International Civil Aviation Organization

Twenty Sixth Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/26) of APANPIRG

Video Tele-Conference, 5 – 9 September 2022

Agenda Item 5: Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

5.3 Other issues related to aeronautical communications service and aeronautical radio spectrum management, especially on 5G implementation and potential impacts to aircraft radio altimeters

OUTCOMES OF APT-ICAO WEBINAR ON 5G IMPLEMENTATION AND RADIO ALTIMETER

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the Asia-Pacific Telecommunity (APT)-ICAO Webinar on 5G Implementation and Radio Altimeter held on 23 August 2022 via Video Tele-Conferencing (VTC).

1. INTRODUCTION

1.1 The APT-ICAO Webinar on 5G Implementation and Radio Altimeter (also known as *APT-ICAO Regional Dialogue: Radio Altimeters at 4200-4400 MHz band and implementation of 5G in adjacent bands*) was held on 23 August 2022 via Video Tele-Conferencing (VTC) on Zoom which was hosted on APT platform. The Webinar was intended to promote the common understanding among the spectrum regulators, and industries on the operation of Radio Altimeters in the band 4.2 – 4.4 GHz and the implementation of 5G in the adjacent bands ensuring the aviation safety in the Asia-Pacific region.

1.2 The Webinar has registered with about **250** participants. The presentations can be accessed in the webpage at https://www.icao.int/APAC/Meetings/Pages/2022-Webinar-on-5G-Implementation-and-Radio-Altimeter.aspx.

1.3 This paper summarized the key outcomes of the Webinar.

2. DISCUSSION

2.1 Four (4) presentations were delivered by experts from APT, ICAO Headquarters, Airbus and GSMA. The summaries of all presentations are as follows:

Information on the Implementation of 5G in the Asia-Pacific Region – APT

2.2 Dr. Jongbong Park, Director, Project Development of APT, introduced the structure and work of APT, and the information on implementation of 5G in the APAC Region. Established in 1979, APT is an intergovernmental organization specialized in the ICT field in APAC Region, which fosters the development of telecommunication services and information infrastructure throughout the Region. The presentation introduced the functions, objectives, membership of the APT, described its five pillars of areas of work in their Strategic Plan 2021-23, and introduced their work programmes on spectrum management and radiocommunication. In the second half of the presentation, Dr. Park shared the background of 5G (IMT-2020) in Radio Regulation, and the details of 5G in three spectrum bands – below 1 GHz, 1 – 6 GHz and above 24 GHz. In particular, the C-band allocation (3.3 - 4.8 GHz) to various services and in different APAC countries have been introduced, with references to relevant APT reports provided.

Potential Safety Concerns due to Interference from 5G to Aeronautical Radio Altimeters – ICAO Headquarters

2.3 Ms. Mie Utsunomiya, Technical Officer, Communications, Navigation, Surveillance and Spectrum (CNSS), ICAO Headquarters first presented the State Letter issued from ICAO Headquarters in March 2021 stating the potential safety concerns and encouraging States to consider as a priority, public and aviation safety when deciding how to enable 5G in radio frequency bands near those used by radio altimeters. She introduced the background of the Problem Statement jointly issued by IATA and IFALPA, the critical roles of radio altimeters for aircraft, a comparison of ITU Radio Regulations in C-band in the past and at current, and a brief summary of concerns between telecom/5G and aviation industries. Ms. Utsunomiya further introduced the serious safety risks with potential catastrophic consequences if not properly mitigated, and possible measures required such as limitation/suspension of precision approach and landing capabilities, night operations and regulations mandating retrofits and re-certification. The presentation further introduced the ongoing long-term actions including new RTCA/EUROCAE MOPS, and the notional mitigations plan and timeline for radio altimeter upgrades and continued operational safety during transition. The presentation ends with an example of mitigation in Montreal airports and references used in this presentation.

Concerns, Impact, Mitigations and Way Forward on 5G Interference to Radio Altimeter - Airbus

2.4 Mr. Claude Pichavant, Executive Expert, Communications, Navigation, Surveillance, Airbus presented the current problem to existing radio altimeters from 5G implementation that some altimeters appear to be sensitive to high power cellular system, and the impacted aircraft potentially include commercial aircraft, military aircraft, helicopters and larger GA & UAS aircraft with radio altimeters, while the operational impact depends on platform and integration/archetectures. The presentation explained the context and technical concern that radio altimeter receivers have not been designed to support such level of terrestrial interferences in its adjacent band despite fully compliant to applicable regulations. Mr. Pichavant further explained the FAA's Alternative Method of Compliance (AMOC) process in US since December 2021 and the different versions of AMOC developed over time, and the development of "5G Round Table" to define the plan about Radio Altimeter retrofit in US. The presentation also introduced the mid- and long-term roadmaps for FAA, including release of DO-155 "Intermediate MOPS" for December 2022 and DO-155A/ED-30A "Complete MOPS" for December 2023 to provide specifications to radio altimeter suppliers. In parallel, Airbus is actively working to understand 5G worldwide environment and define requirements. Airbus objective is to ensure the continuous safe operations of airplanes in assessing and addressing potential interference between the 5G networks and aircraft systems considering aircraft integration, while allowing future 5G deployment including supporting aviation industry.

5G and Aviation Altimeters Co-existence in 3.3-4.2 GHz and 4.5-4.8 GHz – GSMA

2.5 Mr. YiShen Chan, Director, Spectrum (Asia Pacific) presented the matter's viewpoint from GSMA, the organization representing the interests of mobile operators worldwide. As of Q2 2022,

almost 200 operators in 75 markets have launched mobile 5G with about 80% of 5G network launched so far have used the 3.5 GHz band (3.3-4.2 GHz), around 160 networks in 55 countries. Regarding the RTCA SC-239's study results in *Assessment of C-Band Mobile Telecommunications Interference Impact on Low Range Radar Altimeter Operations*, Mr. Chan raised a few concerns with the Study, including lack of detailed deployed radio altimeter models information, calculation based on highly pessimistic and unrealistic assumptions, and obsolete, poorly designed devices built on old standards not being able to adequately reject out-band signals would not be usable/acceptable in today's radio-frequency environment. The presentation also quoted the outcomes of field tests conducted in France and Norway showed no abnormalities on radio altimeters from 5G-band base stations. Mr. Chan further summarized that Majority of countries using 5G in the 3.5 GHz do so without extra restrictions and thousands of flights take off and land safely in their airports every day. There are already technical requirements on spurious emissions from 5G base stations. The safe operation of altimeters is critical and the international mobile community is working in good faith with the aviation community to address any concerns. Any precautionary measures for protection should be provisional and be based on least restrictive technical conditions. GSMA has published a report on 5G and Radio Altimeters Co-existence in 3.3-4.2 GHz and 4.5-4.8 GHz published in June 2022 which could be downloaded on their website.

2.6 With the successful conducting of the Webinar, ICAO APAC Regional Office appreciates the effort of APT to jointly bring up the issue from views of different stakeholders in the Region, and the excellent arrangement to the Webinar.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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