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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2013-0792; Directorate Identifier 2013-NM-118-AD; Amendment 39-17979; AD 2014-20-06]**

**RIN 2120-AA64**

#### **Airworthiness Directives; The Boeing Company Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

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**SUMMARY:** We are adopting a new airworthiness directive (AD) for all The Boeing Company Model 737-600, -700, -700C, -800, -900, and -900ER series airplanes, and Model 777 airplanes. This AD was prompted by testing reports on certain Honeywell phase 3 display units (DUs). These DUs exhibited susceptibility to radio frequency emissions in WiFi frequency bands at radiated power levels below the levels that the displays are required to tolerate for certification of WiFi system installations. The phase 3 DUs provide primary flight information including airspeed, altitude, pitch and roll attitude, heading, and navigation information to the flightcrew. This AD requires replacing the existing phase 3 DUs with phase 1, phase 2, or phase 3A DUs, and for certain replacement DUs, installing new DU database software. We are issuing this AD to prevent loss of flight-critical information displayed to the flightcrew during a critical phase of flight, such as an approach or takeoff, which could result in loss of airplane control at an altitude insufficient for recovery, or controlled flight into terrain.

**DATES:** This AD is effective November 5, 2014.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of November 5, 2014.

**ADDRESSES:** For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

## **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2013-0792; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Docket Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Jeffrey W. Palmer, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, Seattle Aircraft Certification Office, FAA, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6472; fax: 425-917-6590; email: [jeffrey.w.palmer@faa.gov](mailto:jeffrey.w.palmer@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all The Boeing Company Model 737-600, -700, -700C, -800, -900, and -900ER series airplanes, and Model 777 airplanes. The NPRM published in the Federal Register on September 24, 2013 (78 FR 58487). The NPRM was prompted by testing reports on certain Honeywell phase 3 DUs. These DUs exhibited susceptibility to radio frequency emissions in WiFi frequency bands at radiated power levels below the levels that the displays are required to tolerate for certification of WiFi system installations. The phase 3 DUs provide primary flight information including airspeed, altitude, pitch and roll attitude, heading, and navigation information to the flightcrew. The NPRM proposed to require replacing the existing phase 3 DUs with new phase 3A DUs and installing new DU database software. We are issuing this AD to prevent loss of flight-critical information displayed to the flightcrew during a critical phase of flight, such as an approach or takeoff, which could result in loss of airplane control at an altitude insufficient for recovery, or controlled flight into terrain.

### **Clarification of Cause of Unsafe Condition**

The cause of the unsafe condition stated in the Discussion section of this AD is a known susceptibility of the Phase 3 DUs to RF transmissions inside and outside of the airplane. This susceptibility has been verified to exist in a range of RF spectrum (mobile satellite communications, cell phones, air surveillance and weather radar, and other systems), and is not limited to WiFi transmissions.

### **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the proposal (78 FR 58487, September 24, 2013), and the FAA's response to each comment.

### **Request To Change Applicability**

Three commenters requested that we revise the applicability. A4A requested that we change the applicability to address only airplanes that have phase 3 DUs installed. Mr. Philipp Schmid requested that the applicability only address airplanes that have a WiFi system installed in the cabin. All

Nippon Airways (ANA) requested that we revise applicability paragraph (c) of the proposed AD (78 FR 58487, September 24, 2013) to refer to the airplanes identified in Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012.

A4A stated that the FAA is making the NPRM (78 FR 58487, September 24, 2013) applicable to all Model 737 NG and Model 777 series airplanes, regardless of the operator's intent to install a Wi-Fi system. A4A expressed that in paragraph (e) of the proposed AD, the FAA acknowledges that the unsafe condition is directly related to electromagnetic interference (EMI) characteristics exhibited at specific frequency ranges related to Wi-Fi transmission. A4A stated that the phase 3 DUs have passed all applicable certification testing required for approval and use on transport category airplanes, including the DO-160 environmental standards. A4A asserted that the phase 3 display units have proven to be reliable under normal operating conditions. A4A also stated that the failure mode identified by the NPRM is specific to an additional test procedure prescribed by DO-294C that is required only as part of the certification requirements of an operator-installed Wi-Fi system.

ANA stated that the those airplanes not specified in Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012; were/will be delivered with the requested changes in production.

We partially agree with the commenters' requests. We recognize that operators will not be able to comply with the proposed replacement specified in paragraph (g) of the proposed AD (78 FR 58487, September 24, 2013) if airplanes do not have any phase 3 DUs installed. Therefore, we have revised paragraph (g) of this AD to allow operators to inspect to determine if phase 3 DUs are installed and if no phase 3 DUs are installed, no further action is necessary.

The intent of this AD is to remove all DUs with an unsafe condition from all Model 737NG and Model 777 series airplanes, regardless of whether or not the airplanes are listed in the effectivity of Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012.

DUs can be rotated among other airplanes. As noted by Boeing, the phase 3 DU's are interchangeable and intermixable with earlier versions of DU's on 737NG and 777 airplanes, and may have been installed on any 737NG or 777 airplanes, and may be in operator spares inventory.

In regards to A4A's comment that phase 3 DUs have proven to be reliable under normal operating conditions, the testing that revealed the DU susceptibility was verified by inspection of the phase 3 DU qualification test reports provided by the DU manufacturer. The intent of this AD is to eliminate this known susceptibility of the phase 3 DUs to RF transmissions, including those from sources outside the airplane. This susceptibility is not limited to WiFi transmissions, but has been verified to exist in a range of the RF spectrum used by mobile satellite communications, cell phones, air surveillance and weather radar, and other systems. The phase 3 displays that failed the test did so substantially below the RF immunity levels set forth in paragraph 1 of the "High Intensity Radiated Fields (HIRF)" section of the preamble to 737 Special Condition 25-ANM-132, dated September 26, 1997; and paragraph 1 of the HIRF discussion in the preamble to 777 Special Condition 25-ANM-78, dated November 10, 1993. Under the provisions of paragraph (h) of this AD, we will consider requests for approval of an AMOC if sufficient data are submitted to substantiate that the DU change is not necessary. We have not changed this AD in this regard.

### **Request To Withdraw the NPRM (78 FR 58487, September 24, 2013)**

Virgin Australia (VOZ), Air France (AFA), Ryanair, Airlines for America (A4A), and Honeywell requested that we withdraw or review the need for the NPRM (78 FR 58487, September 24, 2013).

VOZ stated that during testing of the WiFi inflight entertainment system on the VOZ Model 737NG fleet, it noted that the DU blanking occurred only when the WiFi radiated power source (set-up in the flight deck) was increased to a high level. VOZ also stated that under normal operating conditions of the WiFi radiated power, there was no blanking of the DU, but interference was present

only at a certain frequency. VOZ commented that as part of the WiFi supplemental type certificate (STC), a decal is installed in the flight deck that states that WiFi is not to be used when airplane engines are running for the purpose of flight, and flight operation procedures also restrict transmitting devices in the flight deck. We infer that VOZ requested that we withdraw the NPRM (78 FR 58487, September 24, 2013).

AFA stated that since April 2013, AFA and Koninklijke Luchtvaart Maatschappij N.V.(KLM) have operated two Model 777 airplanes equipped with WiFi that have had no DU problems. AFA commented that the WiFi signal is available on the flight deck, but its use is prohibited. AFA suggested that it is likely that the WiFi signal level is too low to cause the DU blanking problems that led to the NPRM (78 FR 58487, September 24, 2013). AFA also stated that on its other Model 777 airplanes (85 airplanes equipped with phase 2 or 3 DUs with no WiFi), neither AFA nor KLM, have experienced DU problems. AFA stated that the DU discrepancies are caused by WiFi interference directly associated with design defects of the phase 3 DU, and since replacement cost is at customer expense, estimated more than \$2,000 per DU, the cost to comply with the NPRM for the quantity of phase 3 DUs in service in both fleets is not reasonable or justified.

Ryanair and Honeywell commented that testing performed on the phase 3 DUs concluded that a Federal Communications Commission (FCC) compliant WiFi radiating device does not result in interference on the phase 3 DU unless the transmitting device is within 1 meter of the DU. Ryanair and Honeywell stated that is not possible for FCC compliant WiFi devices to cause interference to the DUs from outside the airplane during flight and that intentional emitting devices by passengers are prohibited from use on an airplane, and in any case will always be more than the required 1 meter distance from the DU, and consequently cannot cause interference to the DUs. Ryanair and Honeywell also stated that the installation and operation of any intentional emitting devices in the cockpit during flight is subject to regulatory approval and such regulatory approval process includes electromagnetic interference testing at WiFi frequencies. Ryanair asserted that requiring the NPRM (78 FR 58487, September 24, 2013) actions on all airplanes, irrespective of the installation or operation of WiFi systems in the cockpit, is imposing a high, and unnecessary, financial burden on operators.

Honeywell stated that instead of requiring all phase 3 DUs to be replaced or modified, as proposed by the NPRM (78 FR 58487, September 24, 2013), the need for modifying the DUs should only be considered in the process for authorizing the use of WiFi devices in the cockpit. Honeywell explained that since the cockpit is a controlled environment, the airline has the opportunity to select acceptable devices and establish procedures for their use and storage that can mitigate any interference risk. Honeywell stated that Delta Airlines has been safely operating WiFi-enabled Apple iPads in its flight decks, including those with phase 3 DUs, based on a waiver granted by the FAA.

Honeywell also stated that they have performed an assessment of continued operational safety (COS) risk to an external high intensity radiated field (HIRF) condition using the methods defined in the Transport Airplane Risk Assessment Methodology (TARAM) Handbook published by the FAA, Transport Airplane Directorate, and that its TARAM analysis concluded that the COS risk from external HIRF condition falls well within the FAA's acceptable risk zone.

A4A requested that we withdraw the NPRM (78 FR 58487, September 24, 2013) because it believes that the risk is not adequately substantiated, and that conflicting data exists questioning the susceptibility of the DUs to WiFi interference. A4A also commented that the economic impact of the NPRM actions is far greater than the cost estimate stated in the NPRM and should be acknowledged and weighed against what it characterized as questionable risk.

We do not agree with the commenters' request to withdraw the NPRM (78 FR 58487, September 24, 2013). The testing that revealed the DU susceptibility to WiFi interference was verified by inspection of the phase 3 DU qualification test reports provided by the DU manufacturer. The intent of this final rule is to eliminate this known susceptibility of the phase 3 DUs to radio frequency (RF) transmissions, including those from sources outside the airplane. The phase 3 displays that failed testing did so substantially below the RF immunity levels set forth in paragraph 1 of the HIRF section of the preamble to 737 Special Condition 25-ANM-132, dated September 26, 1997

(<http://www.gpo.gov/fdsys/pkg/FR-2009-09-03/pdf/E9-21299.pdf>); and paragraph 1. of the HIRF discussion in the preamble to 777 Special Condition 25-ANM-78, dated November 10, 1993 (<http://www.gpo.gov/fdsys/pkg/FR-2004-11-08/pdf/04-24847.pdf>).

As part of our assessment of the safety issue in accordance with our established safety process, the FAA also performed a TARAM analysis of the issue with the assistance of the airplane manufacturer. This analysis did not agree with Honeywell's assessment. The FAA issued an operating rule exemption to Delta Airlines for use of iPads on the flight deck because it was in the public interest to do so in order to enable testing and evaluation of other aviation safety-enhancing technology the FAA was researching. The FAA's exemption was granted to Delta based on extensive testing and supporting data, use of specially trained flight crews, and establishment of appropriate operating procedures to ensure safe flight operations during the time period of the exemption. The NPRM (78 FR 58487, September 24, 2013) will not be withdrawn because it meets the intent of correcting the unsafe condition listed in the SUMMARY section. Under the provisions of paragraph (h) of this AD, we will consider requests for approval of an alternative method of compliance (AMOC) if sufficient data are submitted to substantiate that the DU change is not necessary. We have not changed this AD in this regard.

### **Request To Disclose Underlying Data in Support of the NPRM (78 FR 58487, September 24, 2013)**

A4A requested that we fully present our underlying data in support of the NPRM (78 FR 58487, September 24, 2013) risk allegation. Mr. Philipp Schmid stated that WiFi operational limitations should be considered in the risk assessment and that to his knowledge, WiFi systems must be disabled during the critical phases of flight such as an approach or take-off.

A4A stated that the FAA does not disclose in the NPRM (78 FR 58487, September 24, 2013), the nature of DU testing conducted nor its source, and that a rulemaking of this magnitude must be supported in incontrovertible data from appropriate and reliable sources.

A4A submitted information from Southwest Airlines (SWA) that stated that SWA collected data from both certified lab and engineering designed airplane ground tests indicating that the Honeywell phase 3 DUs are not susceptible at or below the energy levels required for certification. SWA also stated that it has performed extensive testing with respect to susceptibility of the Honeywell phase 3 DUs in the WiFi bands outlined in the NPRM (78 FR 58487, September 24, 2013) and that this testing indicated that significant safety margins are available; and that there are no threat susceptibilities recorded at or below the WiFi certification levels. SWA also commented that it has flown 2,375,481 hours with 435 airplanes since WiFi system installation with no un-attributable DU blanking or blinking defects that would be a consideration under the NPRM. SWA concluded that "this experience indicates a negligible level of risk."

A4A submitted information from United Airlines (UAL). UAL explained that an alternate means of assuring an equivalent level of safety while a replacement program is undertaken has been accepted by FAA at UAL. UAL stated that it has been granted certification limitations which allow operation of the WiFi system provided that the flight deck is placarded to disallow use of transmitting portable electronic devices (TPED) when engines are operating for purposes of flight. UAL stated it believes such limitations are the appropriate means to address the unsafe condition because they apply directly to the certification of airplane with an operator-installed WiFi system. A4A stated that it agrees with UAL that such a restriction provides an equivalent level of safety, for if it did not, it would not have been approved by the FAA.

We do not agree with the commenters' requests. We do not agree to share the underlying data in the AD. An AD is not an appropriate vehicle for sharing proprietary data.

The susceptibility of phase 3 DUs to RF transmissions was initially identified during a WiFi STC installation by an operator and a WiFi vendor and reported to the FAA. As a result of this discovery, we performed a risk assessment for in-service airplanes equipped with phase 3 DUs using our established COS process, which determined that an AD action was warranted for this issue. In

addition, Boeing did an independent safety review and also determined that the DU blanking was a safety issue using its own risk assessment process.

Although various entities (operators, vendors, etc.) may have done testing which may seem to contradict our findings, the WiFi tests conducted during the above referenced STC project failed to meet RF immunity level requirements. The testing that revealed the DU susceptibility was further verified by inspection of the phase 3 DU qualification test reports provided to the FAA by the DU manufacturer.

The intent of this AD is to eliminate this known susceptibility of the phase 3 DUs to RF transmissions, including those from sources outside the airplane. The phase 3 displays that failed testing did so substantially below the RF immunity levels set forth in paragraph l of the "High Intensity Radiated Fields (HIRF)" section of the preamble to 737 Special Condition 25-ANM-132, dated September 26, 1997; and paragraph l. of the HIRF discussion in the preamble to 777 Special Condition 25-ANM-78, dated November 10, 1993.

We do not agree that no problems have occurred on in-service airplanes, since the WiFi STC testing that disclosed this susceptibility was conducted on an in-service airplane equipped with phase 3 DUs. With respect to operational limitations providing an acceptable level of safety, we approved certain STCs with such limitations as a means of compliance until a permanent solution was available. However, we intended those limitations as interim action until permanent corrective actions for the unsafe condition became available for the baseline airplanes. We do not consider it adequate to leave those operating limitations in place permanently as the sole corrective action for the unsafe condition.

Under the provisions of paragraph (h) of this AD, we will consider requests for approval of an AMOC if sufficient data are submitted to substantiate that the DU change is not necessary. We have not changed this final rule in this regard.

### **Request To Change Compliance Time**

A4A requested that we revise the compliance time in the proposed AD (78 FR 58487, September 24, 2013) from 60 months to 72 months, and that we recognize system redundancy when considering its compliance time request.

A4A stated that multiple redundancies associated with the display system are designed to assure the flight crew always has access to critical information, and even in the event three DUs become inoperative, all normal primary flight display, navigation display, terrain guidance, and engine instrument information will still be displayed to the pilot. A4A also stated that there are vastly more affected units than were identified by the proposed AD (78 FR 58487, September 24, 2013). A4A stated that two of its largest operators alone account for over one thousand affected DUs. A4A contends that a 72-month compliance time is a reasonable time to comply with the NPRM and is an appropriate time given the risk.

We partially agree with the commenter. We agree with the commenter's statement that there are more units and airplanes affected than those listed in the proposed AD (78 FR 58487, September 24, 2013) because this has now been verified with the manufacturer's service information and comments to the NPRM. We disagree with extending the compliance time beyond 60 months. Our risk assessment considered system redundancy. However, along with DU susceptibility to RF transmissions, we have also considered other risk factors such as human factors, pilot workload, and phase of flight, etc. It is possible for all primary flight display units to fail at once during a critical phase of flight such as a takeoff or approach and landing. This could lead to loss of control of the airplane at an altitude insufficient for recovery, or controlled flight into terrain or obstacles, the availability of standby instruments in such a situation notwithstanding.

Our compliance time is based on a detailed and in-depth risk assessment by the FAA and Boeing that has determined that the requirements of this AD must be accomplished within 60 months to mitigate the unsafe condition in the interest of the safety of the flying public. We recognize that in some cases, it may be necessary to accomplish the AD requirements outside normal scheduled

maintenance cycles, and that some level of additional cost and/or lost revenue may result in such cases. However, the risk assessment indicates 60 months is an appropriate compliance time that will ensure an acceptable level of continued operational safety for the Model 737NG and Model 777 series airplane fleets. However, according to the provisions of paragraph (h) of this AD, we may consider requests to adjust the compliance time if the request includes data that prove that the new compliance time would provide an acceptable level of safety. We have not changed this AD in this regard.

### **Request To Change Compliance Method**

Boeing requested that we remove Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012; from the terminating action, since terminating action should include alternate part number DUs. Or, alternatively, Boeing recommended that operators be allowed to replace at a minimum, the phase 3 DUs and corresponding database software with earlier or newer certified units installed in the left outboard, right outboard and upper center DU positions. Boeing stated that earlier versions of intermixable/interchangeable DUs also do not exhibit HIRF susceptibility, so the terminating action could include replacement of phase 3 DU's with earlier certified units.

Boeing also requested that we revise the language in the NPRM (78 FR 58487, September 24, 2013) to specify that terminating action is to remove phase 3 DUs from Model 737NG and Model 777 series airplanes, with replacement of any other DU certified for the Model 737NG and Model 777 series airplanes. Boeing stated that the NPRM should not require the installation of the phase 3A DUs, but instead only require that the phase 3 DUs be replaced or not installed on any airplane.

We partially agree with the commenter's requests. We agree that terminating action is to replace all phase 3 DUs with certain other DUs certified for the Model 737NG and Model 777 series airplanes. We have revised this final rule so that it does not require the installation of phase 3A DUs, but instead only requires that the phase 3 DUs be replaced with the following approved DU part numbers that do not have the unsafe condition: Phase 1, phase 2, and phase 3A DUs. Phase 1 and phase 2 DUs do not have the RF susceptibility that has been identified in the phase 3 DUs, are intermixable and interchangeable with the phase 3 DUs, and therefore, are an acceptable option for replacement of the phase 3 DUs to correct the unsafe condition. The intent of this AD is to remove all DUs with an unsafe condition and replace them with an acceptable alternative.

We disagree with the request to remove the references to Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012; from the terminating action. Installing phase 3A DUs as specified in these service bulletins is an acceptable option for correcting the identified unsafe condition.

We have revised paragraph (g) of this AD to require replacing phase 3 DUs with phase 1, phase 2, or phase 3A DUs.

### **Request To Allow DU Upgrade**

Honeywell requested that we allow for phase 3 DUs to be upgraded to phase 3A DUs, rather than replacing with new phase 3A DUs. Honeywell stated that phase 3 DUs can be upgraded to phase 3A DUs via a modification kit and rework process defined in service information that has previously been provided to operators.

We agree with the commenter's request to allow for phase 3 DUs to be upgraded to phase 3A DUs. We have removed the requirement in paragraph (g) of this AD to replace phase 3 DUs with "new" phase 3A DUs. Either new or modified phase 3A DUs may be installed.

## **Request To Revise Cost Estimate**

Several commenters requested that we revise the cost estimate in the NPRM (78 FR 58487, September 24, 2013). A4A requested that we revise the cost analysis to include all affected airplanes and DUs in the U.S. registry, and increase the per-airplane replacement time to three hours. A4A stated that the FAA states that the NPRM affects 157 airplanes of U.S. registry, encompassing 942 DUs. A4A commented that UAL alone operates 150 such airplanes, exposing a significant error in estimation. A4A also stated that Honeywell indicates there are 10,100 in-service phase 3 DUs affected; and that using the NPRM figure of \$1,700 parts cost per DU (\$10,200/six units per airplane), the parts cost alone rises to \$17,170,000, or more than ten times the stated total cost of compliance. A4A also commented that while the NPRM estimates two hours per airplane for DU replacement, one carrier estimates three hours, a 50 percent increase in labor hours.

Ryanair requested that we review the cost of compliance. Ryanair stated that the estimated cost of compliance for the U.S. carriers seems to be a gross underestimate of the actual figure. Ryanair explained that it has 707 phase 3 DUs in its fleet of 737-800s. This is approximately the same number the FAA is assuming for the entire US fleet of Model 737NG series airplanes.

Boeing requested that we review the estimated costs table for the number of affected airplanes for both Model 737 and Model 777 series airplanes; and that we include the cost of updating phase 3 DUs which may have been installed on airplanes not delivered with phase 3 DUs as replacement units for failed DUs, and spare phase 3 DUs provided to airlines. Boeing explained that phase 3 DUs are interchangeable and intermixable with earlier versions of DUs on Model 737NG and Model 777 series airplanes, and may have been installed on any Model 737NG and Model 777 series airplane, and may be in operator spares inventory. Boeing also stated that a review of Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012; and Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012; shows an effectivity of 1,326 U.S. registered airplanes.

We partially agree with the commenters' requests. We agree with revising the estimated U.S. fleet size in the Cost of Compliance section in this final rule. Boeing has indicated in its comments that the number of affected U.S. airplanes is greater than the number of airplanes estimated in the NPRM (78 FR 58487, September 24, 2013). We disagree with revising the estimated labor hours. The labor hour estimate has been provided by the manufacturer. A4A's comment indicates that only one operator estimates that the labor hour estimate should be increased. We do not account for individual operator differences in the calculation of total labor hour estimates. We also disagree with considering airplanes that may have had phase 3 DUs installed after production as we have no way of estimating how many airplanes may have had this modification. We have changed the cost estimate in this final rule to reflect 1,149 Model 737 airplanes and 177 Model 777 airplanes.

## **Comment Regarding Certification Process**

Mr. Philipp Schmid commented that in today's world with more and more transmitters in the cabin and on the ground, the FAA should have more carefully taken into account the design and system integrations of line replaceable units for immunity to EMI.

We acknowledge the commenter's concern. We make efforts to ensure that systems and equipment are immune to EMI effects during certification. We recently published rules with compliance requirements for HIRF immunity (e.g. section 25.1317 of Title 14, Code of Federal Regulations (14 CFR 25.1317)) (<http://www.gpo.gov/fdsys/pkg/CFR-2011-title14-vol1/pdf/CFR-2011-title14-vol1-sec25-1317.pdf>). However, we continue to conduct monitoring and surveillance of approved designs in service and require accomplishment of corrective actions for unsafe conditions when needed to ensure continued operational safety. This AD accomplishes continued operational safety by addressing an identified unsafe condition. The commenter did not request any changes to the NPRM (78 FR 58487, September 24, 2013). We have not changed this AD in this regard.

## Clarification Regarding the Installation of Winglets

Aviation Partners Boeing (APB) stated that the installation of winglets per Supplemental Type Certificate (STC) ST00830SE (<http://rgl.faa.gov/RegulatoryandGuidanceLibrary/rgstc.nsf/0/E3615811C4A7D87B86257C1C00720D67?OpenDocument&Highlight=st00830se>) does not affect the accomplishment of the manufacturer's service instructions.

We agree with APB's statement that the installation of winglets as specified in STC ST00830SE (<http://rgl.faa.gov/RegulatoryandGuidanceLibrary/rgstc.nsf/0/E3615811C4A7D87B86257C1C00720D67?OpenDocument&Highlight=st00830se>) does not affect accomplishment of the requirements of this AD, and for airplanes on which STC ST00830SE is installed, an alternative method of compliance (AMOC) approval request to account for the installation of that STC is not necessary to comply with the requirements of section 39.17 of the Federal Aviation Regulations (14 CFR 39.17).

## Conclusion

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously and minor editorial changes. We have determined that these minor changes:

[Agr]re consistent with the intent that was proposed in the NPRM (78 FR 58487, September 24, 2013) for correcting the unsafe condition; and

Do not add any additional burden upon the public than was already proposed in the the NPRM (78 FR 58487, September 24, 2013).

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

## Costs of Compliance

We estimate that this AD affects 1,326 airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

### Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Replacement (1,149 Model 737 airplanes)	2 work-hours × \$85 per hour = \$170	\$10,200	\$10,370	\$11,915,130
Replacement (177 Model 777 airplanes)	3 work-hours × \$85 per hour = \$255	10,200	10,455	1,850,535

## Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This

regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

#### **PART 39—AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

**Authority:** 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):



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**2014-20-06 The Boeing Company:** Amendment 39-17979; Docket No. FAA-2013-0792; Directorate Identifier 2013-NM-118-AD.

**(a) Effective Date**

This AD is effective November 5, 2014.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to The Boeing Company airplanes, certificated in any category, as identified in paragraphs (c)(1) and (c)(2) of this AD.

(1) Model 737-600, -700, -700C, -800, -900, and -900ER series airplanes.

(2) Model 777-200, 777-200LR, 777-300, 777-300ER, and 777F series airplanes.

**(d) Subject**

Air Transport Association (ATA) of America Code 31, Instruments.

**(e) Unsafe Condition**

This AD was prompted by testing reports on certain Honeywell phase 3 display units (DUs). These DUs exhibited susceptibility to radio frequency emissions in WiFi frequency bands at radiated power levels below the levels that the displays are required to tolerate for certification of WiFi system installations. The phase 3 DUs provide primary flight information, including airspeed, altitude, pitch and roll attitude, heading, and navigation information, to the flightcrew. We are issuing this AD to prevent loss of flight-critical information displayed to the flightcrew during a critical phase of flight, such as an approach or takeoff, which could result in loss of airplane control at an altitude insufficient for recovery, or controlled flight into terrain.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Inspection, Software Installation, and DU Installation**

Within 60 months after the effective date of this AD: Inspect to determine if any phase 3 DUs are installed. If any phase 3 DUs are installed, within 60 months after the effective date of this AD, do the applicable actions required by paragraph (g)(1) or (g)(2) of this AD. A review of airplane maintenance records is acceptable in lieu of this inspection if the phase number of the DUs can be conclusively determined from that review.

(1) For Model 737 airplanes: Remove all phase 3 common display system (CDS) DUs and replace with phase 1, phase 2, or phase 3A CDS DUs. If any phase 3 CDS DUs are replaced with phase 3A CDS DUs, replace the phase 3 CDS DUs and install new database software into the display electronics units, in accordance with the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012.

(2) For Model 777 airplanes: Remove all phase 3 DUs and replace with phase 1, phase 2, or phase 3A DUs. If any phase 3 DUs are replaced with phase 3A DUs, replace the phase 3 DUs and install the DU database software into the left and right airplane information management system core processor module/graphics generator, in accordance with the Accomplishment Instructions of Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012.

#### **(h) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ACO, send it to the attention of the person identified in the Related Information section of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair required by this AD if it is approved by the Boeing Commercial Airplanes ODA that has been authorized by the Manager, Seattle ACO, to make those findings. For a repair method to be approved, the repair must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

#### **(i) Related Information**

For more information about this AD, contact Jeffrey W. Palmer, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, Seattle Aircraft Certification Office, FAA, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6472; fax: 425-917-6590; email: jeffrey.w.palmer@faa.gov.

#### **(j) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Boeing Special Attention Service Bulletin 737-31-1471, dated November 29, 2012.

(ii) Boeing Special Attention Service Bulletin 777-31-0187, dated November 29, 2012.

(3) For Boeing service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>.

(4) You may view this service information at FAA Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, Washington. For information on the availability of this material at the FAA, call 425-227-1221.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Renton, Washington, on September 19, 2014.  
Jeffrey E. Duven,  
Manager, Transport Airplane Directorate,  
Aircraft Certification Service.