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| U.S. Radiocommunications SectorFact Sheet |
| **Working Party:** ITU-R WP 5B | **Document No:** USWP5B34-06a |
| Ref: Resolution 256 (WRC-23) | **Date:** 2/8/25 |
| **Document Title:** Draft liaison statement to Working Party 5D on WRC-27 agenda item 1.7 |
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| **Purpose/Objective:** This contribution presents additional information on radio altimeters and WAIC operating in the 4.2-4.4 GHz band. |
| **Abstract:** This contribution presents additional information for WP 5B’s consideration when developing their response liaison station to WP 5D concerning WRC-27 agenda item 1.7. |

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| **Radiocommunication Study Groups** | A blue logo with a black background  Description automatically generated |
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| Subject: WRC-27 agenda item 1.7 | Document 5B/USA-E |
| Date 2025 |
| English only |
| United States of America |
| Draft Liaison statement to working Party 5D on WRC-27 agenda item 1.7 |

**Summary**

At the last meeting (November 2024), Working Party 5B, as a contributing group for WRC-27 agenda item 1.7, informed the CPM-27 Steering Committee that more time was required to develop technical characteristics, protection criteria, and operational consideration of Radio Altimeters (RA) and Wireless Avionics Intra Communication (WAIC) systems in the frequency bands 4 200-4 400 MHz which will be essential for sharing and compatibility studies.

In the attached, the United States presents a draft reply liaison to Working Party 5D regarding this topic.

**Attachment.**

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| REPLY LIAISON STATEMENT TO WORKING PARTY 5D (COPY FOR INFORMATION TO WORKING PARTIES 1B, 3K, 3M, 4A, 4C, 5A, 5C, 7B, 7C, 7D AND ICAO) |
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Attachment

**Additional technical information for sharing studies
under WRC-27 agenda item 1.7**

Working Party (WP) 5B would like to thank WP 5D for its liaison statements (Document [5B/147](https://www.itu.int/md/R23-WP5B-C-0147/en)) requesting additional information on radio altimeter performance in the frequency band 4200- 4400 MHz and updates to considerations of WAIC as noted in the liaison statement to WP 5D from ICAO (Document [5D/257](https://www.itu.int/md/R23-WP5D-C-0257/en)).

**Radio Altimeters**

A radio altimeter (RA) is a radar system mounted to the underside of an aircraft. A radio altimeter is the only system that provides a continuous measurement of the aircraft’s height above ground, clearance height above obstacles, and the rate of change of those measurements. Modern aviation would not have the safety record it does without this system. Radio altimeters are integrated into several safety critical aircraft functions; such systems include, but are not limited to, the flight control system, airborne collision avoidance systems, and terrain awareness warning system. These systems combined enable and enhance several safety and navigation functions throughout all phases of flight on all commercial aircraft and a wide range of other civil aircraft.

As noted in WP 5B’s liaison statement to WP 5D, Rec. [**ITU-R M.2059-0**](https://www.itu.int/rec/R-REC-M.2059/en) provides the technical and operational characteristics, and protection criteria of radio altimeters. Representative radio altimeter operational and technical characteristics are contained in Annex 1 and Annex 2; and radio altimeter protection criteria are contained in Annex 3. Any evaluation of the aggregate effects of potential interferers using the altimeter band should use the “Operational Altitude” stipulated in Tables 1 and 2 and not the “Range of Reported Altitude”. Radio altimeters are operational during all phases of flight, including ground maneuvers.”

As observed from publicly available aviation industry test data[[1]](#footnote-2), RAs operating at lower heights, near terrestrial services, are often more resilient to interference.[[2]](#footnote-3) Based on publicly available data from aviation industry testing, more up-to-date measurements of altimeter performance are available and may be used in sharing and compatibility studies.[[3]](#footnote-4) [Note for WP5B: Insert guidance to send to WP5D at this point.]

Finally, while some administrations have been implementing RA filters/retrofits to improve their RF blocking performance on categories of airplanes, those filters cannot be assumed to be installed on all aircraft.[[4]](#footnote-5)

**Wireless Avionics Intra-Communication systems (WAIC)**

WAIC systems provide safety-related wireless communication over short distances between two or more points onboard a single aircraft. They are installed at various locations both within and on the outside of the aircraft, and operate during all phases of flight, including on the ground (as described in Report [ITU-R M.2283-0](https://www.itu.int/pub/R-REP-M.2283-2013)). WAIC systems do not provide air-to-ground, air-to-satellite, or air-to-air communications. They are only used for aircraft communications related to the safety and regularity of flight, allowing greater flexibility and redundancy to the existing internal aircraft wiring. One example of communications provided by WAIC systems is sensor information used to monitor the health of an aircraft structure and critical systems, and to communicate this information to a central onboard entity.

WP 5B has previously provided Rec.[ITU-R M.2067-0](https://www.itu.int/rec/R-REC-M.2067/en), which gives the technical and operational characteristics and protection criteria for WAIC systems operating in the frequency band 4 200-4 400 MHz, as described in its Annex.

WP 5B also notes that ICAO is in the process of publishing WAIC standards and recommended practices (SARPs) to be contained in ICAO Annex 10 to the Convention on International Civil Aviation. Based on technical analysis submitted to WP 5B, WP 5B has sent a request to ICAO for further information on the new interference level being specified and how it is satisfied under the current interference environment with other operational systems that have spurious emissions falling into the 4.2 – 4.4 GHz band. Thus, the parameters proposed in Rec. ITU-R M.2067 should be used only for studies considering indoor WAIC receivers, where the interference signal of radio altimeters will be additionally attenuated due to the aircraft fuselage.

Working Party 5B requests to be kept informed on the progress of the studies under WRC-27 agenda item 1.7.

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| **Status:** For action |  |
| **Contact:**  | **E-mail:**  |

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1. AVSI AFE 76s2 Report, available at <https://avsi.aero/avsi-publishes-volume-iii-of-the-afe-76s2-report/>. [↑](#footnote-ref-2)
2. This data was limited to black-box testing (i.e., testing a system without regard to its internal workings) of 5 different RA models installed in larger single-aisle and wide-body commercial air transport airplanes and 4 different RA models installed in all other fixed-wing aircraft and rotorcraft). [↑](#footnote-ref-3)
3. Add link to reference material or place material/analysis in WP 5B Chair’s Report. [↑](#footnote-ref-4)
4. The publicly available aviation data pre-dates all filter/retrofit programs. [↑](#footnote-ref-5)