



Civil Aviation Authority of Singapore

## Safety Information Bulletin

<b>CAAS SIB No.</b>	2021-01 R1
<b>Issued</b>	20 January 2022
<b>Subject</b>	Operation of aircraft Radio Altimeter in a cellular 5G C-Band environment
<b>Ref. Publication(s)</b>	<ol style="list-style-type: none"> <li>1) FAA Airworthiness Directive (AD) 2021-23-12 (Transport and Commuter Category Airplanes)</li> <li>2) FAA Special Airworthiness Information Bulletin (SAIB) AIR-21-18</li> <li>3) DGAC France Safety Info Leaflet (No. 2021/01) – Risk of interference of 5G signals on radio altimeters and on-board equipment using the radio altimeter information.</li> <li>4) Transport Canada Civil Aviation Safety Alert (No. CASA 2021-08) – Potential Risk of 5G Signals on Radio Altimeter.</li> <li>5) Civil Aviation Safety Authority (AWB 34-020 Issue 4) – Potential Interference of Radio Altimeter Systems.</li> <li>6) Hong Kong Special Administrative Region, People's Republic Of China (Aeronautical Information Service, AIC 24/21) – Use of Portable Electronic Devices on Hong Kong Registered Aircraft</li> </ol>
<b>Purpose</b>	<p>This SIB advises air operators on:</p> <ol style="list-style-type: none"> <li>i) the potential cellular 5G interference to the aircraft radio altimeter, and consequential effect on automatic and/or manual flight guidance systems that facilitates low visibility operations which rely on radio altimeter inputs.</li> <li>ii) 5G Portable Electronic Devices (PED) allowed for carriage in cabin and transport in checked baggage.</li> </ol>
<b>Applicability</b>	All Singapore AOC holders and foreign air operators operating to Singapore aerodromes.
<b>Cancellation</b>	This is the second revision of the SIB issued on this subject and it supersedes the first revision issued on 29 Dec 2021.
<b>Description</b>	The 5G cellular system has brought about greater speed in data transmissions, lower latency and ability to interconnect a high number of devices in over 40

countries. However, the use of 5G system may result in potential interference to the normal operation of aircraft radio altimeters, which is the only system providing information to other aircraft systems on the height of the aircraft above the terrain, at low altitude.

With the imminent push towards 5G network launches worldwide and the issue of potential interference to aircraft radio altimeters, States and industry need to collectively work towards mitigating any safety risk to flight operations. It is important for all air operators and CAAs to closely monitor the development and address any requirements issued by various countries. This issue of potential interference by 5G networks has gathered significant interest globally. Administrations and major aviation organisations have collectively published reports and issued advisories on this issue.

At the ICAO High Level Conference on COVID-19 (HLCC) in October 2021, IATA, IBAC, ICCAIA, IFALPA and RTCA presented their safety concerns regarding 5G interference on aircraft radio altimeters. They stressed the importance of the radio altimeter as a mandated safety-critical aircraft system, and noted the following:

- 1) Cellular broadband/5G services should not be in radio frequency bands near the bands used by radio altimeter;
- 2) Undetected failures can lead to catastrophic results and false alarm may undermine trust in the avionics system;
- 3) Sufficient time should be provided to develop standards and implement mitigations that will allow 5G signals to be fully deployed for frequencies near those being used by radio altimeter;
- 4) Economic importance of next generation commercial telecommunication system must not compromise aviation safety; and
- 5) Frequency allocation/assignment should be comprehensively studied and proven not to adversely impact aviation safety and efficiency.

On 2 November 2021, the US FAA issued a Special Airworthiness Information Bulletin (SAIB) to advise the aviation community on managing this potential interference. The SAIB recommends that radio altimeter manufacturers, aircraft manufacturers, and US operators provide information to the FAA on altimeter system design and functionality, deployment and usage of radio altimeters on aircraft for further analysis.

An FAA Airworthiness Directive issued on 9 December 2021, applicable to transport and commuter aeroplanes equipped with a radio altimeter, requires a revision of the Aircraft Flight Manual (AFM) to incorporate limitations prohibiting certain operations requiring radio altimeter data when operating in U.S. airspace

and in the presence of 5G C-Band interference as identified by Notices to Air Missions (NOTAMs).

Various Civil Aviation Authorities (CAAs) such as DGAC France, Transport Canada, CASA Australia and Hong Kong Civil Aviation Department have also issued safety alert and bulletins recommending air operators to report radio altimeter failures, perform risk assessment and associated mitigating actions, and manage the use of Portable Electronic Devices (PEDs) in cabin and checked baggage.

In view of the safety alerts and bulletins issued by the various CAAs against potential 5G interference on radio altimeter, air operators are advised to remain vigilant and to continually seek to mitigate any safety risk to flight operations, the aircraft and its occupants.

### **Recommendation**

Singapore air operators should take the necessary precautions to further enhance safety in a 5G C-Band environment, and report to CAAS on any incident encountered during operation that may be attributable to 5G interference. Singapore air operators should also engage aircraft and component manufacturers on the potential interference by 5G signals on radio altimeters.

Before operating into airports that are within a cellular 5G environment, air operators should consider the following:

- 1) Review all NOTAMs published by the local airport Authority.
- 2) Perform a risk assessment and develop mitigating actions for all aircraft fleets.

When conducting operations into airports that are within a cellular 5G environment, air operators should consider the following:

- 3) Remind passengers that all PEDs in checked baggage should be turned off and prevented from accidental activation.
- 4) Remind passengers to turn off or disable the 5G functionality of PEDs carried in the cabin when the aircraft is operating at an altitude of 10,000 feet or lower.
- 5) Report to Air Traffic Control, when encountered, any anomalies affecting the radio altimeter.

Singapore air operators should address all applicable mandatory continuing airworthiness information, such as Airworthiness Directives, issued by foreign CAAs that covers situations specific to operations in 5G environments. All alternative methods of compliance approved by the foreign CAA to facilitate operations by Singapore air operators should be reported to CAAS.

### Foreign Air Operators

Foreign air operators should consider the above recommendations 1) through 5) in order not to compromise safe flight operations when operating into a Singapore

aerodrome. In particular, foreign air operators should report to Air Traffic Control if any anomalies affecting the radio altimeter are encountered.

**Contact(s)**

For further information, contact CAAS FS Division Infocenter via email at [CAAS\\_AFO\\_Infocenter@caas.gov.sg](mailto:CAAS_AFO_Infocenter@caas.gov.sg)