



# MIDANPIRG CNS SG/11 Meeting

## Muscat, Oman, 16 – 19 May 2022



## 5G Deployment and Aviation Safety

### OMAN

## 5G Deployment in Oman

The 5G network has been officially launched in the country by Oman Telecommunications Company (Omantel) in **DEC 2019**.



# 5G Deployment and Aviation Safety

## Global Concern



International  
Civil Aviation  
Organization

Organisation  
de l'aviation civile  
internationale

Organización  
de Aviación Civil  
Internacional

Международная  
организация  
гражданской  
авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

Tel.: +1 514-954-8219 ext. 7130

25 March 2021

Ref.: SP 74/1-21/22

**Subject:** Potential safety concerns regarding interference to radio altimeters

**Action required:** As indicated in paragraph 5

Sir/Madam,

1. I have the honour to bring your attention to an ongoing initiative by the International Civil Aviation Organization (ICAO) to ensure continued public and aviation safety.

2. During recent meetings of ICAO experts, concerns about interference to radio altimeters on-board aircraft have been raised. A number of administrations are currently considering or have already begun deploying new cellular broadband technologies (such as 5G) in the frequency bands close to the radio altimeter's frequencies of operation (4.2-4.4 GHz), a critical aviation safety system. The international aviation industry has noted with concern that these broadband technologies may cause harmful interference to radio altimeters.

3. The radio altimeter<sup>1</sup> is a mandated critical aircraft safety system used to determine an aircraft's height above terrain. Its information is essential to enable several safety related flight operations and navigation functions on all commercial aircraft as well as a wide range of other civil aircraft. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection, flight controls, and functions to automatically land an aircraft. If not properly mitigated<sup>2</sup>, harmful interference to the function of the radio altimeter during any phase of flight may pose a serious safety risk to passengers, crew and people on the ground.

4. ICAO has received studies from several States and organizations regarding the interference potential to radio altimeters<sup>3</sup>. These studies generally conclude that some radio altimeters will be impacted

<sup>1</sup> In some aviation publications it is also known as the radar altimeter or Low Range Radar Altimeter.

<sup>2</sup> General guidance on Interference Protection Considerations can be found in Chapter 9 of the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation – ICAO spectrum strategy, policy statements and related information* (Doc 9718, Volume I)

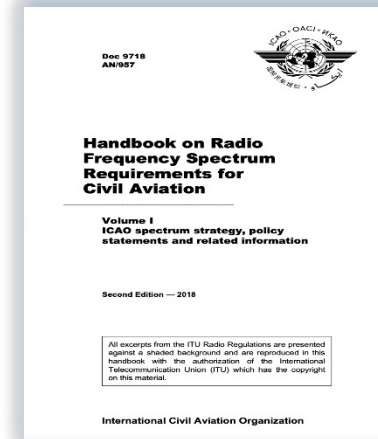
<sup>3</sup> Report by RTCA – [https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG11/IP/FSMP-WG11-IP07\\_RTCA\\_Report.docx](https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG11/IP/FSMP-WG11-IP07_RTCA_Report.docx)

## ICAO Doc. 9718 Vol I

### Chapter 9. Interference Protection Considerations

9-21

Regions. In particular, allocations supporting IMT were adopted for eight-one countries in Region 1 for the band 3 400–3 600 MHz and fourteen countries in Region 2 for the band 3 400–3 500 MHz. The 3 500–3 600 MHz band has also been identified for IMT in countries that opt-in in Region 3. At WRC-15, the issue was revisited, and the band 3 400–3600 MHz was identified for IMT for the entirety of Regions 1 and 2 and for eleven Region 3 countries, and the band 3 600–3 700 MHz was identified for IMT in four Region 2 countries. The current situation is described in RR Nos. 5.430A, 5.431B, 5.432A, 5.432B, 5.433A and 5.434.



### WRC-23 Agenda Item 1.3

#### Agenda item title:

**To consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with Resolution 246 (WRC-19).**

# 5G Deployment and Aviation Safety

## CAA Actions



### Action 1

Establishing Ad-Hoc  
Safety Committee

Flight Safety  
Department

AN Safety  
Department

Safety REG  
Department

AD Safety  
Department



### Action 2 Internal Engagement

Meeting of the safety  
committee Members



### Action 3

Approving Safety  
Circular 2021-05

**APPROVED**



### Action 4 External Engagement

Joint meeting between  
CAA and TRA



# 5G Deployment and Aviation Safety

## Industry Awareness

### SAFETY CIRCULAR 2021-05

Issue 01

Date of Issue: July 8, 2021

Subject: Potential Safety Concerns regarding interference to radio altimeters

The purpose of this Civil Aviation Safety Alert is to raise awareness of the potential risk of 5G interference and to recommend precautionary operational measures before confirmation of impact of 5G radio waves on radio altimeters.

Reference: ICAO state letter SP 74/1-21/22 dated 25 March 2021.

#### Applicability:

- Airport Operators
- All airlines operators (Oman and foreign) operating within Oman Airspace.
- Air Traffic Service Units. (ATSU).
- Aircraft Training Organization.

#### Background:

The frequency bandwidth allocated to 5G is close to one used by aircraft radio altimeters (4.2-4.4 GHz). In some countries in Europe and Asia, 5G is already deployed. The most undesirable outcome of interference is the indication of an undetected wrong height information given by the radio altimeter. Depending on operations, equipment model and aircraft type, this kind of error could have significant adverse impacts on flight safety. It may impact Terrain Awareness Warning Systems (TAWS), Traffic Alert and Collision Avoidance Systems (TCAS) and Airborne Collision Avoidance Systems (ACAS), Wind Shear detection systems, flight control systems, and auto land systems (including auto-throttle and automated landing flare and rollout) and loss of situational awareness due to erroneous or unexpected behavior.

#### Potential Safety and Operational Impact (Anywhere close to terrain):

- Could inhibit some functionalities of the TAWS (Terrain Alerting Warning System) reactive modes which would remove a safety net in case against CFIT (Controlled Flight in to Terrain).

#### Impact if 5G base stations are located too close to Airports:

- Could jeopardize flare manoeuvre (manual or auto).
- Risk of Go Around as landing laws may be affected.
- Diversion as there is no possibility to land in low visibility conditions.
- Spurious fault messages or Audio in the cockpit.

SAFETY CIRCULAR 2021-05 - ISSUE 01

Page 1 of 2

#### Recommended action

Operators shall remind passengers and flight crew that all electronic devices are either carried in the cabin, (on person) or in the luggage. If these are placed in checked baggage, they shall be turned off and protected from accidental activation.

All 5G PED's carried in the aircraft shall be set to non-transmitting mode so they do not transmit on the cellular networks (e.g. flight mode) or switched off.

For essential communications, e.g. for Emergency Medical Service operations (EMS), crew should only use 3G or 4G communication devices.

In the event of an actual disturbance of radio altimeter, it is imperative that flight crew report the event to the Air Traffic Unit (ATU) as soon as possible.

All Oman operators shall report to Flight Safety Department and Air Traffic Services Unit (ATSU) on any 5G interference with Radio Altimeter readouts.

International operators need to be aware of the potential risk of interference to radio altimeters when operating in countries with different 5G networks and their respective mitigations measures, if there is any 5G interferences with radio altimeter observed in Oman report to Air Traffic Services Unit (ATSU).

The Use of Transmitting and Non Transmitting Portable Electronic Devices are still applicable, where no air operator shall permit use of a Portable Electronic Devices (PEDs) on board an aircraft except with the permission of the aircraft operator and permit the use of non-transmitting PEDs on board aircraft during any critical phase of flight.

This Safety Circular is effective from the date of the issuance.

#### Contact:

CAA Flight Safety Department for further instructions or guidance.

Foreign operators contact: Director of Flight Safety email: shadiya@caa.gov.om.



Mubarak Saleh Al-Ghelani  
Acting Director General Civil Aviation Regulation

SAFETY CIRCULAR 2021-05 - ISSUE 01

Page 2 of 2

## Recommended Actions

- 1. Operators shall remind passengers and flight crew that all electronic devices are either carried in the cabin, (on person) or in the luggage. If these are placed in checked baggage, they shall be turned off and protected from accidental activation.**
- 2. All 5G PED's carried in the aircraft shall be set to non-transmitting mode so they do not transmit on the cellular networks (e.g. flight mode) or switched off. For essential communications, e.g. for Emergency Medical Service operations (EMS), crew should only use 3G or 4G communication devices.**
- 3. In the event of an actual disturbance of radio altimeter, it is imperative that flight crew report the event to the Air Traffic Unit (ATU) as soon as possible.**

International operators need to be aware of the potential risk of interference to radio altimeters when operating in countries with different 5G networks and their respective mitigations measures, if there is any 5G interferences with radio altimeter observed in Oman report to Air Traffic Services Unit (ATSU).

## Conclusions

- ❑ TRA allocated band 3.4 - 3.8 GHz for the 5G network deployment in Oman.
- ❑ Currently 3.4 - 3.6 GHz is used for the deployed 5G network by the telecommunication operators.
- ❑ Monitoring the industry report/complaint due to interference if any.
- ❑ Joint work and cooperation between TRA and CAA in any relevant update in this regard.

**No Currently reported Occurrences due to RADALT Interference**



# 5G Deployment and Aviation Safety

## Recommendation

### Reporting mechanism

Developing/ updating occurrence template

### Data Collection

Collecting the occurrences related to RADALT Interference due to 5G

### Guidance Development

Develop/update guidance material of the 5G Safeguarding measures



### Data sharing

Provide occurrence reports of RADALT interference, If any

### Updating RASP

Adding RADALT interference as an Emerging risk and develop the relevant SEI

## Action by the meeting:

### The meeting is invited to:

- a) Take a note of the information provided in this presentation;
- b) Encourage States to share information on their practices to mitigate 5G potential interference that may impact the radio altimeters during aircraft operations; and
- c) Continue joint work between the Civil Aviation and Telecommunication Regulatory Authorities of the states to assess any possible measures that might be needed, both near-term and in the future, to ensure compatible operation of radio altimeters and these new mobile service systems.

# Thank You

Stay Safe and Healthy

