

# Timeframe and Challenges to Alternative IFE Accessibility via Portable Electronic Devices

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## Background

The Facilitator and the Department of Transportation have asked the airline industry to explain in writing the reasons it cannot commit to making an alternative IFE accessibility path available on a very-short timeframe. The general alternative path idea is meant to apply when an air carrier has an installed IFE system without accessibility features.

They have also asked the industry for information, additional to its previously-submitted papers (revised and attached as Appendices A and B, respectively), on enhancing accessibility of inflight entertainment (IFE) through either carrier- or passenger-provided portable electronic devices (PEDs). The industry views these questions as interrelated. A timeframe for implementing any regulatory requirement to provide an alternative form of accessible IFE when and where an airline's seatback IFE systems remain inaccessible should be designed to accommodate all envisioned paths that an airline could use to meet such a mandate.

Members of the Committee have suggested, among other options, that airlines that provide IFE via inaccessible legacy seatback systems might provision portable electronic devices (PEDs) for passengers' use as an alternative for inflight entertainment accessibility. However, it appears this may also be the alternative accessibility path that would take the longest time to implement. As discussed in the updated attachment there are significant downsides for both passengers and carriers to this path, including the fact that carrier-provided PEDs would be available for less than the duration of the flight; the need to pre-register and pay a deposit; and limitations on content to content that would be acceptable to all audiences, including children.

This paper offers additional details from the point of view of air carriers about the practical considerations that require at least a four- to five-year implementation period, after a rule becomes effective, before carriers could even begin to provide accessible IFE via carrier-provided PEDs (CPEDs). Other alternatives, such as streaming accessible content to passenger-owned devices via WiFi, might be feasible on a shorter schedule – the limited time available prevents investigating in depth all the steps involved in pursuing that option as well. However any obligation to alternative entertainment must be based on a schedule that allows all airlines to select the compliance path(s) that are best for them and their customers, including the possibility of a CPED program. This schedule also should ensure that carrier efforts to make installed IFE accessible are not delayed or underfunded due to the need to pursue two compliance paths simultaneously.

As the carriers have shared with the Fifth Plenary in the documents attached, IFE has previously been entirely free of regulation. Every carrier's technology and business model are different, and the current state of IFE accessibility ranges widely among carriers and even among aircraft types, and cabins within

those types, even within the same carrier. The centerpiece of the carriers' proposed approach on accessible IFE therefore embraces the idea that any regulation should permit various compliance paths, and not depend on carrier-provided PEDs (or in fact any other single path to compliance). The carriers' suggested approach is consistent with the regulatory imperative to explore various alternatives when evaluating proposed regulation. Carriers also advocate for timeframes that allow for a practically and financially reasonable transition. This approach takes into account the inherent difficulty and uncertainty of a complex project such as making accessible IFE on thousands of aircraft and scores of airlines available to almost a billion airline passengers annually.

It also bears explaining that a five-year period not only allows for carriers that elect to do so to develop and test a CPED-based program, but also allows carriers and the market to continue to invest in making installed IFE systems accessible. Many carriers prefer to continue to make their basic IFE systems accessible rather than diverting resources to alternatives such as CPEDs. Investing heavily in CPEDs would consume resources that could otherwise be put toward equally-accessible primary IFES for all customers, with or without a disability, and slow carriers' progress toward much more effective and desirable, sustained solutions.

#### **Carrier-provided PED Timeframe**

Many if not most carriers with IFE have experimented with CPEDs. They have found the customer experience, cost, loss and damage of such programs generally negative. Few such programs remain. The few CPED programs that continue to exist are on limited routes, often where other options are unavailable or as stopgap measures. Even some of the lingering experiments in CPEDs are likely to end in the near future.

Other such CPED programs are in premium classes of service where the high cost of the tickets and competitive considerations for premium customers may justify the expenditures involved in operating such a program on a limited basis, and where the high ratio of flight attendants to passengers reduces (but does not eliminate) theft. PEDs in a premium cabin are also more feasible than in coach, as flight attendants have more time available to support passengers using a device for the first – and probably last – time. In addition, where they exist CPEDs tend to be for long-haul routes only in part because the process of provisioning the devices onboard at the beginning of the flight (after ascent) and collecting them ordinarily about 45 minutes before landing means that a device is only available for a portion of flight. That timing is acceptable for long-haul flights, but for short haul flights means that the device might be available only for half or less of the flight duration.

For these reasons, even where carriers may already have a limited form of airline-provided PED entertainment program in place, such a program cannot be easily expanded to provide PEDs for passengers with hearing and/or visual disabilities who may be traveling in other classes of service or aboard different aircraft and routes. In the case of shorter flights the short time that the PED might be available suggests that other alternatives are better for the passenger.

Against that backdrop, and in response to the Committee's request, airlines share a broad outline of the steps and minimum timeframes needed to implement a CPED program. As no carrier to our knowledge

has a system-wide CPEDs program, much of this development would be necessary for every carrier that elected this compliance path. For any carrier that has some CPEDs program that could be scaled, the development might be compressed relative to an airline that would be required to implement from scratch.

In general, as described below, timing to implementation ranges from an estimated absolute minimum of three years (assuming a carrier has an existing program that is scalable) to five years from the time a rule is final. To be clear, these are optimistic assumptions, leaving no room for unknown factors, supply chain or contracting problems or other contingencies. The steps outlined below assume funding a program; development of a supply chain; implementation and testing; and training flight attendants and call center staff to the new program. Ultimately, timing would also depend on the FAA's agreement on a per-device/per-aircraft basis; as described below, the timing of that step is outside of carrier control.

Most steps below are sequential; where steps can be run at least in part concurrently that is indicated. Please note that this is an initial assessment and may inadvertently ignore steps or misstate timing.

#### Seeking Clarification and Interpretation (two months)

For complex rules there is frequently back and forth between the regulated community and the Department regarding specifics. Carriers believe that it would take at least two months to ensure that carriers understand the meaning of a final rule on IFE accessibility that might include a CPEDs option.

#### Internal Scoping/Defining Strategy and Requirements (seven months)

Once the specifics of a rule are known, each carrier would need to conduct internal review to determine how it might comply with a rule, including exploring whether a carrier-provided PED program should use internal or external resources and figuring out the approximate cost of such a program. This process would take at least three months. Several additional months would be needed subsequently to determine PED hardware selection, and for PED software selection and development. Please note that these phases regard only the PED itself; carrier website and other IT development is a separate task and is discussed separately below.

#### Securing Budget (eight months)

Once internal scoping with initial estimates of budget needs has been completed, carriers would have to put this budget request into their internal budget cycles. Airline budgets typically run one year in advance. Depending on budget cycles, carriers would need to build in six months on average after a rule is final to ensure that sufficient funds are budgeted for a carrier-provided PEDs program. Any budget implications of a CPED program would complete for financial and other resources with programs to make installed IFE more accessible.

#### Requesting Proposals / Signing Contracts (five months)

If a carrier elects to use an outside vendor for a CPED program it would typically need to use a request for proposal (RFP) process. It can take three months to draft the RFP; an equal time to receive

responses; and several months more to complete the procurement process, including signing contracts. At this point the carrier might be reasonably certain of the type of PED that would be used, and therefore would be ready only after this phase to seek FAA agreement and testing. That phase is described below.

#### Hardware Development (six months)

Because of the low and declining demand for airline provided PEDs, there are very few IFE suppliers who still produce airline PEDs. IFE suppliers no longer manufacture PEDs specifically for airlines, but instead modify consumer off-the-shelf (COTS) electronic devices for airline use (e.g. Apple iPad, Samsung Galaxy, etc.). Because COTS devices change rapidly, there is little opportunity for economy of scale among airline PED programs. Each individual airline PED program essentially becomes a bespoke program, driving additional costs and development time.

COTS devices must be modified to provide additional security to receive studio approvals to exhibit early-window movies. Such security measures may include hardware, software, and/or firmware modifications. Hardware modifications require special tooling to be developed and typically a prototype unit is produced prior to tool finalization and production.

COTS devices also need to be ruggedized for the wear and tear of provisioning on aircraft (e.g., the COTS casing may require reinforcement or the audio jack may need to be replaced with a ruggedized audio jack). These components may need to be custom designed for the COTS device selected.

#### Studio Testing of PED / Content Security (four months, more if the PED fails)

The PED supplier is required to submit a prototype PED to each studio for security evaluation to receive approval to exhibit early-window movies. Each studio will independently attempt to hack content from the device with their respective internal security organizations.

#### Hardware Production (six months)

Once studio approvals are received, the PED supplier can begin production of PED hardware. This is typically done by a third-party plastics provider off-shore. Production schedules can be difficult to obtain because of the relatively low volumes of customized hardware compared with COTS devices. Once hardware components are produced and shipped, the final airline PED must be assembled.

#### Preparing FAA Application / Receiving FAA Agreement (minimum six months, maximum is unknowable)

After an RFP process or an internal process that selects, specs and determines necessary modifications for a type of device or devices, each carrier would have to seek FAA approval for its PED program. Naturally the Department and not carriers would be in the best position to determine the FAA's requirements and imaginable timeframes for completing any needed review of industry-wide carrier-provided PEDs, and the information below is provisional awaiting the FAA's own assessment of applicable rules and timeframes.

In carrier experience, pending any specific information from the FAA, even if there are not specific FAA rules or regulations requiring FAA approval prior to implementation for consumer electronics devices airlines elect to board on their aircraft for crew or customers to use inflight, in fact the FAA's interpretations of its various requirements have meant in practice that carriers still must obtain FAA clearance.<sup>1</sup>

Carriers assume that the DOT is in the best position to ask FAA about its approval timeline. From carrier experience in analogous programs, however, these FAA approvals are likely to require airlines to provide test data, such as EMI testing results that exceed what is required to certify consumer devices for public use on the ground. Further, from carrier experience, testing PEDs would likely take place on every aircraft on which the PED might be used, commonly in aircraft hangars overnight. This testing creates timing and logistics challenges both for carriers and the FAA that would be multiplied if they were to apply at about the same time period across every carrier/aircraft/PED combination that would arise from a carrier-provided PED rule.

The FAA's website states regarding pilot PEDs, "The FAA has let pilots use PEDs for some time. Why not passengers?"

"Many airlines use tablets as Electronic Flight Bags containing information such as maintenance documents, company and aircraft manuals and approach charts. Before the FAA allows an airline to do this, the device must go through a rigorous evaluation period — typically six months — to make sure they are reliable and will not cause interference with the airplane's electronic systems... The FAA's safety risk assessment will help an airline review the electronic systems on its airplanes to determine if expanded use of PEDs is acceptable for their specific airplanes and operations. It looks at the technical risks associated with system problems caused by PEDs. Airlines should use the assessment as a tool in conjunction with other operational considerations such as PED stowage and crew and passenger education."

In addition to known processes and timelines that are under FAA (not carrier) control, FAA requirements are added or reinterpreted over time. Additional FAA oversight in the area of consumer electronics onboard is always a possibility.<sup>2</sup> Due to uncertainty over the time that any FAA review of a CPED proposed approach would take, any DOT regulation that sets a specific time for carrier-provided PEDs

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<sup>1</sup> FAA InFo document 09014 mentions Title 14 of the Code of Federal Regulations (14 CFR) §§ 91.21, 121.306, 125.204, and 135.144 limits the operation of PEDs aboard U.S.-registered civil aircraft. It states, "These rules also permit the use of specific PEDs after the aircraft operator has determined that the PED will not interfere with the operations of the aircraft nor cause problems stemming from hazardous materials (hazmat)." Please note that this information is not meant to substitute for information directly from FAA, but illustrates that FAA has oversight over PEDS that a carrier might provision for use onboard aircraft due to concerns about any communication and navigation system interference and possible fire hazards.

<sup>2</sup> Carriers also note that APEX previously explained to the Committee that if tablets are part of a WiFi network "the aircraft must be DO-307 certified to determine that emission-mitigation procedures have been deployed. If the server or any part of the network is attached to the aircraft, then it has to be DO-160-certified." According to APEX: "These might well cost into the hundreds of thousands of dollars." (See *PEDs in IFE*, APEX Aug 12 Presentation, at 2.)

must be counted starting from the date that the FAA agrees to allow such a device for each specific aircraft type/PED combination.

If the DOT were to propose a mandatory or optional carrier-provided PED program, it should establish a compliance deadline that starts only after FAA approval.

Provisioning-Supplier Ramp-Up (12 to 18 months – could begin while hardware/software development is ongoing)

Much like they do with caterers and wheelchair providers, airlines will likely need to source a provisioning supplier to manage the logistics of taking PEDs on and off aircraft and to provide maintenance support. There are very few – or depending on location – no such suppliers in the marketplace today and they may or may not be located in the correct airport locations for any given airline.

If a new airport location needs to be established, the supplier will have to lease space, likely off-airport, because of limited real estate availability on airport property. Supplier personnel will have to be screened by the airport authority and the TSA, and the proposed end-to-end provisioning process will need to be reviewed and approved by the TSA.

Cart-Inspection Supplier Ramp-Up (six to twelve months – could occur concurrently with provisioning-supplier ramp-up)

The TSA requires any cart provisioned on aircraft to be inspected and sealed by a separate entity than the cart provisioner. Similar to the provisioning suppliers, there are very few such cart inspection suppliers in the marketplace today and they may or may not be located in the correct airport locations for any given airline.

IT Development and Website Registration Steps (16 months – could occur concurrently with other steps)

Prior to obtaining FAA approval for a CPED plan, carriers would be reluctant to take costly steps to implement such a program. One less-costly step that might take place even awaiting FAA approval is preparation for a data collection standard for an attestation of eligibility for a CPED. As discussed previously, carriers would need to ask passengers to provide an attestation of eligibility in order to reduce fraud and ensure that PEDs are made available for those entitled to them. Therefore, IATA might need to create a standard for data collection to ensure consistency across carriers and itineraries that might involve multiple carriers. That process might take two months, subject to IATA's commentary or agreement as to whether an IATA standard would be applicable in this case.

The next step is costly and would reasonably only take place once FAA approval was received. It would take each carrier about three months, at a minimum, to secure IT budget. With the standard (carrier or perhaps IATA) and budget in hand, it would take about nine months for each carrier to specify, complete and test programming depending on the complexity of the project. This IT work might reach into individual passenger profiles and would certainly have to query the specific flights booked and cabin of service to determine whether the particular flight on which a passenger was booked had accessible or

inaccessible IFE. This is a complex IT project. This projected timeframe is based on recent carrier experience regarding passenger certification for flights to Cuba, and may be understated.<sup>3</sup>

#### Website and App Development (depends on completing IT development – five months)

Once IT development was finished, the system(s) developed would need to be integrated into carrier websites. At least five months would be needed to develop websites and apps to support a CPED program with its attestation process and to address the advocates' request to have preferences built in to carriers' stored passenger profiles if that proves technically possible. Storing preferences is even theoretically feasible only for passengers who have and use loyalty program profiles. Please note that Legal and Regulatory review are simultaneous with Website and IT development and would likely take no additional time.

#### User Testing (one month, unless flaws are found)

Carriers usually perform user testing on new products and services to ensure that they perform to customers' expectations. Any new CPED program would likely undergo user testing. This phase can be brief unless it uncovers flaws that require changes.

#### Flight Attendant Training (12 months, immediately before program launch only – CPED program might be able to launch before training is complete)

It takes at least several months to develop flight attendant training before it can be presented for the first time. A full cycle of flight attendant training usually takes a full year for a large airline, and this may include obtaining FAA curriculum approval. There are potentially hundreds of thousands of flight attendants in the United States who would need to undergo some sort of training to support a CPED program depending on how many carriers elected such a program. Therefore the timeline described includes a full year for flight attendant training to be completed once all other aspects of a program are set in stone. Flight attendants are responsible for a huge body of knowledge; and learning that is not soon reinforced is quickly forgotten. Therefore flight attendant training should only take place once a program and its specifics are certain.

#### Contact Center and Accessibility Desk Training (four months, immediately before program launch only – could take place simultaneously with flight attendant training)

IT cannot of course solve every element of ensuring that passengers who would benefit from a CPED would get that device (and that those who do not qualify do not consume all PEDs, leaving the intended beneficiaries without them). A degree of live customer contact is inevitable, requiring that call-center staff are y trained to handle customer calls about the issue. Call center training can only be successful if

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<sup>3</sup> IT development and deployment would be necessary because, for most carriers, a process under which the passenger calls in to request the device would be prohibitively expensive. Skilled call-center "talk time" can run \$1 per minute and would be cost-prohibitive in the long run and burdensome on the passenger. If a carrier did not have any accessible IFE systems, however, this step could be greatly simplified since there would be no need to research at the flight level if the scheduled aircraft and class of service had accessible or inaccessible IFE.

it takes place immediately before a program goes into place. As in the case of flight attendants, training too early means that staff forgets the training when it is not directly reinforced by actual experience. Fortunately call center staff training could take place at the same time as flight attendant training in the timeline above, as there are no dependencies between those two steps.

### **Contingencies**

The timeline above ignores contingencies that include but are not limited to weight and balance considerations, if any; storage for PEDs onboard (if elected or mandatory); testing for avionics equipment known as Radio Technical Commission for Aeronautics (RTCA) DO -160 testing and associated timing; potential security issues (cyber attacks, power outages, loss of connectivity to Internet; and nature and gravity issues). It also does not address any timing or complications regarding content, which may require separate negotiations with providers to reach agreements for the licensing and procurement of content that may be displayed on PEDs, as they are a separate display channel that may not be covered under existing content-supply contracts. That process alone could take more than 90 days for many carriers to complete, and at least one U.S. carrier notes that it procures its content in six-month increments beginning approximately two months before it begins to appear onboard, in which case making content changes necessary for compliance with eventual new rules could take considerably longer than 90 days to become effective. Nor does the timeline above address potential timing or complications related to arrangements for charging the devices, or to arrangements that a carrier might have to make with business partners such as alliance partners and express carrier partners, to the extent that a rule would require obligations on those partners. All of these additional factors could add to the time required for a carrier to make available an alternative IFE accessibility path.



## APPENDIX A

### **Challenges to IFE via Carrier-Provided Portable Electronic Devices**

#### **Background**

Members of the Committee have suggested among other options a regulatory requirement that airlines that provide inflight entertainment (IFE) via inaccessible legacy seatback IFE systems might provision portable electronic devices (PEDs) to passengers as an alternative for inflight entertainment accessibility. APEX provided substantial written information to the Working Group's August 12 call on this topic that details the difficulties of a carrier-provided PED program from the perspective of its membership. This background paper provides additional details from the point of view of air carriers.

There are enormous challenges to a mandatory PED program and carriers strongly believe that no rules should mandate carrier-provided PEDs. Every carrier's technology and business model are different, however, so IFE compliance should offer various paths, potentially including PEDs as an option, without mandating carrier-provided PEDs.

There are a host of reasons not to mandate carrier-provided PEDs. These include negative cost-benefit balance relative to other options under most circumstances; the fact that other options are likely to provide a better customer and entertainment experience for users; and the reality that a mandatory PEDs program threatens to force at least some carriers or aircraft to turn off inaccessible IFES, rather than bear the anticipated exceptionally high cost and logistical challenges of such a compliance path.

APEX reports that 97 percent of passengers carry a PED already, making a carrier-provided PED itself redundant for most passengers in terms of hardware. Personally-owned PED use is only increasing, and that small three-percent gap is likely to become yet smaller over time. As discussed in the ACCESS Committee's IFE Working Group, due to obstacles that cannot be overcome, including restrictions by content providers, IFE content that might be preloaded on a carrier-provided PED will not be the same as entertainment provided by seatback IFES or overhead IFES. Moreover, the trend in IFE is toward passenger-selected (preloaded or streamed) entertainment selected from the entire universe of entertainment, not from a much smaller universe of carrier-selected movies or television programs. The inconvenience to passengers of having to collect, return and provide a deposit for the device itself also makes other options, potentially including WiFi access, more attractive to passengers.

#### **Even if Carriers Offered a PEDs Program It Might Not Be Customer Friendly**

Air carriers want to serve passengers in the most convenient way possible. The characteristics of a carrier-provided PED program alone are likely to make this option unacceptable to many customers. First, a PED program might provision the device onboard the aircraft or elsewhere, as discussed below. In a program that provided PEDs anywhere other than onboard the aircraft, carriers would not offer PEDs without a deposit presumably equal to the value of the device. This alone is a barrier for many passengers to access such a program. Second, the customer would frequently have to pay this deposit through a separate transaction since approximately one-half of passengers book through a travel agent,

and even for passengers who book directly there would need to be agreement for the deposit. The PED request might also be made at a different time than the ticket is booked, which would drive a separate credit card transaction. Third, at least one major carrier charges for entertainment in its economy cabin, and would presumably also charge for PEDs content. Finally, some reservation or pre-qualification would be needed to ensure availability of the device and to attempt to minimize fraud.

Practical considerations make carrier-provided PEDs particularly challenging from a customer experience perspective on short-haul flights. One major U.S. airline with considerable experience in provisioning PEDs in premium cabins for its long-haul flights notes that it is not always possible to distribute PEDs to premium-cabin customers prior to takeoff, depending on crew duties at the time, meaning that passengers often do not receive a PED until sometime after the aircraft reaches cruising altitude. The carrier typically collects these devices 45-60 minutes prior to landing. After adjusting these timeframes slightly to account for the larger passenger volumes and related flight-attendant workloads in coach cabins, which could further delay distribution of carrier-provided PEDs and mean they must be collected earlier in the landing-preparation process, it's clear to see that these devices would be available to passengers for viewing for only a very narrow window of time during short-haul flights, perhaps less than half the duration (or less) of flights shorter than two hours.

### **Quality of Entertainment**

The amount and variety of entertainment that could be loaded on a PED would be limited by its storage capacity and by the need to keep entertainment generally acceptable and useable to different types of passengers, including children. Devices provided outside of the aircraft itself are also expected to be subject to restrictions on current movie content according to discussion in the Working Group. APEX has previously described many of the content-related problems to different varieties of a carrier-provided PED program; as IFE industry experts have brought forth in the Working Group, PEDs will not provide content that mirrors that which is provided by onboard (seatback) systems.

### **FAA and Consumer Electronics Onboard**

Time has not allowed a full exploration of FAA requirements and timeframes that might be associated with a carrier-wide PED program. Even if there are not specific FAA rules or regulations that say a consumer electronics device an airline elects to board on its aircraft for crew or customer to use inflight must have FAA approval prior to implementation, carrier experience shows that airlines must do so anyway so per FAA interpretation of its various requirements. These approvals may require providing test data such as EMI testing that far exceeds what the consumer device requires for public use on the ground. It bears repeating that merely because an electronic device is available and in use on the ground does not mean that an airline might provide it for use onboard or, even if allowed, that the carrier may do so immediately. The September 2016 FAA recommendation that airline passengers not turn on or charge Samsung Galaxy Note 7 devices on board aircraft and should not stow them in any checked baggage is just one illustration of the special risks consumer devices might pose onboard and associated requirements. Moreover, FAA requirements are added or reinterpreted over time and additional FAA oversight in the area of consumer electronics onboard is always a possibility.

## **Fraud**

Potential for fraud by passengers who are not qualified individuals with a disability is, regrettably, another barrier to a successful carrier-provided PED program. Air carriers have decades of experience administering a number of programs intended for qualified individuals with disabilities. All of these programs suffer from fraud. Carriers bear millions of dollars in costs informing the public about eligibility for programs to reduce fraud in order to ensure services are available to those entitled to them. However, there is no way to eliminate fraud entirely, and carriers are committed to minimizing any burden on qualified individuals.

In the case of PEDs, since any member of the public might enjoy an alternative or additional form of entertainment, at even a minimal one-percent fraud rate among the public, there would be potentially 10 million annual fraudulent users of a PEDs program, with associated costs. Carriers are also concerned that fraud would threaten to limit the number of PEDs available to their intended beneficiaries, especially for any first-come, first-served arrangement.

### **A Carrier-provided PED Program is Costly and Challenging**

Even if customers were to accept the need to pre-certify, pay a deposit, and accept the limited entertainment offerings a carrier-provided PED loaded with entertainment might offer, and if each carrier had the FAA's agreement for each aircraft/device combination, the costs to carriers and other barriers alone argue against a carrier-provided PED program as a regulatory requirement. While certain carriers provide entertainment by PEDs, this is commonly in limited circumstances only; PEDs at carrier election on certain routes is far easier to administer than a system-wide requirement. Non-U.S. carriers and U.S.-carrier international flights would have exceptional and perhaps impossible challenges to overcome in providing and retrieving PEDs at non-U.S. locations, possibly including customs restrictions. Content restrictions may also be a problem for any international itineraries.

### Onboard/Aircraft-anchored PEDs

As discussed, there are two major paths a carrier might use to offer PEDs. A program to provide PEDs onboard would need multiple PEDs, potentially for every aircraft in the fleet. Thousands of aircraft operate in the United States across hundreds of commercial airports and scores of air carriers serving over 900 million annual passengers. The logistics of ensuring a reasonable number of PEDs on aircraft across this network would be extraordinarily complicated as would ensuring they are charged. The huge cost burden to carriers in the past of administering medical oxygen programs, especially relative to more cost-efficient personally-provided oxygen, is a good analogy. Passengers now almost always bring their own portable oxygen concentrators (POCs) to address their medical needs inflight rather than relying on carrier-provided oxygen with the cost and, given the complexity of provisioning, service failures that plagued those programs.

### Mobile/On-demand/Non-networked Carrier-provided PEDs

Any effort to provide passengers with carrier-owned PEDs outside of the aircraft itself might require fewer PED units than stocking PEDs at airports or on aircraft. Time has not permitted a full scoping, but numbers of devices needed would depend on yet-unknowable factors like demand; loss and breakage; time required to recharge the devices; possible shipping costs and times; and other factors. For any such program the passenger would presumably be in possession of the device for a longer period than the duration of the flight, creating the need to offer a PED for a far longer duration than the flight itself, perhaps days. Many other questions remain unanswered, such as how the device would be returned; ensuring devices are fully charged when needed; delivery problems; lost devices; and what would happen if the passenger ultimately cancels the trip and does not fly. Any such arrangement would require staffing for dispatch, distribution, maintenance, and content management. It is difficult to conceive of a program that would depend on delivering and/or returning the device in the secure airport space as many airports are very small and have no or minimal services and skeletal staffing, especially at off hours. These, like other complexities, are exacerbated if any PED program were to include non-U.S. locations.

#### **Commercial Options are Limited or Nonexistent**

There is no reason to believe that a carrier-provided PED program could be easily outsourced to a third party. A third-party concept, whether for use by one or a group of carriers, is likely to incur prohibitive recurring/overhead cost structure, particularly on an expected per-legitimate usage basis precisely because many or most passengers likely prefer their personally-owned PEDs. At the same time, carriers very likely would retain responsibility for reviewing eligibility for the PED based in part on the aircraft expected to operate on the passenger's itinerary – which might or might not already have accessible seatback IFES. Each carrier's internal effort to review whether a customer is eligible for the service alone will easily run in the millions of dollars annually per carrier based on experience with administering far more straightforward programs.

A brief review did not turn up an existing service that rents PEDs to individuals, though some likely exist. Commercial providers of PEDs rentals are oriented to the business (versus individual user) market and appear to charge on a multi-day basis, with a three-day minimum for one larger provider of between \$36 for an iPad mini and \$90 for larger devices, for the device alone (no content). Another commercial provider shows insurance rates alone for iPad Rental of \$9.99, with a deductible of \$79.99; these rates cover only damage and replacement, but not lost or stolen devices. These figures give at least some idea of the costs in today's market for devices and insurance alone.

Businesses that existed in some airports in the past to rent devices that played movies no longer seem to exist or at least to exist widely, likely due to competition from more convenient passenger-owned PEDs.

## APPENDIX B

### **Challenges to Near-Term Access to Accessible Content via Onboard WiFi**

#### **Background**

Members of the Committee have asked why the airline offer regarding inflight entertainment's alternative suggestion of WiFi access does not provide this option in the near term. As a starting point, the carrier offer is centered on a timeframe that prioritizes ensuring that installed seatback IFES are capable of supporting bitmap closed captions, or any higher standard in the future, and audio tracks. A WiFi or other alternative for passengers booked on flights with IFES that do not meet those standards after a date to be determined is meant as a backstop, addressing the desire that, despite the long timeframe for IFES projects as with other elements of aircraft and the significant investment in IFES to date, there will be a date after which access will be guaranteed on flights that offer inaccessible inflight entertainment.

Some airlines that provide IFE on certain flights through inaccessible systems may have the infrastructure to offer WiFi in the near term. The industry is large and diverse, and other airlines that provide IFE via legacy seatback IFES are not able to offer access via WiFi as a near-term solution. This reality makes a near-term industry-wide offer that might cover the scores of carriers that would be covered by a DOT rule unfeasible, for several reasons. Differences in carriers' technologies and even technology on different aircraft in their fleets; their contracts with WiFi and IFE providers; their spectrum and bandwidth limitations; and their business models leave them in varying situations. While a WiFi-based program may be an attractive alternative for one or more carriers even in the near term, and those that are able to do so may opt to take this alternative path at any time, mandated near-term WiFi access cannot be part of an industry offer.

#### **In-Flight WiFi Relies on Dedicated Spectrum with Bandwidth Limitations**

Airlines that offer WiFi connectivity aboard airborne aircraft rely on a network of satellite and/or ground-based antennas that operate within FCC-designated broadband spectra to provide this service. While promising advancements continue to be made, the bandwidth available to these systems and allocated for this purpose by the FCC is currently limited, and varies among carriers, aircraft and service providers. Because of the currently high costs involved with operating or contracting for these systems, and as many carriers do not have access to enough bandwidth to meet the demand that would be required if access were offered for free, many carriers today must charge customers for access to onboard WiFi.

This charge not only allows them to cover their costs – including the costs of investing in capacity increases such as additional, dedicated satellites to meet future needs – it also ensures that demand does not swamp their systems' limited bandwidth supplies. Excess demand would result in an unusable WiFi product for everyone or the inability for all passengers onboard who want to use the product to do so. Although some airlines with smaller customer bases and relatively-greater access to airborne broadband or alternatives have been able to make the commercial decision to offer inflight WiFi access

at no cost to passengers, inflight WiFi is, at least currently, an expensive product to provide and supply is limited. In order to prevent excessive use that would degrade service quality for all users, angering passengers who make travel decisions based on WiFi availability and squandering carrier investment in these systems, charges for inflight WiFi access often reflect the cost and value to customers of this access. Access is priced between \$1 to \$12.50 per hour or \$3.99 to \$29.95 per flight for one major carrier.

In other cases, depending on the aircraft and carrier's previous investment, content is streamed locally from the onboard server. Content is stored locally on the server and streamed via the aircraft wireless access point to customer PEDs. Some carriers and some aircraft, but not all, may be able to take advantage of this path to enhance accessibility of IFE in a shorter timeframe, illustrating again that there is no single best way to achieve accessibility in this complex area.

### **A WiFi-Based IFE Accessibility Solution Would, for Many Airlines, Require Fraud Safeguards and Time to Develop**

The potential for fraud/abuse by passengers who are not qualified individuals with a disability is a meaningful barrier to carriers that today charge passengers for WiFi connectivity and that may be considering adoption of a WiFi-based IFE accessibility solution. Air carriers have decades of experience administering a number of programs intended for qualified individuals with disabilities. Extensive data shows that when even a small share of the public engages in fraud to secure benefits intended exclusively for individuals with disabilities, the costs of providing services to those not entitled to them, and of policing fraud, are very high. Given high demand for WiFi and its cost, carriers would need time to build a solution to address fraud while ensuring access to qualified individuals with disabilities with minimal inconvenience. Unchecked, the unfortunate prevalence of fraud would also threaten availability of services for the passengers with disabilities for whom such a program is intended, since the demand for free WiFi access could overload the limited bandwidth available to the satellite-fed inflight environment.

### **Contractual Obligations Likely Prevent WiFi Access to Content in the Near Term for Some Airlines**

Streaming content wirelessly to a PED, whether that content is cached aboard the aircraft or comes from an external source via broadband transmission, may not be an option for some carriers and aboard certain aircraft. Carriers' contracts with service providers can be long in duration. Current contractual obligations with the providers of other content aboard those aircraft limit carriers' ability to display potentially-competing products. For instance, one carrier's provider of paid television services requires that the carrier prevent the streaming of content (whether cached or streamed from a ground-based source) that could compete with live television as a passenger-entertainment selection. These contracts have fixed, frequently long durations that inhibit the introduction of WiFi-based IFE accessibility solutions in the near term on at least certain aircraft. In the longer term, however, carriers can renegotiate contracts with a view to ensuring solutions for accessibility.