Current Status – Radio Altimeter Standard

A standard set in the 1980s

Developed before “telecom boom” and existence of 3G/4G/5G/6G...

Few if any requirements to ensure spectrum compatibility with adjacent/nearby spectrum users.

Current radio altimeters are complied with national regulations; however, the national regulations may not be suitable for current competing needs and spectrum environment.
5G interference Impact

- Governments all over the world are considering (or have considered) allowing 5G cellular systems to operate in parts of the frequency ranges 3.4 - 4.2 GHz and 4.4 - 4.9 GHz (adjacent to the band used by radio altimeters from 4.2 - 4.4 GHz.)
- Based on the Radio Technical Commission for Aeronautics (RTCA) Paper No. 274-20/PMC-2073, the 5G mid-band emissions may interfere with the Radio Altimeters.
- Impacted aircraft potentially include commercial aircraft, military aircraft, helicopters and larger GA & UAS aircraft with radio altimeters.
- Some altimeters appear to be vulnerable to high power cellular systems.
- New Radio Altimeter standards are being developed to sustain planned 5G environment.
- The level of the problem is different depending on the platform.
5G Proposals/Deployments Across the Globe

Snapshot of 5G roll-out in mid-band spectrum (C Band) (Dec 2021)

- **UK**: 3.4 – 3.8 GHz, 3.805 – 4.195 GHz
- **Europe**: 3.4 – 3.8 GHz, 3.8 – 4.2 GHz
- **China**: 3.3 – 3.6 GHz
- **Japan**: 3.4 – 4.1 GHz
- **Korea**: 3.4 – 3.7 GHz
- **Australia**: 3.5 – 3.7 GHz, 3.7 – 4.0 GHz
- **Canada**: 3.7 – 4.1 GHz
- **USA**: 3.1 – 3.55 GHz, 3.7 – 3.98 GHz
- **India**: 3.3 – 3.6 GHz
- **Saudi A**: 3.4 – 3.8 GHz, 3.8 – 4.0 GHz, 4.0 – 4.2 GHz

Low power: at risks

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Technical Concern

Fundamental Satellite signals are filtered by RA.

Fundamental Terrestrial 5G energy not filtered by all RA models.

Air Transport RA receivers have not been designed to support such level of terrestrial interferences in its adjacent band (previously allocated to Fixed Satellites Services) even though they are fully compliant with applicable regulations.
Current Status

• Updated IATA Position on 5G Deployment in C-Band

• IATA strategic roadmap to mitigate current and future threats to the civil aviation spectrum
  • Safe and uninterrupted airline operations
  • Cooperative coordination
  • Protection of civil aviation spectrum resources and establishment of predictable global spectrum environment
  • Robust aircraft and avionics design with clear and cost-effective migration path

• IATA 5G Web Site
The 5G roll-out world map above provides a display of information obtained by IATA. The map focuses on 5G roll-outs in C-Band, close to the frequency band used by aircraft radio altimeters (4.2-4.4 GHz). It also contains IATA remarks and concerns on specific current 5G C-Band deployment and upcoming roll-out plan(s).

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Schedule for New Radio Altimeter Standard

- Q4 2022: RTCA/EUROCAE – Definition for the RF interference environment
- 2022: ICAO guidance materials for States on 5G deployments
- Q4 2023: RTCA/EUROCAE - Minimum Operational Performance Standards (MOPS) for new radio altimeters
- 2023: ICAO SARPS development for new radio altimeters (expected an amendment of ICAO Annex 10)
- 2024+: Joint aviation engagement with ITU on reviewing relevant part of IT-R recommendations and ITU Radio Regulations
Current Status – Regional Updates

Africa & Middle East

Arab Civil Aviation Organization (ACAO) Air Navigation Committee endorsed the following recommendations:

✓ Urged the member states of the organization to take appropriate measures to reduce the impact of the installation of 5G cellular networks on the movement of aircraft in coordination with the concerned authorities of each country (national telecommunications regulatory bodies).

✓ Tasked the General Administration of ACAO in coordination with the recently established 5G Working Group by ICAO Middle East Regional Office to work on the development of a mechanism at the national and regional levels to report and analyze interference reports resulting from the use of 5G networks.

✓ Urge member states to support ICAO’s position during the 2023 World Telecommunications Conference WRC-23 meeting to be held on 2023 through coordination with the national telecommunication’s regulatory bodies of each member state.
Next Steps in Spectrum

• **Upcoming:** ICAO 41st Assembly – September 2022
  
  • IATA Paper on “Strengthen Protection and Encourage Efficient Aviation Use of Aeronautical Spectrum Resource”

• **Upcoming:** Preparation for World Radiocommunication Conference (WRC) – Nov 2023
  
  • [Aviation Positions for WRC-2023 recognized by ICAO](#)
  
  • Continuing IATA engagements at ITU-R WP5B

Medium-to-Long Term

• Broadening engagements in standard setting activities, including at ITU and ICAO – **minimizing future spectrum conflicts.**
  
  • Advocating airlines preference with OEMs on robustness of future avionic and aircraft designs to be suitable competitive and uncertain spectrum environment
Next Steps in Spectrum/Middle East

- **Action group** established. Tasked to develop guidance material on safeguarding measures to protect RA from potential harmful interference from 5G C-band.

**Guidance includes 4 Chapters;**

- **Chapter 1**: Background on 5G and frequency ban allocation
- **Chapter 2**: Potential impact of 5G on RA during aircraft operations
- **Chapter 3**: Safeguarding measures adopted at regional & global levels for use of 5G networks / Short & Long-Term solutions
- **Chapter 4**: Methodologies for defining safeguarding measures for aerodromes & Heliports
Thank you