

**NOTICE OF PROPOSED REGULATION  
BRAZILIAN AIRWORTHINESS DIRECTIVES**

**REPÚBLICA FEDERATIVA DO BRASIL  
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL – ANAC  
Gerência Geral de Certificação de Produto Aeronáutico**

**Reference:** NPR/AD 2023-787-01

**Date:** 28 Dec. 2023

*In accordance with the provisions of RBAC 11, The Continuing Airworthiness Technical Branch (GTAC) is proposing the issuance of a Brazilian Airworthiness Directive applicable to the aeronautical product referred below.*

*All the persons interested may send their comments until the date specified in item 2, indicating the **Reference** above, to the following address:*

*National Civil Aviation Agency (ANAC) – Continuing Airworthiness Technical Branch (GTAC)  
Rua Doutor Orlando Feirabend Filho, nº 230  
Centro Empresarial Aquáriu - Torre B - 14 o ao 18 o andares  
Parque Residencial Aquáriu  
12246-190 – São José dos Campos – SP - Tel.: (12) 3203-6600 - E-mail: pac@anac.gov.br.*

**1. Proposer:** Continuing Airworthiness Technical Branch (GTAC).

**2. Comments:** Must be received until 31 Mar. 2024.

**APPLICABILITY:**

- (a) This Airworthiness Directive (AD) applies to BOEING airplane models 787-8, 787-9 e 787-10, all serial numbers.

**CANCELLATION / REVISION:**

Not applicable.

**REASON:**

The reason for this AD is the finding of potential interference in radio altimeters from wireless broadband operations in the 3.300 MHz to 3.700 MHz frequency band (5G C-Band). During takeoffs and landings, as a result of this interference, certain airplane systems may not properly function, resulting in longer than normal landing or rejected takeoff distances due to the effect on thrust reverser deployment, spoilers, speedbrake deployment, and increased idle thrust, regardless of the approach type or weather. The degraded deceleration performance could lead to a runway excursion.

Since this condition may occur in other airplanes and affects flight safety, corrective action is required. Thus, sufficient reason exists to request compliance with this AD in the indicated time limit.

**REQUIRED ACTION:**

Airplane Flight Manual (AFM) Revision

**COMPLIANCE:**

Required as indicated below, unless already accomplished.

**(b) Airplane Flight Manual Revision**

- (1) For airplanes identified in paragraph (a) of this AD, that do not meet the criteria for a “radio altimeter tolerant airplanes”, as established by PORTARIA Nº 13.365/SAR, de 14 de dezembro de 2023, within 10 days after the effective date of this AD, revise the Limitations Section of the existing AFM to include the following information:

**Radio Altimeter 5G C-Band Interference, Takeoff and Landing Performance**

Due to the presence of 5G C-Band wireless broadband interference, the following limitations are required to dispatch or release to airports, and takeoff and landing on runways, in the Brazilian airspace.

**Minimum Equipment List (MEL)**

Dispatch or release with any of the following MEL items is prohibited:

- 32-42-02 – Antiskid Control Systems
- 32-45-01 – Wheel Brake Systems
- 32-45-01-01 – Wheel Brake Systems, Electric Brake Actuator Systems

**Landing Operations on Runways with ice, wet ice, water on top of compacted snow, dry snow, or wet snow over ice**

Dispatch or release to, or takeoff or landing on, runways with ice, wet ice, water on top of compacted snow, dry snow, or wet snow over ice is prohibited.

**Takeoff and Landing Performance**

Operators must use the **5G C-Band Interference Landing Distance** Calculations procedure contained in the Operating Procedures Section of this AFM.

- (2) For airplanes models identified in paragraph (a) of this AD, that do not meet the criteria for a “radio altimeter tolerant airplanes”, as established by PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023, within 10 days after the effective date of this AD, revise the Operating Procedures Section of the existing AFM to include the following information:

**5G C-Band Interference Landing Distance**

Dispatch or release:

- No additional landing distance calculations are required for dry runway condition.
- For wet runway condition, use Table 1 through 6, as applicable, to determine the unfactored landing distance, applying all adjustments. Multiply the resulting unfactored landing distance by 1.15 to obtain the minimum required landing distance.

Table 1:

787-10 / TRENT 1000									
Landing Distance and Adjustments (feet)									
	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
Runway condition	440,000 LB Landing Weight	Per 10,000 LB Above/Below 440,000 LB	Per 1,000 ft	Head/Tail wind	Down/Up Hill	Above/Below ISA	Per 5 KTS above VREF	One Reverser	No reverser
Dry	5640	110/-90	160	-240/790	90/-80	150/-150	230	0	0
Wet (non-contaminated)	9180	170/-150	340	-470/1680	440/-340	290/-280	390	0	0
Wet (contaminated)	12180	280/-250	560	-770/2850	970/-690	480/-460	540	0	0

Table 2:

787-10 / GENx									
Landing Distance and Adjustments (feet)									

Runway condition	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
								One Reverser	No reverser
Dry	5670	110/-90	170	-240/800	90/-80	150/-150	230	0	0
Wet (non-contaminated)	9300	170/-150	360	-480/1710	450/-350	290/-290	400	0	0
Wet (contaminated)	12400	280/-250	610	-790/2930	1010/-710	480/-470	540	0	0

Table 3:

787-9 / TRENT 1000									
Landing Distance and Adjustments (feet)									
Runway condition	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
								One Reverser	No reverser
Dry	5470	100/-90	160	-240/780	80/-80	150/-150	230	0	0
Wet (non-contaminated)	9010	170/-160	340	-470/1670	430/-340	290/-280	390	0	0
Wet (contaminated)	11740	270/-260	540	-750/2780	910/-650	460/-440	530	0	0

Table 4:

787-9 / GENx									
Landing Distance and Adjustments (feet)									
Runway condition	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
								One Reverser	No reverser
Dry	5500	100/-90	170	-240/790	90/-80	150/-150	230	0	0
Wet (non-contaminated)	9130	170/-150	360	-480/1700	450/-350	290/-280	390	0	0
Wet (contaminated)	11960	270/-260	590	-770/2860	940/-670	460/-460	530	0	0

Table 5:

787-8 / TRENT 1000									
Landing Distance and Adjustments (feet)									
Runway condition	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
								One Reverser	No reverser
Dry	5050	110/-80	150	-230/750	80/-70	130/-130	220	0	0
Wet (non-contaminated)	8370	170/-150	290	-440/1500	410/-320	250/-250	340	0	0
Wet (contaminated)	10800	290/-240	520	-720/2680	820/-590	430/-420	510	0	0

Table 6:

787-8 / GENx									
Landing Distance and Adjustments (feet)									

Runway condition	Reference Distance	Weight adjustment	Altitude adjustment **	Wind adjustment per 10 knots	Slope Adjustment per 1%	Temperature Adjustment per 10° C	Approach Speed Adjustment	Reverse Thrust Adjustment	
								One Reverser	No reverser
Dry	380,000 LB Landing Weight	Per 10,000 LB Above/Below 380,000 LB	Per 1,000 ft	Head/Tail wind	Down/Up Hill	Above/Below ISA	Per 5 KTS above VREF	0	0
Wet (non-contaminated)	5100	110/-80	160	-230/760	80/-70	130/-140	220	0	0
Wet (contaminated)	8530	160/-140	300	-450/1530	430/-330	250/-250	340	0	0
Wet (contaminated)	11090	290/-240	560	-740/2790	880/-620	430/-420	510	0	0

Reference distance is based on MAX MANUAL braking, sea level, standard day, no wind or slope and maximum reverse thrust.

Reference distance includes a distance from the threshold to touchdown associated with a flare time of 7 seconds.

Distances are based on HYD PRESS L+R failure distances which conservatively approximate the effects of 5G interference after the Reverse Thrust Adjustment for no Reversers is applied.

Actual (unfactored) distances are shown.

Note: per procedure, MAX MANUAL braking is not required for normal operations and is to be used only in the event that significant 5G interference occur,

#### En route:

- Plan to use Flaps 30 and  $V_{REF30}$  (with appropriate wind additives) for landing.
- For wet runway condition, compute time of arrival (en route) landing distance using Table 1 through 6, as applicable, applying all adjustments. Multiply the resulting unfactored landing distance by 1.1 to obtain the minimum required landing distance at the destination. This approximates a minimum required landing distance resulting from 5G C-Band interference.
- Determine desired AUTOBRAKE setting by using the normal configuration landing distance information from an approved source, Maximum manual braking may not be required.

#### During Approach and Landing

- Monitor radio altimeters for anomalies.
- Normal use of autothrottles is allowed. Monitor performance of autopilot and autothrottle. If the autopilot or autothrottle is not performing as expected, disconnect both the autopilot and autothrottle and apply manual inputs to ensure proper control of the flight path.
- If the autothrottle does not reduce the thrust to IDLE at 25 feet, manually reduce the thrust to idle, hold the thrust levers in the idle position and disconnect the autothrottle to prevent autothrottle from advancing the thrust levers after touchdown.

Caution: if the autothrottle advances the thrust levers after landing, the speedbrakes will stow and the autobrake will disarm. It will not be possible to raise the reverse thrust levers to deploy the thrust reversers until de thrust levers are at idle.

- Manual deployment of the speedbrakes may be required.
- If the thrust reversers do not deploy, immediately ensure the speedbrakes are extended, apply manual braking, and modulate as needed for the existing runway conditions.

Note: In some conditions, maximum manual braking may be needed throughout the entire landing roll.

**NOTE 1:** The AFM alteration required by this AD may be accomplished by inserting a copy of this AD into the Aircraft Flight Manual.

**NOTE 2:** For the purpose of this AD, a “radio altimeter tolerant airplane” is the one for which ANAC accepts that the combination airplane-radio altimeter demonstrates tolerance to the limits specified in this PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023.

- (3) For airplanes identified in paragraph (a) of this AD, that are defined as “radio altimeter tolerant airplanes”, according to the established by PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023, no action is required.

**(c) Terminating Action to the AFM Revision**

Modification of a “non-radio altimeter tolerant airplane” to a “radio altimeter tolerant airplane”, according to PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023, terminates the limitations required by paragraphs (b)(1) and (b)(2) of this AD. After modification to a “radio altimeter tolerant airplane”, according to PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023, remove the AFM revision required by paragraphs (b)(1) and (b)(2) of this AD.

**(d) Compliance with PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023.**

For the purpose of this AD, the acceptance of the combination airplane-radio altimeter as a “radio altimeter tolerant airplane” depends on the data provided to demonstrate the tolerance limits established in PORTARIA N<sup>o</sup> 13.365/SAR, de 14 de dezembro de 2023. These data should be submitted to ANAC through [5g@anac.gov.br](mailto:5g@anac.gov.br).

**(e) Alternative methods of compliance (AMOCs).**

A different method or a different compliance time from the requirements of this AD may be used if approved by the Manager of the Continuing Airworthiness Technical Branch (GTAC) of ANAC.

**(f) Additional information**

For questions or further information, please contact [pac@anac.gov.br](mailto:pac@anac.gov.br)