircraft type basis. Given this extensive testing and certification the Commission may rely on FAA and EASA certifications for operation under Part 15 of the rules. Panasonic suggests that Section 15.201 be amended to reflect this exemption from the equipment authorization requirement and related FCC certification.

2. Other Benefits of a Part 15 Approach

Although Panasonic believes that adoption of a new Part 15 rule section governing AAS operations is not essential to enable the near-term implementation of IMC on international flights, it would be a straightforward way for the Commission to formally adopt technical

[26] The draft rules otherwise incorporate the fundamental elements of the international standards, and Panasonic would suggest that AAS operations otherwise be required to comply with applicable international standards (rather than trying to incorporate relevant elements of all standards into the Part 15 rules).

parameters for AAS operations. This approach would govern AAS operations on foreign aircraft as well as U.S. aircraft traveling on international flights and, if modified (as appropriate), on U.S. domestic flights. AAS technical parameters could still be incorporated in Part 15 even if the Commission concluded that Part 87 aircraft stations licensing was necessary to confirm AAS operating authority on U.S. aircraft traveling in foreign airspace.

Enabling AAS operations under Part 15 also avoids domestic spectrum allocation questions (e.g., as between federal government and commercial use) and disparate international spectrum allocations (e.g., differences in national frequency tables). Part 15 devices can operate in any non-restricted band regardless of whether it is allocated for federal government or commercial use. This is important for access to non-commercial portions of the 1800 MHz band by existing AASs and for international AAS operations.[27]

A Part 15 approach would also preserve a sufficient basis upon which to resolve potential interference issues. Devices are permitted to operate under Part 15 because they have a *de minimis* potential to cause interference and they may not cause unacceptable interference to other spectrum users. Unlike most unlicensed devices, however, AASs operate in very limited circumstances that would make interference assessment and resolution quite straightforward. The equipment operates only on commercial aircraft at altitude with large separation distances from other aircraft and potentially affected users. To the extent an incident occurs, IMC providers and their customer airlines can be expected to cooperate – like all Part 15 device

[27] Panasonic understands the AASs may be able to limit their operations to portions of the 1800 MHz band. If the Commission decides to restrict AASs to commercial portions of the band, then it may simply adjust the frequencies for AAS operations the Part 15 rules. Such a limitation may also permit AASs to be licensed by rule, rather than as unlicensed devices under Part 15, because there would be no need to access U.S. government spectrum. The draft Part 15 rules proposed herein could form the basis of AAS operating provisions to be included in another rule part.

operators – to help identify and resolve issues. Of course, as the Commission is aware, there have been no incidents of interference in more than five years of AAS operation around the world. Given the small number of parties and limited operating conditions, the Commission can rely on existing policies governing Part 15 devices, including Section 15.5, to address potential interference issues.[28]

Finally, a new Part 15 rule would authorize operation of mobile devices associated with AASs. The passenger's device connects to and is controlled by the AAS, and the two operate in tandem for the duration of the flight. Reflecting the applicable international standards, the proposed Part 15 rule includes specific provisions regarding maximum power levels at which associated mobile devices must be commanded to operate by the AAS. Part 15 authority would therefore also cover operation of the passenger's mobile device associated with an onboard AAS.

D. The Commission Should Not Apply Part 20 CMRS Rules to AAS Operations

The Commission seeks comment on whether IMC providers should "be required to comply with all rules applicable to CMRS licensees under Part 20 of the Commission's rules given the limited scope of the in-cabin service offering."[29] Panasonic submits that there is no need to require AAS operations to comply with CMRS obligations. IMC providers operate as systems integrators, not CMRS providers or telecommunications carriers, and thus would not be subject to Part 20 of the FCC Rules. Moreover, in every case, the Part 20 obligations of CMRS providers would be either inapplicable to AAS operations, or would be met by the passenger's home wireless carrier under the FCC's existing regulatory framework.

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[28] To the extent supplemental policies or procedures may be considered, Panasonic would suggest that those embodied in the 800 MHz air-ground rules may be instructive. *See* 47 C.F.R. §§ 22.879, 22.880.

[29] *NPRM* at ¶ 57.

1. As Systems Integrators, IMC Providers Are Not Subject to Part 20 or Other Obligations of Telecommunication Carriers

IMC providers function as systems integrators not telecommunications carriers. The Commission has explained that systems integrators, in contrast to telecommunications carriers,

> provide integrated packages of services and products that may include, for example, the provision of computer capabilities, data processing, and telecommunications. Systems integrators purchase telecommunications from telecommunications carriers and resell those services to their customers. They do not . . . own any physical components of the telecommunications networks that are used to transmit systems integration customers' information. In other words, systems integrators provide telecommunications solely through reselling another carrier's service.[30]

This definition precisely describes the IMC business model. IMC providers use network equipment and services owned and provided by others to create a functional service. The AAS picocell is owned by the airline on whose aircraft it is installed. The off-board communications link is licensed to Ku-Band ESAA licensees such as Panasonic, L-Band MSS licensees, or Air-Ground Radiotelephone Service providers. The terrestrial mobile switching center access is provided under contract with an affiliated mobile carrier, which then routes traffic to its destination. Licensed terrestrial backhaul providers perform back-office integration with the passenger's home terrestrial mobile wireless service provider. Further, by definition, IMC offerings include data processing and computer capabilities, as they include broadband Internet access, text messaging, and VoIP.

As network integrators, IMC providers do not carry traffic. Instead, IMC providers simply offer access on a wholesale basis to the terrestrial mobile wireless service providers via a roaming agreement. AASs extend mobile connectivity to consumers traveling onboard airborne aircraft but do not create a separate new service. An IMC provider merely offers the technology

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[30] *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Fourth Order on Reconsideration, FCC 97-420, 13 FCC Rcd 5318 (1997), at ¶ 278.

to extend the reach of terrestrial mobile wireless service providers to the airplane cabin, and passengers can access IMC applications – the same types of applications that can be accessed on the ground – if, and only if, the terrestrial mobile wireless service provider consents through an international roaming agreement. Thus, the IMC provider functions as a systems integrator, connecting the licensed terrestrial mobile wireless networks to the passenger via AAS technology, licensed off-board communications links, and licensed terrestrial providers.

It is clear that IMC providers are not telecommunications carriers, as defined in the Communications Act. Under the Communications Act, "telecommunications carriers" offer "telecommunications service," defined in turn as the provision of " telecommunications for a fee directly to the public."[31] The AAS essentially enables three types of service: broadband Internet access, text messaging, and voice services. Mobile data, such as broadband Internet access service and text messaging, are information services, not telecommunications services.[32]

Even with respect to voice services, the AAS-off-board link interface converts voice traffic to an IP data stream. Onboard the aircraft, the "last meter" connection from the passenger's mobile device to the AAS-picocell is effectively indistinguishable from the packet stream that would connect the same device to an onboard Wi-Fi router that could also be used for VOIP applications. Differences in the spectrum or air interface utilized should have no direct bearing on how IMC applications are treated from a regulatory standpoint. In addition, differences in authorization and billing arrangements (which, for IMC, are handled by the passenger's home wireless carrier) suggest that the actual service provider is the passenger's home carrier, regardless of how specific IMC applications are classified.

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[31] 47 U.S.C. §§153(50, 51, 53).

[32] *Cellco P'ship v. Fed. Commc'ns Comm'n*, No. 11-135 at 5. Indeed, if an airline chose not to enable voice, IMC would not implicate any potential common carrier service issues.

Moreover, IMC providers do not hold themselves out as common carriers. As stated by the United States Court of Appeals for the District of Columbia Circuit, the "primary *sine qua non* of common carrier status is a quasi-public character, which arises out of the undertaking to carry for all people indifferently."[33] IMC providers operating today make no such undertaking. They provide service only on a private contractual basis to wireless carriers within an international roaming framework. IMC providers bear no legal obligation to serve all carriers or public indifferently, and have not assumed such an obligation in their business practices.

2. There Is No Need to Impose Carrier-Like Obligations on IMC Providers

The Commission's Part 20 CMRS obligations can be separated into three general categories: (i) operational mandates; (ii) funding and support mechanisms; and (iii) common carrier/customer protection requirements. In every case, the Part 20 rules governing CMRS providers would be either inapplicable to IMC offerings or would continue to be met by the passenger's chosen home terrestrial mobile wireless service provider.

Operational Mandates. CMRS carrier operational mandates include the obligation to provide hearing aid compatible ("HAC") handsets, access to Telecommunications Relay Service ("TRS"), E-911 service, and traditional voice and data roaming.

IMC providers should not be required to comply with HAC requirements because they do not supply subscriber devices. As discussed above, AAS equipment extends terrestrial mobile wireless service to the airline cabin. U.S. CMRS carriers must comply with Commission requirements governing availability of HAC handsets, but IMC providers would have no control

[33] *National Ass'n of Regulatory Util. Comm'rs v. FCC*, 533 F.2d 601, 608 (D.C. Cir. 1976) ("*NARUC II*") (internal quotation marks omitted); *see also Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014).

over the means by which those providers discharge that responsibility. Moreover, even if the Commission were to find IMC providers subject to its HAC obligations, that rule exempts IMC providers on its face, stating that "service providers that offer two or fewer digital wireless handsets in an air interface in the United States are exempt from the requirements of this section in connection with that air interface."[34] Because IMC providers supply no wireless handsets, any obligation to include HAC handsets in their offerings is reduced to a nullity.

TRS obligations are similarly inapplicable to IMC providers. Because AASs operate pursuant to an international roaming framework, with a non-geographic mobile country code, it would be technically infeasible for AASs to comply with the obligation to make such services available using the "711" abbreviated dialing code required of domestic CMRS providers.[35] To the extent that a passenger must reach a TRS provider while aboard, he or she would need to dial a conventionally-dialed ten-digit North American Numbering Plan number in order to do so.

E-911 service obligations should not be imposed upon AAS operations for two primary reasons. *First*, E-911 requirements simply make no sense in an airborne emergency. Passengers have immediate access to cabin crewmembers, who are considered first responders aboard an aircraft[36] and who are trained to respond to in-flight emergencies. Even if an airborne mobile device would be capable of connecting to a Public Service Answering Point ("PSAP"), it would be infeasible, if not impossible, for the first responders on the ground to provide emergency services directly to someone in an aircraft traveling over 500 miles per hour at cruise altitude,

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[34] 47 C.F.R. § 20.19(e).

[35] 47 C.F.R. § 64.603; *The Use of N11 Codes and Other Abbreviated Dialing Arrangements*, CC Docket No. 92-105, Second Report and Order, FCC 00-257, 15 FCC Rcd 15188 (2000), at ¶ 3, App. B ¶ 4.

[36] *See* Association of Flight Attendants-CWA, AFL-CIO Comments at 2.

circumventing the cabin crew. For this reason, the Panasonic eXPhone automatically provides directions to any passenger dialing "911" or another emergency number to contact a member of the on-board cabin crew.

Second, crewmembers already have access to primary aviation radio communication channels should they need to contact the authorities on the ground during an in-flight emergency. The crew members do not rely on traditional 911 services or ground-based rescue operations in the event of an in-flight emergency, as the Commission has recognized.[37] AAS operations are not designed to supplant or supplement the communications systems used by the aircraft crewmembers in performance of their duties as first responders.

Traditional CMRS voice and data roaming obligations do not apply to AAS operations. While passengers "roam" onto the AAS operations, the AAS equipment provides neither the home or host carrier function on which the CMRS roaming obligations are premised. Instead, AASs facilitate a "last meter" mobile broadband connection by extending the licensed terrestrial mobile wireless network into the aircraft. AAS operations also do not roam onto host terrestrial mobile wireless networks on the ground. Thus, the traditional CMRS data and voice roaming obligations would not apply in the context of AAS operations.

Funding and support mechanisms. The Commission's rules require CMRS carriers and other telecommunications carriers to contribute to universal service support mechanisms, as well as the Commission's funds supporting TRS, administration of the North American Numbering

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[37] *See Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Report and Order and Further Notice of Proposed Rulemaking, CC Docket 94-102, ¶ 82 (rel. July 26, 1996).

Plan, and the shared costs of local number portability administration.[38] Universal service contributions are based on a provider's interstate and international, end user, telecommunications revenues,[39] subject to certain exemptions for those whose assessable revenues are *de minimis* or overwhelmingly international in nature.[40] Contributions to the other mechanisms are required of all U.S. interstate and international telecommunications carriers.

As discussed above, IMC providers do not operate as telecommunications carriers; thus, they bear no obligation to contribute to the TRS, numbering administration, or local number portability support mechanisms. Further, even if viewed as telecommunications providers, IMC revenues would be unlikely to trigger universal service contribution obligations. IMC providers have no end user customers because they solely provide wholesale access services to retail CMRS providers using an international roaming framework. Thus, their contribution base would necessarily be zero, based on this criterion alone. Rather, the passenger's home CMRS provider, as the owner of the end user relationship, bears the obligation to properly classify and report the revenue it receives from its customer based on his or her use of IMC offerings.

Moreover, IMC provider revenues are not assessable for purposes of the Commission's universal service contribution mechanism. Because it includes broadband Internet access, at least a portion of the IMC offerings constitutes an information service, not telecommunications,

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[38] *1998 Biennial Regulatory Review – Streamlined Contributor Reporting Requirements Associated with Administration of Telecommunications Relay Services, North American Numbering Plan, Local Number Portability, and Universal Service Support Mechanisms*, CC Docket No. 98-171, Report and Order, FCC 99-175, 14 FCC Rcd 16606 (1999), at ¶ 6.

[39] 47 C.F.R. § 54.706(b).

[40] 47 C.F.R. §§54.706(c), 54.708.

which is exempt from the contribution requirement.[41] Even with respect to voice services, because IMC is provided using an international roaming framework, all communications are considered to originate outside the United States, and many, of course, also terminate in foreign countries. As a result, existing AAS operations, which are global in nature, are likely to qualify for either the international revenue/12 percent rule or the *de minimis* USF contribution exemptions, discussed above.

Common carrier/consumer protection requirements. CMRS providers, as common carriers, have certain pricing, truth-in-billing, and related requirements for services offered to consumers. In addition, consumer protection requirements for CMRS carriers include protecting Customer Proprietary Network Information ("CPNI"). IMC providers should not be required to comply with these CMRS requirements because they do not operate as common carriers and because the passenger's home wireless carrier addresses these obligations.

With respect to common carrier requirements, the Commission should rely on its existing regulatory framework to govern CMRS provider end user rates, and should not impose separate requirements on AAS operations. Although IMC providers negotiate wholesale rates with wireless carriers in the context of international roaming arrangements, the passenger's home wireless carriers have exclusive control over end user rates and related business practices. Passengers can connect to the AAS only on subscriber devices through their home wireless carrier, which invoices the passengers for IMC access. Thus, the IMC provider cannot confirm

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[41] *See Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities*, CC Docket No. 02-33, Report and Order, FCC 05-150, 20 FCC Rcd 14853 (2005), at ¶ 12 ("*Wireline Broadband Internet Access Order*"). Thus, many of the obligations discussed in this section would apply solely to voice services provided via IMC.

or ensure whether IMC applications are provided to end users at a just and reasonable rate. The pricing requirements and related common carrier obligations would be met by the CMRS carrier.

Customer Proprietary Network Information ("CPNI") obligations are also inapplicable to IMC providers, because IMC is neither a telecommunications carrier or interconnected VoIP provider, nor an affiliate or marketing agent thereof.[42] The Communications Act of 1934, as amended, defines CPNI, in relevant part, as "information that relates to the quantity, technical configuration, type, destination, location, and amount of use of a telecommunications service subscribed to by any customer of a telecommunications carrier, and that is made available to the carrier by the customer solely by virtue of the carrier-customer relationship."[43] As discussed herein, the IMC provider is a systems integrator, not a telecommunications carrier or interconnected VoIP provider, and the air passenger is not its customer. Rather, the passenger's home CMRS provider will remain bound by CPNI obligations, including with respect to the passenger's use of IMC service. Thus, the Commission should recognize that there is no need to extend CPNI obligations in the context of AAS operations.[44]

E. The Commission Should Conduct Further Proceedings to Develop Rules for U.S. Domestic Implementation of AASs

Once it authorizes existing AASs to operate in U.S. airspace, the Commission should embark on further proceedings necessary to permit future generations of AAS equipment to

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[42] 47 C.F.R. § 64.2007(b); *see, e.g., USA Teleport, Inc.*, Order on Review, FCC 13-3, 28 FCC Rcd 525 (2013), at ¶ 10 ("Although the Commission has not addressed whether interconnected VoIP service constitutes a telecommunications service, it has elected to impose the same CPNI requirements on providers of both services.").

[43] 47 U.S.C. § 222(h)(1)(A).

[44] Moreover, the two existing IMC providers, AeroMobile and OnAir, are European companies subject to European customer protection and data privacy laws and will have a continuing obligation to abide by European consumer protection principles if AAS operations are approved for U.S. airspace.

incorporate U.S. domestic commercial mobile spectrum bands and air interfaces. Doing so would greatly expand the utility of IMC to the traveling public on U.S. domestic flights by eliminating the need for the passengers' subscriber devices to communicate on global frequency bands.

The Commission should accept CTIA's offer to work with IMC providers and other interested parties to conduct the technical and regulatory studies necessary to lay the groundwork for such rules, [45] and direct the participants to jointly file a progress report no later than December 31, 2014 providing recommendations on how best to implement IMC on U.S. domestic flights.

III. Conclusion

For the foregoing reasons, Panasonic requests that the Commission (a) expeditiously authorize the use of AAS equipment to provide IMC on U.S. and foreign-flagged aircraft operating on international routes in U.S. airspace; (b) adopt a Part 15 authorization framework to support AAS operations onboard U.S. airlines; (c) abstain from imposing additional service regulations on IMC offerings that would depart from international norms; and (d) direct CTIA

[45] CTIA Comments at 3 ("CTIA stands ready to work with the Commission and other stakeholders on the proposal—with a particular focus on potential interference issues.").

and other interested parties to conduct further study of U.S. domestic AAS operations and file a progress report with the Commission by the end of the year providing recommendations on how best to enable AAS operations on U.S. domestic flights.

Respectfully submitted,

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APPENDIX A

Proposed Rules

Part 15 of Title 47 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 15 continues to read as follows:

   AUTHORITY: 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

2. New section 15.258 is added to read as follows

AIRBORNE ACCESS SYSTEMS

§ 15.258 Operation of airborne access systems

(a) *Scope of operation.* Airborne access systems shall be permitted to operate under this rule subject to the following conditions:

(1) airborne access systems shall be authorized to operate only within the cabins of aircraft engaged in international commercial aviation;

(2) airborne access systems shall be authorized to operate only over the frequencies designated in this section;

(3) airborne access system operations must comply with the technical rules set forth in this section;

(4) airborne access systems shall be authorized to operate only after obtaining an airworthiness certification from the Federal Aviation Administration (FAA), the European Aviation Safety Administration (EASA) or other civil aviation agency responsible for airworthiness certification for the subject aircraft.

(b) *Definitions*.

(1) *Airborne access system (AAS)*. Equipment provided by an undertaking to enable airline passengers to use mobile wireless devices during flight without connecting directly to terrestrial mobile networks. AASs are comprised of an Aircraft Base Transceiver Station (Aircraft BTS) and Network Control Unit (NCU) as defined in this section.

(2) *Aircraft Base Transceiver Station (Aircraft BTS)*. One or more low-power transceivers located onboard the aircraft supporting the transmission and reception to or from mobile devices on specified frequencies within the aircraft cabin.

(3) *Network Control Unit (NCU)*. One or more low-power transmitters located onboard the aircraft that transmit on specified frequencies to ensure signals transmitted by ground-based mobile base station transmissions are not detectable by mobile devices within the aircraft cabin.

(c) *Technical requirements.* Airborne access systems must operate in accordance with the following technical requirements. Notwithstanding compliance with the technical requirements set forth in this section, airborne access system operations are subject to Section

15.5 (General conditions of operations) and shall not cause unacceptable interference to other authorized spectrum users.

(1) *Minimum height*. The minimum height above ground level for any transmission from an AAS in operation shall be 3,048 meters (~ 10,000 feet).

(i) *Active State*. When the AAS is in Active state, both the Aircraft BTS and the NCU are in Active State.

(A) The transmitter of the NCU is powered up when the NCU function of the AAS is in NCU Active State.

(B) The transmitter of the Aircraft BTS is powered up when the Aircraft BTS function of the AAS is in the Aircraft BTS Active State.

(C) The Aircraft BTS function is permitted to enter the Active State only after proper NCU initialization has been reached.

(D) The Aircraft BTS function is not permitted to be in the Active State unless the NCU function is concurrently in the Active state.

(ii) *Standby State*.

(A) The transmitter of the NCU is powered down when the NCU function of the AAS is in NCU Standby State.

(B) The transmitter of the Aircraft BTS is powered down when the Aircraft BTS function of the AAS is in the Aircraft BTS Standby State.

(iii) If the requirements herein cannot be met simultaneously for a particular aircraft altitude, the minimum altitude for the operation of that AAS shall be increased to such altitude as to ensure compliance with the requirements.

(2) The Aircraft BTS, while in operation, shall limit the transmit power of all mobile terminals to the following nominal values at all stages of communication, including initial access:

(i) 0 dBm / 200 kHz for all GSM terminals transmitting in the 1800 MHz band

(ii) 5 dBm / 5 MHz for all LTE terminals transmitting in the 1800 MHz band

(iii) -6 dBm / 3.84 MHz for all UMTS terminals transmitting in the 2100 MHz band

(3) *Frequency Bands*

(i) *Aircraft BTS*. The Aircraft BTS of a AAS must be designed to operate on the following frequencies:

(A) 1710 to 1785 MHz uplink for GSM, or LTE technologies

(B) 1805 to 1880 MHz downlink for GSM, or LTE technologies

(C) 1920 to 1980 MHz uplink for UMTS

(D) 2110 to 2170 MHz downlink for UMTS

(ii) *NCU*. The NCU of a AAS must be designed to prevent mobile terminals receiving within the frequency bands listed below from attempting to register with mobile networks on the ground:

(A) 460 to 470 MHz

(B) 791 to 821 MHz

(C) 921 to 960 MHz

(D) 925 to 960 MHz

(E) 2110 to 2170 MHz

(F) 2620 to 2690 MHz (from the 1st January 2017)

(4) *Transmission Characteristics.*

(i) *EIRP From the NCU / Aircraft BTS, Outside the Aircraft.*

(A) The total equivalent isotropic radiated power (EIRP), outside the aircraft, from the NCU / Aircraft BTS shall not exceed:

(1) For NCU operations on the 460 to 470 MHz band

(i) -17.0 dBm/1.25 MHz at 3048 meters above ground

(ii) -14.5 dBm/1.25 MHz at 4000 meters above ground

(iii)-12.6 dBm/1.25 MHz at 5000 meters above ground

(iv) -11.0 dBm/1.25 MHz at 6000 meters above ground

(v) -9.6 dBm/1.25 MHz at 7000 meters above ground

(vi) -8.5 dBm/1.25 MHz at 8000 meters above ground

(2) For NCU operations on the 800 MHz band:

(i) -0.87 dBm/10 MHz at 3048 meters above ground

(ii) 1.63 dBm/10 MHz at 4000 meters above ground

*(iii)*3.57 dBm/10 MHz at 5000 meters above ground

(iv) 5.15 dBm/10 MHz at 6000 meters above ground

(v) 6.49 dBm/10 MHz at 7000 meters above ground

(vi) 7.65 dBm/10 MHz at 8000 meters above ground

(3) For NCU operations on the 921 to 960 MHz band

(i) -19.0 dBm/200 kHz at 3048 meters above ground

(ii) -16.5 dBm/200 kHz at 4000 meters above ground

(iii)-14.5 dBm/200 kHz at 5000 meters above ground

(iv)-12.9 dBm/200 kHz at 6000 meters above ground

(v) -11.6 dBm/200 kHz at 7000 meters above ground

(vi)-10.5 dBm/200 kHz at 8000 meters above ground

(4) For NCU operations on the 2110 to 2170 MHz band

(i) 1.0 dBm/3.84 MHz at 3048 meters above ground

(ii) 3.5 dBm/3.84 MHz at 4000 meters above ground

*(iii)*5.4 dBm/3.84 MHz at 5000 meters above ground

*(iv)*7.0 dBm/3.84 MHz at 6000 meters above ground

(v) 8.3 dBm/3.84 MHz at 7000 meters above ground

*(vi)*9.5 dBm/3.84 MHz at 8000 meters above ground

(5) For NCU operations on the 2620 to 2690 MHz band:

(i) 1.9 dBm/4.75 MHz at 3048 meters above ground

(ii) 4.4 dBm/4.75 MHz at 4000 meters above ground

*(iii)*6.3 dBm/4.75 MHz at 5000 meters above ground

*(iv)*7.9 dBm/4.75 MHz at 6000 meters above ground

(v) 9.3 dBm/4.75 MHz at 7000 meters above ground

*(vi)*10.4 dBm/4.75 MHz at 8000 meters above ground

(6) For GSM operations in the 1800 MHz band, the transmit power of the Aircraft BTS must not exceed the following maximum EIRP:

(i) -13.0 dBm/200KHz at 3048 meters above ground

(ii) -10.5 dBm/200KHz at 4000 meters above ground

(iii)-8.5 dBm/200KHz at 5000 meters above ground

(iv)-6.9 dBm/200KHz at 6000 meters above ground

(v) -5.6 dBm/200KHz at 7000 meters above ground

(vi)-4.4 dBm/200KHz at 8000 meters above ground

(7) For LTE operations in the 1800 MHz band, the transmit power of the Aircraft BTS must not exceed the following maximum EIRP:

(i) 1.0 dBm/5 MHz at 3048 meters above ground

(ii) 3.5 dBm/5 MHz at 4000 meters above ground

*(iii)*5.5 dBm/5 MHz at 5000 meters above ground

*(iv)*7.1 dBm/5 MHz at 6000 meters above ground

(v) 8.4 dBm/5 MHz at 7000 meters above ground

*(vi)*9.6 dBm/5 MHz at 8000 meters above ground

(8) For UMTS operations in the 2100 MHz band, the transmit power of the Aircraft BTS must not exceed the following maximum EIRP:

(i) 1.0 dBm/3.84 MHz at 3048 meters above ground

(ii) 3.5 dBm/3.84 MHz at 4000 meters above ground

*(iii)*5.4 dBm/3.84 MHz at 5000 meters above ground

*(iv)*7.0 dBm/3.84 MHz at 6000 meters above ground

(v) 8.3 dBm/3.84 MHz at 7000 meters above ground

*(vi)*9.5 dBm/3.84 MHz at 8000 meters above ground

(B) *EIRP Values.* The values in this subsection correspond to a maximum increase of the receiver noise floor 1 dB (i.e. I/N ≤ -6 dB) with a high statistical confidence using the most sensitive types of base stations and terminals.

(ii) *EIRP From Mobile Devices Onboard the Aircraft*.

(A) The maximum equivalent isotropic radiated power (EIRP), outside the aircraft, from mobile terminals shall not exceed the following values:

(1) From GSM terminals transmitting in the 1800 MHz band

(i) -3.3 dBm/200 KHz at 3048 meters above ground

(ii) -1.1 dBm/200 KHz at 4000 meters above ground

(iii) 0.5 dBm/200 KHz at 5000 meters above ground

(iv) 1.8 dBm/200 KHz at 6000 meters above ground

(v) 2.9 dBm/200 KHz at 7000 meters above ground

(vi) 3.8 dBm/200 KHz at 8000 meters above ground

(2) From UMTS terminals operating in the 2100 MHz band

(i) 3.1 dBm/3.84 MHz at 3048 meters above ground

(ii) 5.6 dBm/3.84 MHz at 4000 meters above ground

(iii) 7 dBm/3.84 MHz at 5000 meters above ground

(iv) 7 dBm/3.84 MHz at 6000 meters above ground

(v) 7 dBm/3.84 MHz at 7000 meters above ground

(vi) 7 dBm/3.84 MHz at 8000 meters above ground

(3) From LTE terminals operating in the 1800 MHz band

(i) 1.7 dBm/5 MHz at 3048 meters above ground

(ii) 3.9 dBm/5 MHz at 4000 meters above ground

(iii) 5 dBm/5 MHz at 5000 meters above ground

(iv) 5 dBm/5 MHz at 6000 meters above ground

(v) 5 dBm/5 MHz at 7000 meters above ground

(vi) 5 dBm/5 MHz at 8000 meters above ground

(B) *ERIP Values.* The values in this subsection correspond to a maximum increase of the receiver noise floor 1 dB (i.e. I/N ≤ -6 dB) with a high statistical confidence using the most sensitive types of base stations and terminals.

Part 22 of Title 47 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 22 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 222, 303, 309, and 332.

2. Section 22.925 is revised to read as follows:

§ 22.925 Airborne Operation of Mobile Devices

Devices using frequencies licensed under this subpart are prohibited from operating onboard airborne aircraft except as authorized by § 15.258.

Part 24 of Title 47 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 24 continues to read as follows:

   AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 309, and 332.

2. Section 24.3 is revised to read as follows:

§ 24.3 Permissible Communications

PCS licensees may provide any mobile communications service on their assigned spectrum. Fixed services may be provided on a co-primary basis with mobile operations. Broadcasting as defined in the Communications Act is prohibited. Devices using frequencies licensed under this rule part are prohibited from operating onboard airborne aircraft except as authorized by § 15.258.

Part 27 of Title 47 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 27 continues to read as follows:

   AUTHORITY: 47 U.S.C. 154, 301, 302(a), 303, 307, 309, 332, 336, 337, 1403, 1404, and 1451 unless otherwise noted.

2. Section 27.2 is revised to read as follows:

§ 27.2 Permissible Communications

(a) Miscellaneous wireless communications services. Except as provided in paragraph (b), (d), or (e) of this section and subject to technical and other rules contained in this part, a licensee in the frequency bands specified in § 27.5 may provide any services for which its frequency bands are allocated, as set forth in the non-Federal Government column of the Table of Allocations in § 2.106 of this chapter (column 5).

(e) Devices using frequencies licensed under this rule part are prohibited from operating onboard airborne aircraft except as authorized by § 15.258.

Part 90 of Title 47 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332 (c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7), and Title VI of the Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. 112-96, 126 Stat. 156.

2. Section 90.423 is revised to read as follows:

§ 90.423 Airborne Operation of Mobile Devices

Devices using frequencies licensed under this rule part are prohibited from operating onboard airborne aircraft except as authorized by § 15.258.