AIRWORTHINESS DIRECTIVE

This Airworthiness Directive (AD) is issued pursuant to Canadian Aviation Regulation (CAR) 521.427. No person shall conduct a take-off or permit a take-off to be conducted in an aircraft that is in their legal custody and control, unless the requirements of CAR 605.84 pertaining to ADs are met. Standard 625 - Aircraft Equipment and Maintenance Standards Appendix H provides information concerning alternative means of compliance (AMOC) with ADs.

Number:

CF-2024-14

Effective Date:

29 May 2024

ATA:

34

Type Certificate:

See Applicability

Subject:

Navigation – Aeroplane – Limitations of Operations with Non-Tolerant Radio Altimeter when Operating in Canada due to 5G C-Band Wireless Broadband Interference

Applicability:

This AD applies to all transport and commuter category aeroplanes equipped with a radio (also known as radar) altimeter. These radio altimeters are installed on various transport and commuter category aeroplanes including, but not limited to, the aeroplanes for which the design approval holder is identified below:

1) Airbus Canada Limited Partnership
2) Airbus SAS
3) ATR-GIE Avions de Transport Régional
4) BAE Systems (Operations) Limited
5) Bombardier Inc.
6) Dassault Aviation
7) De Havilland Aircraft of Canada Limited
8) Embraer S.A.
9) Fokker Services B.V.
10) Gulfstream Aerospace Corporation
11) Gulfstream Aerospace LP
12) Lockheed Martin Corporation/Lockheed Martin Aeronautics Company
13) MHI RJ Aviation ULC.
14) Pilatus Aircraft Limited
15) Saab AB, Support and Services
16) Textron Aviation Inc.
17) The Boeing Company
18) Viking Air Limited

Compliance:

As indicated below, unless already accomplished.

Background:

In July 2023, Innovation, Science and Economic Development Canada (ISED), Canada's spectrum regulator, published Standard Radio System Plans (SRSP)-520 Issue 3 and Radio Standard Specifications (RSS)-192 Issue 5. These publications define the spectrum environment for the 5G C-Band in Canada. The spectrum auctions for 5G C-Band in the 3.45 to 3.65 GHz (3.5 GHz) and the 3.65-3.9 GHz (3.8 GHz) band were completed in 2021 and 2023, respectively. Deployment in the 3.8 GHz band may occur as early as May 2024. Furthermore, ISED recently concluded a consultation on non-competitive local licensing (NCL) framework for operation in the frequency bands of 3.9 to 3.98 GHz.

The frequency bands allocated to these services are close to those used by aeroplanes' radio altimeters (4.2 to 4.4 GHz). Transport Canada has determined that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.45 to 3.98 GHz frequency band (5G C-Band). Radio altimeter anomalies that are undetected by the automation or pilot, particularly close to the ground (e.g., landing flare), could lead to loss of continued safe flight and landing. Additionally, radio altimeter anomalies could lead to increased flight crew workload and flight crew desensitization to warnings.

Transport Canada does not anticipate having the capability to assess the actual risk of interference by tracking 5G deployment locations in Canada. Therefore, to protect aviation safety, this AD mandates limitations that must be applied everywhere 5G deployment is permitted – the entire Canadian airspace.

Currently, based on ISED's resolutions regarding the Canadian spectrum environment, Transport Canada has determined that aeroplanes equipped with radio altimeters deemed compliant with the Federal Aviation Administration (FAA) AD 2023-10-02, are less susceptible to 5G interference in the Canadian environment, considering the existing spectrum mitigations. Given the sunset of certain spectrum mitigations in January 2026 and January 2028, it is not certain that a standard can be established for radio altimeter tolerant aeroplanes to the full scope of 5G emissions permitted in Canada after January 2026. This AD is considered an interim action, and further AD action may follow.

Transport Canada is aware of requirements imposed by the FAA for aeroplanes operating under Title 14 of the Code of Federal Regulations (CFR) Part 121 to meet their radio altimeter tolerance standard by 1 February 2024. At this stage, this AD does not prohibit operation in Canadian airspace under any type of service defined by the Canadian Aviation Regulations (CARs). An equivalent Transport Canada requirement to the FAA requirement, applicable to Canadian operators, is under review and further AD action may follow.

The FAA AD also prohibited the use of Enhanced Flight Vision System (EFVS) to touchdown under 14 CFR 91.176(a) for aeroplanes that were non-radio altimeter tolerant, as defined by the FAA. This AD does not have any restrictions on EFVS as those operations are not yet approved in Canada. Once approved, further AD action may follow.

Corrective Actions:

Part I – Definitions

For the purpose of this AD, the following definitions apply:

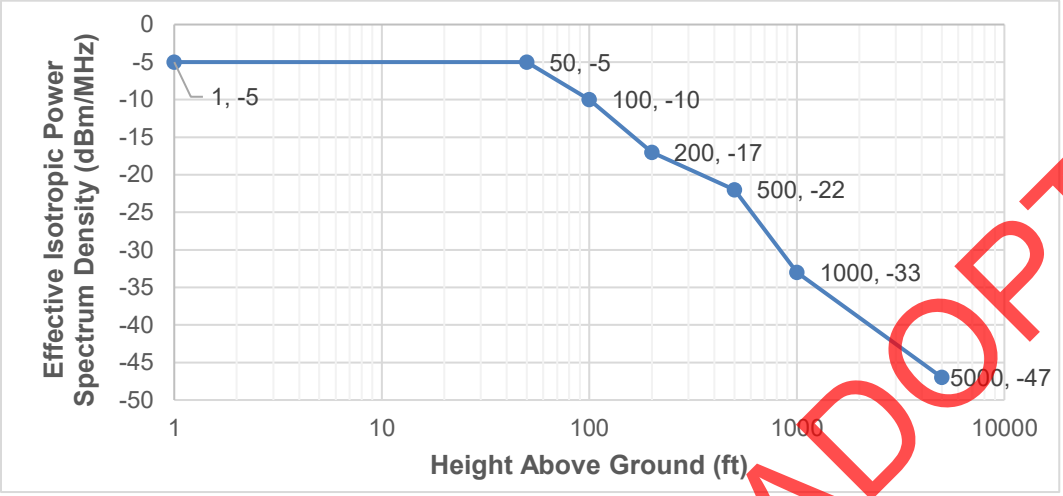
Radio Altimeter Tolerant Aeroplane is one for which the radio altimeter, as installed, demonstrates the tolerances for emissions specified in Paragraph A and Paragraph B, Part I, of this AD, using a method approved by the FAA or Transport Canada. Currently, aeroplanes that meet the requirements of the FAA definition of "radio altimeter tolerant airplane", as per Paragraph (g) Definitions of FAA AD 2023-10-02, are considered radio altimeter tolerant aeroplanes in Canada.

Non-Radio Altimeter Tolerant Aeroplane is one for which the radio altimeter, as installed, does not demonstrate the tolerances for emissions specified in Paragraph A and Paragraph B, Part I, of this AD. Currently, aeroplanes that meet the requirements of the FAA definition of "non-radio altimeter tolerant airplane", as per Paragraph (g) Definitions of FAA AD 2023-10-02, are considered non-radio altimeter tolerant aeroplanes in Canada.

Tolerance for Emissions:

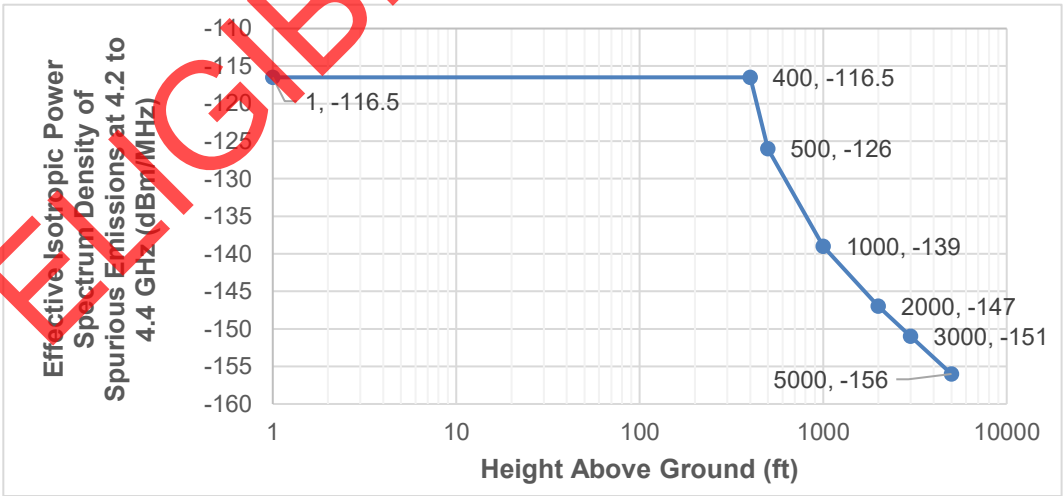
A. Tolerance to radio altimeter interference, for the fundamental emissions (3.45–3.98 GHz), at or above the power spectral density (PSD) curve threshold, are specified in Figure 1 of this AD.
B. Tolerance to radio altimeter interference, for the spurious emissions (4.2–4.4 GHz), at or above the PSD curve threshold, are specified in Figure 2 of this AD.

Figure 1 - Fundamental Effective Isotropic PSD at Outside Interface of Aeroplane Antenna, as per FAA AD 2023-10-02.



Height above ground (ft)	Effective Isotropic PSD (dBm/MHz)
Aeroplanes on the ground	-5
50	-5
100	-10
200	-17
500	-22
1000	-33
5000	-47

Figure 2 - Spurious Effective Isotropic PSD at Outside Interface of Aeroplane Antenna, as per FAA AD 2023-10-02.



Height above ground (ft)	Effective Isotropic PSD (dBm/MHz)
Aeroplanes on the ground	-116.5
400	-116.5
500	-126.0
1000	-139.0
2000	-147.0
3000	-151.0
5000	-156.0

Part II – Airplane Flight Manual (AFM) Revision

A. For non-radio altimeter tolerant aeroplanes, as of the effective date of this AD, revise the Limitations Section of the existing AFM to include the information specified in Figure 3 of this AD. This may be accomplished by inserting a copy of Figure 3 of this AD, or the AD itself, into the existing AFM.
B. After revising the Limitations Section of the existing AFM, inform all flight crews of these new limitations and thereafter operate the aeroplane according to the limitations outlined in Figure 3 of this AD.
C. For radio altimeter tolerant aeroplanes, no actions are required by this AD.
D. AMOCs approved with FAA AD 2023-10-02 for the U.S. airspace are approved as AMOCs with this AD for the Canadian airspace.

Figure 3 – AFM Revision for Non-Radio Altimeter Tolerant Aeroplanes

Radio Altimeter Flight Restrictions

Due to the presence of 5G C-Band wireless broadband interference, when operating in Canadian airspace, the following operations requiring radio altimeter are prohibited:

- Instrument Landing System (ILS) Instrument Approach Procedures (IAP) Special Authorization (SA) CAT I, SA CAT II, CAT II, and CAT III.
- Automatic Landing operations.
- Manual Flight Control Guidance System operations to landing/head-up display (HUD) to touchdown operation.

Part III – Terminating Action for AFM Limitations

A. Modifying the aeroplane from a non-radio altimeter tolerant to a radio altimeter tolerant aeroplane, as defined in Part I of this AD, terminates the limitations specified by Part II of this AD, which may be removed from the AFM.

Authorization:

For the Minister of Transport,

ORIGINAL SIGNED BY

Jenny Young
Chief, Continuing Airworthiness
Issued on 15 May 2024

Contact:

João Falcão, Continuing Airworthiness, Ottawa, telephone 888-663-3639, facsimile 613-996-9178 or e-mail TC.AirworthinessDirectives-Consignesdenavigabilite.TC@tc.gc.ca or any Transport Canada Centre.