



# DGAC SAFETY INFO LEAFLET

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Operators concerned	<ul style="list-style-type: none"><li>All aircraft operators (airplanes or helicopters) equipped with a radio altimeter</li><li>Air Traffic Service Providers</li></ul>
Topic	Risk of interference of 5G signals on radio altimeters and on-board equipment using the radio altimeter information.
Objectives	The objective of this Safety Info Leaflet is to inform operators about this risk, and to recommend precautionary operational measures before confirmation of impact of 5G radio waves on radio altimeters.
Context	<p><b>a. Introduction</b></p> <p>In a context where 5G frequencies are being auctioned to French mobile network operators and, given the worldwide expansion of this technology, DGAC's attention was drawn to <a href="#">a recent RTCA report</a> (Radio Technical Commission for Aeronautics) which concludes to the likelihood of disturbance for certain radio altimeter models by 5G radio waves in numerous operational scenarios, notably at low height (less than 1000 ft). The frequency bandwidth allocated to 5G is close to the one used by aircraft radio altimeters (4,2 to 4,4 GHz).</p> <p><b>b. Threats</b></p> <p>The RTCA report was limited to studying the bandwidth 3,75 - 3,9 GHz, but the preliminary findings of additional DGAC studies show that the risk of interference of 5G on radio altimeters could also occur in Europe where the bandwidth is 3,4 to 3,8 GHz.</p> <p>The 5G technology is based on active antennas that direct their beam towards mobile devices that seek to connect to the network.</p> <p>The development and rapid growth of connected electronic equipment make it clear that 5G will soon become the telecom leading technology.</p> <p>At this stage, the likelihood of interference for certain radio altimeter models cannot be discarded, but no evidence can confirm or invalidate such consequences affecting on-board equipment.</p> <p><b>c. Risk on flight operations</b></p> <p>The most undesirable outcome of an interference is the indication of an undetected wrong height given by the radio altimeter. Depending on operations, equipment model and aircraft type, this kind of error could have a <b>significant adverse impact on flight safety</b>.</p>

	<p>Other on-board systems using radio altimeter information (such as TAWS) could also be affected.</p> <p><b>d. Applicable regulation</b></p> <p>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 approaches (LVO).</p> <p>The regulation having been written before the emergence of 5G, it does not take into account the potential risks related to 5G mobile devices operation.</p> <p>In some particular cases, the French regulation on operations of civil aircraft in general aviation (« arrêté du 24 juillet 1991 ») is the applicable regulatory basis.</p> <p>EU regulation N° 376/2014 on occurrence reporting mentions several cases (Article 4) applicable to a jammed radio altimeter.</p> <p>As far as Air Traffic Service Providers are concerned, ATM/ANS.OR.A.065. is the applicable reference for the scope of this Safety Info Leaflet.</p>
5G interferences prevention	<p>Provisional precautionary measures relating to the geographical location of some 5G antennas in the vicinity of airports with IFR procedures in mainland France have been implemented.</p> <p>The DGAC is not aware of comparable measures taken by other European States.</p>
Recommended actions	<p><b><i>Therefore, DGAC warns operators on the potential risk of interference to radio altimeters and recommends the following measures:</i></b></p> <ul style="list-style-type: none"> <li><b>a. Operators should remind passengers and flight crews that all electronic devices should be carried in the cabin, on their person or in luggage. If these were placed in checked baggage, they should be turned off and protected from accidental activation.</b></li> <li><b>b. If 5G-compatible portable electronic devices (telephones, tablets, modems, etc.) are carried in the cabin or cockpit, they should be set so that they do not transmit on cellular networks (e.g. airplane mode) or switched off.</b></li> <li><b>c. For essential communications, e.g. during emergency medical service operations (EMS), crews should only use 3G or 4G communication devices.</b></li> <li><b>d. In addition to the notification provisions to the authority under Regulation (EU) 376/2014, it is imperative that the air traffic service provider in contact with the aircraft is informed of the disturbance to the radio altimeter. The latter will then trigger the appropriate operational actions.</b></li> <li><b>e. Air Traffic Service Providers are encouraged to inform their controllers or AFIS staff of the possibility of jamming reported by crews, and to promptly report to DSAC any repetitive re-</b></li> </ul>

	<p><b>ports of potential jamming. In addition, they are invited to inform the aerodrome operator if the interference was related to the proximity of a 5G antenna.</b></p>
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