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| U.S. Radiocommunications Sector  Fact Sheet | |
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| **Purpose/Objective:** This draft contribution is to reply to the Liaison Statement from WP4A regarding adjacent compatibility studies between Aero ESIM in the 12.75-13.25 GHz and aeronautical radionavigation systems operating in the 13.25-13.4 GHz band. | |
| **Abstract:** This contribution will provide WP4A information requested in the LS to WP5B. | |

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| Working Party 5B |
| REPLY LIAISON STATEMENT TO WORKING PARTY 4A |
| WRC-23 agenda item 1.15 |
| Sharing and compatibility studies for the operation of earth stations on aircraft and vessels in the frequency band 12.75-13.25 GHz and aeronautical radionavigation systems operating in the 13.25-13.40 GHz frequency band |

Working Party (WP) 5B thanks WP 4A for providing their study, Document [4A/323](https://www.itu.int/md/R19-WP4A-C-0323/en), addressing potential interference to ARNS systems in the 13.25-13.40 GHz band from earth stations on aircraft operating in the adjacent 12.75-13.25 GHz band. The scenario of the study was for cases where the earth station on aircraft and aeronautical radionavigation systems are on the same aircraft. WP5B agrees with the study and the results that show under the operational parameters studied that there will not be interference into ARNS systems. Furthermore, for cases where multiple RF equipment are located on an aircraft – EMC analysis are conducted to ensure compatibility between the on-board equipment, and additional measures can be implemented that will ensure compatibility.

WP5B notes that there are two primary electromagnetic interference coupling mechanisms between the radar system and interfering signals from other services. The first mechanism is caused by front-end overload causing saturation, and the generation of intermodulation products. The second is interfering emissions within the receiver IF passband leading to desensitization and degradation of performance resulting in an overall lowered quality radar data output. Given that the studies under AI 1.15 are for potential adjacent band interference to the ARNS system it is the second interference that is of concern in this case.

There are two potential scenarios for interference when the ARNS aircraft and ESIM aircraft are in proximity of each other. One case is when the aircrafts are flying towards each other which could result in interference, but that interference would be very time limited and transient in nature. WP5B is of the view that this case will not be problematic. However, the case where the two aircraft are flying in proximity in the same direction and separated by a relatively short distance, e.g. 1 mile, there is the potential for interference and it may not be transient and could last for minutes, depending on the speed of the two aircraft. WP5B recommends that this case be studied, taking into account that the ARNS system is located in the nose of the plane and ESIM is located on the top of the aircraft. This will be the driving case for determining the potential interference to ARNS systems from aeronautical ESIM.

*Need operational information on how/when ARNS systems are used, e.g., for landing or during flight and are the limits of the scanning of these systems. Do we need studies for takeoff and landing? Is there an ARNS perturbation threshold that should be considered? Is there a short-term protection that should be considered? Are there any previous methodologies that can be used for this case?*

WP5B is of the view that earth stations on vessels, that operate within the envelope of filed fixed earth stations, should not cause more interference to ARNS systems than earth stations on the ground and therefore sharing studies for that case are not required.