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Innovation, Science and Economic Development Canada
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SUBJECT: Consultation on a Policy and Licensing Framework for Spectrum in the 3800 MHz Band

Ref.: Canada Gazette, Part I, Notice Notice No. SLPB-006-21 — Consultation on a Policy and Licensing Framework for Spectrum in the 3800 MHz Band, December 2021

To whom it may concern,

Transport Canada Civil Aviation (TCCA) agrees that mitigation measures for 3500 MHz band are required while international and domestic studies are still underway to further assess the potential for adjacent band interference with radio altimeters (RadAlt) from flexible use operation.

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> ISED is seeking comments on its proposal to extend the mitigation measures described in SRSP-520 to protect radio altimeters from flexible use operations in the 3500 MHz band to flexible use operations in the 3800 MHz band (3650-3900 MHz). This extension is proposed until domestic and international studies are completed.

Answer 1:

As we continue analysis into the aviation safety impacts of C-Band transmitters, a broad range of permanent solutions are possible, from a highly-mitigated telecommunications solution which permits the unfettered use of existing radar altimeters (radalts) without sacrificing operational capability, to significant restrictions/limitations to aviation operations in the proximity of C-band transmitters, to something in the middle – with implications to both the telecommunications sector and aviation operations. While work is ongoing to analyze the full operational effect on operations requiring radio altimeter in the vicinity of C-band transmitters, TCCA supports ISED's proposal to extend the mitigation measures described in SRSP-520 in the 3500 MHz band to the 3800 MHz band, until domestic and international studies are completed and provide data supporting their withdrawal.

Based on available information and published reports, TCCA has conducted an operational risk assessment on 5G potential interference with radio altimeters due to the deployment of

5G in the C Band. Given the 3800 MHz band's closer proximity to the working frequency of radalts, there is currently insufficient data to indicate the extent to which the current mitigations measures in the 3500 MHz spectrum will provide sufficient risk mitigation in the 3800 MHz band. As more data becomes available, and as the impact of the current spectrum usage in the US is assessed in the context of aviation operations, it is anticipated that sufficient information to better quantify risk to aviation operations will become available shortly. In the meantime, it is recommended that at a minimum the current mitigation measures in the 3500 MHz band be extended to the 3800 MHz one. In order to continue to permit existing aviation operations in the future, TC submits that the following scenarios will require adequate mitigation:

- **Landing operation:** Automated air/ground systems errors during normal landing due to erroneous RadAlt data causing unexpected system behaviours and exceeding calculated Landing Distance Available (LDA) resulting in possible runway overrun, damage, or death.

- **Decision height based on RadAlt and aircraft automation:** Determination of final decision height and inaccurate flare guidance error on short final to touchdowns due erroneous RadAlt data. Detected erroneous RadAlt data resulting in go around or undetected erroneous RadAlt data resulting in Controlled Flight into Terrain (CFIT) and crash.

- **Aircraft flying into a 5G interference zone:** RadAlt Aircraft requirements or special authorization requirements and flying into 5G interference zone. Increased risk to the Minister for these procedures, loss of RadAlt detected or undetected erroneous RadAlt information which may increase risk to multiple special authorized procedures.

- **Helicopter landing:** Helicopter landing in brownout or whiteout conditions with detected incorrect RadAlt altitude and overshoot or undetected incorrect RadAlt altitude and hard landing.

- **Helicopter low-level (below 200 ft) operation:** Low-level operation (15-200 ft) when height determination is difficult to establish without RadAlt (over water, very dark night), which may result in the helicopter slung load impacting with surface, aborting the mission or crash.

- **Safety enhancement & Surveillance systems:** Protection systems fail to provide inherent or intended safety mitigation and aircraft crash, resulting in increase pilot's work load or collision with another aircraft.

- **Flight control augmentation systems:** Flight control augmentation systems fail to provide inherent or intended safety mitigation and cannot be turned off. The crew may be unable to maintain full control authority over the aircraft resulting in undesired aircraft state or Loss of Control In-flight .

TC promotes continued collaboration with ISED on the analysis of measures to support protection for aviation procedures or operations requiring RadAlt equipment for safety of

flight against 5G potential interference in the 3500 and 3800 MHz bands. The following aviation procedures or operations should be protected because they are highly dependant on reliable performance of the RadAlt: CAT II/III ILS Approaches, Steep Approach, CAT A helicopter procedure, Required Navigation Performance – Authorization Required (RNP AR), offshore Area Navigation (Global Navigation Satellite System)/Authorization Required for Aircrew (RNAV (GNSS)/ARA) procedure, auto-landing, head-up display (HUD) landing to touchdown and Terrain Collision and Avoidance Systems (TCAS).

While those proposed mitigations are deemed necessary, they may not protect all low-level aviation operations against potential 5G interference with RadAlt (helicopter operations, medevac, search and rescue or other low-level operations). For this reason, TC submits that it would be helpful to complement them with other measures which may include the use of easily-accessible up-to-date geographical depiction of the 5G deployment for aviation planning purposes.

Research is underway in Canada, the United States and several countries to better understand the issue and find solutions that reduce the risk of interference but the result of it will not be known for some time. These efforts may lead to technological solutions that reduce the need for broad restrictions. The Government of Canada should consider those avenues, including ways to facilitate deployment, in due course. That said, broad mitigations by TC and ISED are required until more targeted and efficient measures can be taken. It is important for TC and ISED to continue to work together to ensure that 5G and aviation can safely coexist. Should the analysis and investigations into the effects of radalt interference by 5G transmitters conclude that such mitigation measures are not necessary to the same extent (or at all) in order to permit aviation operations, TCCA's recommendations will be amended. It is important to note, though, that the level of aviation safety enjoyed worldwide today is a result of a very cautious approach to safety risks. This is a consistent industry and regulatory approach worldwide.

Should residual risk following analysis be sufficient to preclude safe aviation operations, it could also be mitigated by prohibiting these types of operations in the vicinity of 5G transmitters. This would have a significant impact on the aviation and airline industry of course, as we have seen in the United States. Yet, mitigation measures are possible on both the telecommunications and aviation operations sides of the issue. Such an outcome should arrive following broader stakeholder and public consultation, however.

Should you have any further questions please do not hesitate to contact Francis Mercier at (343) 550-4226 or email francis.mercier@tc.gc.ca

Yours sincerely,

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