

**57th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

*Incheon, Republic of Korea
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AGENDA ITEM 3: AVIATION SAFETY

5G INTERFERENCE TO AIRCRAFT RADIO ALTIMETERS

Presented by the International Air Transport Association (IATA)

SUMMARY

This paper calls attention to the issue of C-band 5G telecommunications systems operating without proper mitigations in the frequency bands adjacent to aircraft radio altimeters, potentially causing harmful interference to radio altimeters on all types of civil aircraft during any phase of flight – but most critically during approach and landing phases. Such interference poses a serious safety risk to aircraft, passengers and crew onboard, and people on the ground.

The paper urges the Directors General of Asia and Pacific to engage with national telecommunication spectrum regulators prior to decisions being made on the deployment of 5G in the C-Band, and to seek assurances from spectrum regulators that they have established and ensured adequate enforceable safeguards and mitigations to protect critical aircraft safety systems, such as radio altimeters, from potential harmful interference.

1. INTRODUCTION

1.1 The radio altimeter is one of the most critical operational components on an aircraft. It is the only sensor onboard an aircraft providing a direct measurement of the aircraft's clearance over terrain or other obstacles. Undetected failure of this sensor can lead to catastrophic results, and repeated false alarms (caused by interference) have the potential to undermine pilot trust in aircraft avionics.

1.2 The interference risk posed by 5G transmissions in C-Band, if not appropriately mitigated, has the potential to broadly impact aviation safety and operations in a very negative way¹.

1.3 Within each State, decisions regarding spectrum allocation rest fully with each national telecommunication regulator. Adding to the complexity, 5G deployment proposals and associated conditions vary technically from one country to another. The differences can be in terms of which spectrum will be considered for 5G; where the 5G transmitter can be located; and/or the maximum transmitting power the 5G base station can use.

2. DISCUSSION

2.1 IATA recognizes the economic importance of making spectrum available to support next generation commercial telecommunication systems such as 5G. This however needs to be balanced with the criticality of aviation safety being accorded the highest priority. Article 40 of the ITU Constitution states, *international telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the air or in outer space.*

2.2 In ICAO's State Letter SP 74/1-21/22 dated 25 March 2021 (see Appendix A), the ICAO Secretary General noted that harmful interference to the functioning of aircraft radio altimeters, if not properly mitigated, may pose a serious aviation safety risk to passengers, crew, and people on the ground. We note that the ICAO letter also mentions that *some radio-altimeters will be impacted, if high power cellular systems are implemented near the frequency band used by radio altimeter.*

2.3 Article 4.10 of the International Telecommunication Union (ITU) Radio Regulation also emphasizes that Member States recognize that *the safety aspects of radio navigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.*

2.4 IATA is urging all State aviation safety regulators to engage with national telecommunication spectrum regulators prior to decisions being made on the deployment of 5G in the C-Band. Aviation safety regulators are respectfully requested to seek assurances from national telecommunication spectrum regulators that they have established and ensured adequate safeguards and mitigations to protect critical aircraft safety systems, such as radio altimeters, from potential harmful interference.

2.5 IATA also asks States to ensure that appropriate technical and operational evaluations, together with sufficient aviation safety assessments, have been conducted and the results agreed and accepted by aviation safety regulators. To adequately mitigate the aviation safety risk due to potential 5G C-Band interference, the airline industry cannot act alone, and cooperation from State spectrum and aviation regulatory bodies is essential to ensure robust and enforceable mitigations are enacted through State regulations.

2.6 Enforceable mitigations that have been put in place by some national telecommunication regulators to ensure the safe and balanced co-existence of aircraft safety and 5G C-Band deployment needs include combinations of:

- a) Adequate spectral separation between 5G C-Band deployments and the 4.2-4.4 GHz used by aircraft radio altimeters; and

- b) Restricting 5G transmission characteristics, including maximum power limits and down-tilting antenna patterns/angle, particularly around airports and flight paths; and
- c) Adequate prohibition and precautionary zones around airports and runways.

2.7 IATA has created a Global 5G Status Dashboard². The assistance of the Directors General is sought to help accurately populate the dashboard with the latest information for each State in Asia and Pacific. It would be valuable to receive confirmation that:

- a) aviation safety evaluations addressing 5G interference concerns have been conducted; and
- b) appropriate national spectrum regulations have been put in place that include enforceable mitigations to the satisfaction of the State aviation safety regulator, such that aviation safety will not be compromised, and flight operations will not be interrupted.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) Discuss the information contained herein; and
- b) Where it has not already occurred, urge Asia and Pacific aviation safety regulators to engage with relevant government/telecommunication regulatory/management agencies regarding the potential impact of 5G deployment on aviation safety prior to decisions being made on the deployment of 5G in the C-Band, including discussions on the provision of robust and enforceable mitigations; and
- c) Encourage States to assist IATA populating their Global 5G Status Dashboard.

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