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FPS MOBILITY AND TRANSPORT
BELGIAN CIVIL AVIATION AUTHORITY

# Risk of interference of 5G signals on radio altimeters and on-board equipment using radio altimeter information.

## INTRODUCTION

The use of 5G services is expanding in Belgium, with several mobile network operators concerned with the introduction of such services. 5G services are being introduced also in other Member States of the European Union as well as in other regions of the world.

BCAA is aware of a report from the RTCA (Radio Technical Commission for Aeronautics) which describes the likelihood of interference between certain radio altimeter models and 5G radio waves in several operational scenarios, particularly at height levels less than 1000 ft. One of the frequency bands allocated to 5G services is the band 3.4-3.8 GHz. This band is close to the band 4.2-4.4 GHz used by aircraft radio altimeters.

## WHAT ARE THE THREATS?

The RTCA report was limited to studying the impact of 5G transmissions in the frequency range 3.75 – 3.9 GHz. Preliminary findings of additional studies conducted in France show that the risk of interference of 5G on radio altimeters could also occur in Europe where the frequency range is 3.4 to 3.8 GHz.

The 5G technology is based on active antennas that direct their beam towards mobile devices that seek to connect to the network.


The development and rapid growth of connected electronic equipment indicate clearly that 5G will become the most prevalent mobile communications technology in the immediate future.

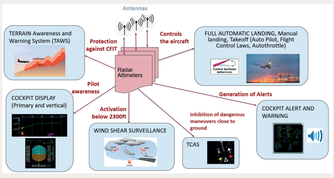
At the present time, the risk of interference with certain radio altimeter models cannot be discarded, even if to date there is no clear evidence this risk is present.

Several relevant studies are underway with the aim of clarifying the situation.

## RISKS AFFECTING FLIGHT OPERATIONS

The worst-case scenario resulting from 5G interference is an undetected wrong height indication by the radio altimeter. Depending on the type of operation, equipment and aircraft type, this type of error can have a significant negative impact on flight safety.

Other on-board systems using radio altimeter information (e.g. Terrain Avoidance and Warning System) can also be potentially affected.




## APPLICABLE REGULATION

The EU Regulation No 965/2012 (AIR OPS), particularly articles CAT.GEN.MPA.140, NCC.GEN.130, NCO.GEN.125, and SPO.GEN.130, regulates the use of portable electronic equipment (PED) on board aircraft. According to the assessment conducted by the operator on the risk of electromagnetic interferences, the use of PED (tablet or smartphone for example) may be allowed during all phases of flight or forbidden during low visibility operations. EU Regulation No 376/2014 on mandatory reporting to the BCAA mentions several occurrence categories (Article 4) where jamming of a radio altimeter can be experienced.

As far as Air Traffic Service Providers are concerned, ATM/ANS.OR.A.065. is the applicable reference for the scope of this ASIL.

## 5G INTERFERENCE PREVENTION

BCAA is closely following related developments in the USA, Europe and other parts of the world and will define precautionary measures as and when necessary. This decision will be based on the guidance expected to be provided by EASA as well as the results of the ongoing studies aimed at determining the scope and nature of the interference risk.

In the meantime, the recommended actions listed below are seen as prudent measures to reduce any potential risk.

## RECOMMENDED ACTIONS

- Aircraft operators should remind passengers and flight/cabin crew that all electronic devices should be carried in the cockpit, passenger cabin, on their person or cabin luggage.

- If electronic devices are packed in checked luggage, they must be turned off completely.

- If 5G compatible portable electronic devices (telephones, tablets, modems, etc.) are carried in the passenger cabin or the cockpit, they should be set so that they do not transmit on cellular networks (airplane mode when available) or switched off completely.

- Emergency Medical Services (EMS) and similar services requiring essential communications, should only use 3G and 4G communications devices until more clarity is available on the potential interference risk between 5G and radio altimeters.

- In addition to the notification provisions under Regulation (EU) 376/2014, it is imperative that the air traffic controller in contact with the aircraft be informed as soon as practicable when interference with the radio altimeter is experienced by the flight crew.

- Air traffic controllers and flight information service personnel should be informed of the potential occurrence of interference between 5G and radio altimeters, and the way such interference may manifest itself as well as the obligation to report any such events as communicated by the flight crew.

- Aircraft operators are invited to communicate any crew post-flight reports of possible interference events to the BCAA.

## REPORTING

All 5G interference related information, and any other aviation occurrences, shall be communicated to the BCAA without delay, per the process described in the Circulaire MAS-01.

## MORE INFORMATION

More information on the subject of interference between 5G and radio altimeters can be found at:

https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdf

https://www.ecologie.gouv.fr/sites/default/files/Safety_Info_Leaflet_2021_01_5G_interferences.pdf

Questions? Suggestions?
BCAA.Safety.Promotion@mobilit.fgov.be

## WHAT IS AN ASIL?

ASIL stands for Aviation Safety Information Leaflet. These leaflets are created and published by the Belgian Civil Aviation Authority (BCAA) in order to raise awareness and to promote aviation safety. These leaflets are often based on the safety analysis of occurrences reported in accordance with Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation. For more information about the leaflets themselves, visit our website in French or in Dutch.