



TELUS COMMUNICATIONS INC.

Comments for

**Consultation on a Policy, Licensing and Technical
Framework for Remotely Piloted Aircraft Systems
(RPAS) in the 5030-5091 MHz Band and Certain Bands
Used to Provide Commercial Mobile Services**

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Executive Summary

1. TELUS appreciates the opportunity to comment on the *Consultation on a Policy, Licensing and Technical Framework for Remotely Piloted Aircraft Systems (RPAS) in the 5030-5091 MHz Band and Certain Bands Used to Provide Commercial Mobile Services* (“the Consultation”)¹.
2. The Spectrum Outlook 2023 to 2027 listed the 5030-5091 MHz band (5 GHz UAV) as Priority 3 to monitor international developments. TELUS applauds ISED for leading through this consultation to advance the 5030-5091 MHz band in an effort to provide timely dedicated spectrum for RPAS use. As RPAS (Remotely Piloted Aircraft Systems) users seek more Beyond Visual Line of Sight (BVLoS) operations, Canada must establish regulations that will maximize the potential of the RPAS industry.
3. While the 5030-5091 MHz band is dedicated to RPAS Command and Non-Payload Communications (CNPC), TELUS notes that it is still in the early stages of global development. TELUS recommends following the US (FCC) band plan and technical requirements (RTCA DO-362A) to take advantage of a potential equipment ecosystem. Further, TELUS suggests ISED establish an interim authorization mechanism, similar to the US, to allow immediate deployments while a more complex Dynamic Frequency Management System (DFMS) is developed.

¹ *Consultation on a Policy, Licensing and Technical Framework for Remotely Piloted Aircraft Systems (RPAS) in the 5030-5091 MHz Band and Certain Bands Used to Provide Commercial Mobile Services*, Canada Gazette SMSE-016-25, published December 2025. Link: <https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/learn-more/key-documents/consultations/consultation-policy-licensing-and-technical-framework-remotely-piloted-aircraft-systems-rpas-5030>

4. TELUS urges ISED to prioritize the RPAS framework in the near term for commercial mobile bands such that RPAS manufacturers can utilize 3GPP standardized hardware that is readily available. TELUS strongly supports ISED's proposal to authorize RPAS operations under existing commercial mobile spectrum licences. We believe that leveraging the existing licensing framework is the most effective way to foster the rapid expansion of the Canadian RPAS industry.

Summary of TELUS' key proposals

5. In order to best enable Canadians to benefit from expanded RPAS use in the near term, ISED should:
 - **Implement the RPAS framework using the proposed list of bands:** Accelerate availability of RPAS while promptly reviewing and including all other commercial mobile bands where no technical barriers exist.
 - **Authorize RPAS use as subscribers under existing commercial mobile licences:** Require RPAS operators to seek and obtain a service agreement from the MNO before using their network and to adhere to all Transport Canada rules and regulations.
 - **Allow RPAS to communicate with satellites under the SMCS framework:** Extend coverage for RPAS in rural and remote areas where terrestrial signals may be limited.
 - **Authorize RPAS equipment under existing technical rules:** Require no additional interference mitigation regulations for RPAS.

- **Establish appropriate technical and regulatory jurisdictional boundaries in the RPAS framework:** There must be a clear distinction between spectrum management (ISED's responsibility) and aviation safety (Transport Canada's responsibility).

TELUS' comments on specific questions posed by ISED

RPAS in the 5030-5091 MHz band

Q1-Q2: Changes to the Canadian Table of Frequency Allocations

Q1. ISED is seeking comments on the proposed changes to the CTFA, to add CXX, as detailed above and suppress footnote No. 5.444, as shown in Table 3 and subsequent updates to the Agreement with NAV Canada and regulatory documents.

Q2. ISED is seeking comments on whether there are other RPAS applications besides CNPC that could also be considered for use in the 5030-5091 MHz band under the AM(R)S and AMS(R)S allocations.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

6. TELUS notes that footnote No. 5.444 was updated following WRC-12 and gives priority to microwave landing systems. TELUS agrees with ISED's proposal to remove footnote No. 5.444 as microwave landing systems in the 5030-5150 MHz are not used in Canada. Further, adding footnote CXX (*The use of the 5030-5091 MHz frequency band by the AM(R)S and AMS(R)S is designated for command and non-payload communications (CNPC) for remotely piloted aircraft systems (RPAS).*) would align with international standard development activities to facilitate RPAS command and non-payload communications (CNPC) in the 5030-5091 MHz band.
7. TELUS notes that while the ITU has identified the 5030–5091 MHz band for Command and Non-Payload Communications (CNPC) for unmanned aircraft systems (UAS) as far back as 2012, it remains in an early stage of development globally. Commercial mobile networks are ready, able and best suited for RPAS operations as opposed to counting on a

future network in the 5030–5091 MHz band for RPAS operations, primarily due to the lack of technical and commercial maturity of the 5030–5091 MHz band.

8. In order for broad RPAS functionality to be supported in the 5030-5091 MHz band, entirely new, dedicated networks will need to be deployed following a positive decision to designate RPAS as an application in this band. In contrast, commercial mobile networks provide existing infrastructure that is capable of delivering both CNPC and payload data. Although the US (FCC) and Australia (ACMA) have established early and temporary rules designed to explore the band, international bodies like the ITU and ICAO are still in the process of developing the necessary technical standards and licensing arrangements. TELUS notes that in 2022, the UK (Ofcom) decided to forgo establishing a framework for the 5030-5091 MHz band due to lack of demand at the time².
9. TELUS urges ISED to prioritize commercial mobile bands for the RPAS framework in the near term such that RPAS manufacturers can utilize 3GPP standardized hardware that is readily available. TELUS recognizes that the 5030-5091 MHz band provides dedicated spectrum for RPAS use and ISED should continue to monitor and support international activities to ensure Canadian RPAS users can take advantage of the band once it is standardized, an ecosystem develops and a network is rolled out in a substantial way.

² Ofcom, *Spectrum for Unmanned Aircraft Systems (UAS)*, Link: <https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/238648-spectrum-for-unmanned-aircraft-systems-uas/associated-documents/secondary-documents/drone-condoc.pdf?v=328029>

Q3-Q4: Band plan for RPAS in the 5030-5091 MHz band

Q3. ISED is seeking comments on whether the high-level 5030-5091 MHz band plan proposed by ICAO or a band plan similar to the one being considered in the U.S. would be appropriate for RPAS use in Canada?

Q4. ISED is seeking comments on any other considerations related to an appropriate 5030-5091 MHz band plan for RPAS use in Canada that may not have been specifically addressed in this consultation.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

10. In its UAS NPRM³, the FCC identified two broad use cases for determining the appropriate band plan and service rules: non-networked operations, or those communications occurring within radio line of sight, and network-supported services, which rely on network infrastructure to go beyond radio line of sight of the operator. The FCC proposed establishing the term Non-Networked Access (NNA) to “indicate spectrum or licenses (e.g., NNA blocks) that would be governed by service rules appropriate to support non-networked communications.”
11. The UAS NPRM further proposed the use of “Network-Supported Services” (NSS) to indicate that the relevant spectrum or licenses would be governed by service rules appropriate to support the provision of networked-based services. The FCC also proposed to use NNA and NSS in the rules to designate the spectrum allocated for non-networked and network-supported use cases, respectively.

³ FCC NPRM, *Spectrum Rules and Policies for the Operation of Unmanned Aircraft Systems*, Link: <https://docs.fcc.gov/public/attachments/FCC-22-101A1.pdf>

12. The development of Remotely Piloted Aircraft Systems (RPAS) in Canada is currently shifting from a niche recreational hobby into a significant industrial sector. It is in the best interest of Canadian RPAS operators to be able to draw from economies of scale when sourcing equipment. Following the US's spectrum use allows for a North American ecosystem to develop. Given the nascent RPAS ecosystem in the 5030-5091 MHz, TELUS considers it appropriate for Canada to follow the US band plan at this time. This will ensure a timely introduction of safe, interference free control for beyond visual line of sight (BVLoS) operations of RPAS in Canada by allowing operators to start obtaining frequency assignments. TELUS urges ISED to continue monitoring RPAS operation as future use cases become more clear. This will guide Canada's evolution toward a finalised RPAS spectrum roadmap, before committing to a finalized band plan that considers alignment with the US, ITU and ICAO.
13. TELUS recommends that ISED continue to monitor development of the relevant draft ITU recommendation that specifies the characteristics of terrestrial airground links operating in the aeronautical mobile radiocommunication service for the 5030-5091 MHz band. Further work will be required to align Canada's draft rules with trends in global developments and domestic needs.

Q5: Licensing aeronautical stations communications with RPA

Q5. ISED is seeking comments on its proposal to issue radio licences as prescribed in the Regulations for terrestrial aeronautical stations communicating with associated aircraft stations (RPA) in the aeronautical service.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

14. TELUS is not opposed to ISED's proposal to issue radio licences for individual terrestrial aeronautical stations annually on a first-come first-served basis. ISED should monitor the uptake of licences and coverage / usage of the band over time and adjust licensing as appropriate.

Q6: Space Stations

Q6. For space stations used within an RPAS, ISED is seeking comments on its proposal to:

- a. issue space station spectrum licences to Canadian satellite operators planning to offer services globally and/or in Canada, or issue a FSA to foreign satellite operators
- b. use a 20-year term for spectrum licences issued for Canadian commercial communications satellites, while FSA would not have an expiration date
- c. apply the existing satellite fee order, SMSE-001-23, Fee Order for Space Stations, to space stations and generic earth station spectrum licences for RPAS

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

15. TELUS is not opposed to ISED's proposal to licence satellite space stations using the established licensing framework.

Q7-Q8: Aircraft Stations

Q7. For aircraft stations communicating with terrestrial aeronautical stations, ISED is seeking comments on its proposal to:

- a. provide for licence-exempt operations by updating RBR-01 to include the 5030-5091 MHz band and section 6.4 (Power restrictions) to restrict output power to a maximum of 10 watts
- b. modify RBR-01 to allow the 15.4 – 15.7 GHz band to be used for licence-exempt radionavigation

Q8. For aircraft stations communicating with space stations, ISED is seeking comments on its proposal to:

- a. issue annual generic earth station spectrum licences which expire on March 31 of each year, with a high expectation of renewal
- b. add the 5030-5091 MHz band in Annex A of CPC-2-6-03 as shown in Table 6 above in order to make aircraft earth stations eligible for generic earth station licensing
- c. apply existing satellite fee order to generic earth station spectrum licences for RPAS

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

16. TELUS is not opposed to ISED's proposal that aircraft stations (aerial UEs) communicating with terrestrial aeronautical stations be authorized on a licence-exempt basis and authorized with generic earth station licences when communicating with space stations for the 5030-5091 MHz band.

Q9-Q10: Technical requirements

Q9. Should ISED require RPAS equipment (both aeronautical and aircraft stations) operating in the 5030-5091 MHz band to meet the minimum operational performance standards described in RTCA DO-362A to allow for an initial launch of services in the band? Are there any other technical standards that ISED should consider adopting in addition to, or instead of, RTCA DO-362A, or considerations that ISED should take into account?

Q10. Should the technical requirements being contemplated for adoption for licensed aeronautical stations and licence-exempt aircraft stations be incorporated into the Conditions of Licence and RBR-1, respectively, or should these requirements form the basis of new Radio Standards Specifications (RSSs) specific to all radio equipment operating in the 5030-5091 MHz band for RPAS operations?

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

17. The US (FCC) has established temporary rules which reference the RTCA DO-362A for its technical requirements. TELUS recommends that ISED follow the international developments and consider how they evolve vis a vis the US RTCA DO-362A. The implementation of long term requirements should be based on the development of a robust equipment ecosystem should one materialize. In the short term, ISED should align the technical requirements between the US and Canada to allow for easier introduction of services and allow Canada to take advantage of the same ecosystem of devices should it develop.
18. TELUS recommends that a specific new RSS for the 5030-5091 MHz band should be developed. If the band develops internationally, it is possible that a large number of RPAS devices will make use of the band. Developing new wireless technology requires millions in R&D and infrastructure spending. Setting clear technical rules at the outset when

enabling a new band like the 5030-5091 MHz provides a stable regulatory environment affording predictability to companies designing equipment to specific standards. Further, considering that this dedicated RPAS band is designated for Command and Control (C2) links that may require an ultra reliable connection for safety purposes, technical rules are critical in establishing how to achieve reliable interference free communications.

Q11-Q12-Q13: Coexistence with adjacent services

Q11. ISED is seeking comments on its proposal to establish an exclusion zone around DRAO, within which transmission and reception of signals for RPAS operations in the 5030-5091 MHz band would be prohibited. This exclusion zone would be defined in the relevant technical standard.

Q12. ISED is seeking comments on its proposal to not require coexistence measures for FSS earth station licensees operating in the 5091-5150 MHz range.

Q13. ISED is seeking comments on any other co-existence considerations that should be taken into account for services in adjacent bands.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

19. TELUS has no comment at this time on the coexistence considerations with the 5030-5091 MHz band and adjacent services.

Q14: Interim approach for coordination of RPAS use

Q14. ISED is seeking comments on an appropriate interim approach to coordinate RPAS use until a formal approach such as a database management system can be developed.

In providing comments, respondents are asked to include supporting rationale and arguments.

20. The US (FCC) established an Interim Access Mechanism (IAM) to allow immediate use of the 5030-5091 MHz band while the permanent Dynamic Frequency Management System (DFMS) is being developed. RPAS operators can access 20 MHz of spectrum within the 5040-5060 MHz block for Non-Networked Access (NNA) limited to short-term and for a single flight. Additionally, Australia (ACMA) allows temporary access to 10 MHz of spectrum within the 5055-5065 MHz for line of site CNPC links. These interim arrangements are in place while regulators monitor the progress and await finalisation of relevant work within the ITU-R on band planning.
21. TELUS recommends that ISED establish a similar interim authorization mechanism as the US to allow Canadian RPAS operators access to dedicated spectrum and to facilitate early deployments without waiting for the complex DFMS to be developed.

Q15-Q16: Dynamic frequency management system

Q15. ISED is seeking views on the use of a DFMS administered by a private third-party, or any other potential coordination approaches to manage RPAS operations in the 5030-5091 MHz band.

Q16. What are the expected timelines for the availability and deployment of DFMS in the 5030-5091 MHz band?

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

22. TELUS has no comment at this time on a DFMS being administered by a private third-party or the expected timelines of an eventual DFMS being operationalised.

Q17-Q18: DFMS

Q17. ISED is seeking views regarding the authorization of multiple third-party DFMS administrators. Would such a model support a sustainable and competitive DFMS market in Canada?

Q18. ISED is seeking views on the proposed DFMS designation agreements modeled on precedents third-party database designation processes such as CPC-4-1-01 and CPC-04-1-02, for the designation and operation of and DFMS in Canada.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

23. TELUS has no comment at this time on ISED's proposal to permit multiple third-party DFMS systems in Canada or the designation agreement.

Q19-Q20: DFMS Technical and operational implementation considerations

Q19. ISED is seeking preliminary comments on the technical and operational implementation aspects for DFMS such as:

- a. information required from licensed incumbents to define exclusion zone
- b. criteria and propagation models used for exclusion zone determination
- c. information required from non-networked RPAS users during the DFMS request process
- d. frequency of updates to licensee data within the DFMS
- e. necessary security and privacy protections for stored and transmitted data

Q20. ISED seeks comments on any additional factors, concerns or technical constraints that should be addressed when developing the DFMS standards in the Canadian context.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

24. TELUS has no comments at this time on the technical and operational implementation of a DFMS system for the 5030-5091 MHz band.

RPAS use in commercial mobile bands

Q21-Q22: RPAS use in commercial mobile bands

Q21. ISED is seeking comments on the proposed considerations to identify specific commercial mobile bands where the proposed RPAS framework will be applied.

Q22. ISED is seeking comments on other considerations it should take into account when identifying commercial mobile bands where the proposed RPAS framework will be applied.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

25. The advancement of cellular connected aerial UEs is reaching a critical inflection point. Driven by key standardization work through 3GPP and the Aerial Connectivity Joint

Activity (ACJA), commercial mobile networks can provide RPAS the reliable, low latency, high throughput, and dedicated and secure communication needed to operate, whether for communications links between drones and drone operators, one or more drones, or transmitting payload for analysis on the ground.

26. TELUS understands that existing technical rules, policies and mobile service allocations were not initially designed with RPAS operations in mind (and in some cases explicitly prohibit airborne use). ISED is proposing to only consider commercial mobile bands with no specific exclusion of aeronautical mobile services. TELUS agrees that these bands should be prioritised to allow the introduction of RPAS use in commercial mobile bands as soon as possible, but encourages ISED to study in the short term the potential use of terrestrial flexible use spectrum for RPAS operations in all bands, and update the rules where no technical reasons remain for such prohibitions. The rules governing terrestrial flexible use spectrum are intended to be just that flexible, meaning licensees should be allowed to respond to consumer needs through a variety of services and operations. Accordingly, consistent with its goal of flexible use, ISED should permit the use of all flexible use bands to support RPAS operations.
27. TELUS agrees with ISED that NCLL bands should not be considered for RPAS operations at this time.

Q23-Q24: Proposed initial commercial mobile bands for RPAS use

Q23. ISED is seeking comments on its proposal to apply the RPAS framework to the following initial bands that provide commercial mobile bands:

- a. 600 MHz (617-652 MHz/663-698 MHz)
- b. 700 MHz (698-756 MHz and 777-787 MHz)
- c. AWS-1 (1710-1755 MHz/2110-2155 MHz)
- d. AWS-3 (1755-1780 MHz/2155-2180 MHz)
- e. PCS (1850-1915 MHz/1930-1995 MHz)

Q24. ISED is seeking comments on any other bands that are used for commercial mobile services for which the RPAS framework should be applied.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

28. As discussed in the previous question, TELUS supports a framework whereby RPAS is authorised as an expanded use for ISED's proposed terrestrial flexible use spectrum bands now, but encourages ISED in the near term to study and determine whether interference concerns remain valid for excluded bands.
29. For example, in Australia and the UK the 3500/3800 MHz (3GPP n78 and n77 bands) are allowed for RPAS use. TELUS acknowledges that interim restrictions were implemented to mitigate the risk of potential interference from use of the 3500 MHz and 3800 MHz bands to radio altimeters, including EIRP elevation masks (permitting uptilted operations at reduced power levels) designed to ensure safe coexistence with modern radio altimeters. With these temporary measures in place, these bands that are globally allocated for mobile use could be prime candidates for RPAS use as well in the near term; longer term operations will be supported with minimal restrictions once radio altimeters

have been upgraded to meet minimum operational performance standards over the next few years.

30. Further, TELUS considers that the 700 MHz Public Safety Broadband spectrum (Band 14) should be included as part of the RPAS framework. Public safety entities are using drones extensively and have expressed a strong desire to enable a more robust and redundant service by operating on commercial mobile networks. Band 14 spectrum has been sitting fallow in Canada for more than a decade now and it's time for ISED to take action by allowing MNOs to partner with public safety and to activate this dedicated spectrum for terrestrial flexible use, SMCS as well as RPAS to underpin Canada's public safety capability.

Q25: RPAS use in the Access Licensing Framework

Q25. ISED seeks comments on its proposal to remove the prohibition of RPAS operations from the Access Licensing framework, noting that RPAS operations would be limited to bands identified under the present RPAS framework consultation.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

31. TELUS disagrees with ISED's proposal to remove the prohibition of RPAS operations from the Access Licensing Framework. Access licences may become available in small pockets of rural and remote areas where spectrum remains unused and present potential coexistence challenges terrestrially. Adding an aerial component to Access Licences changes the spectrum use environment and ISED should only proceed with allowing

RPAS operations under Access Licences if their introduction does not change the methodology for assessing the compatibility of Access Licences with existing licensed operations.

Q26: RPAS use and the SMCS framework

Q26. ISED seeks comments on its proposal to permit RPAS aerial UEs to communicate with authorized satellites under the SMCS framework, noting that RPAS operations using SMCS would be limited to bands common to both the SMCS framework and the RPAS framework.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

32. TELUS strongly supports ISED's proposal to permit RPAS aerial UE to communicate with authorized satellites under the SMCS framework. Integrating RPAS into the SMCS framework is a visionary step that helps address Canada's geographical realities and the connectivity requirements of the emerging drone industry.
33. Currently the primary hurdle for the RPAS industry using licence-exempt bands is coverage. As Canada enables BVLoS operations using commercial mobile networks, the added coverage will unlock many use cases for the RPAS industry, importantly large scale commercial operations. That said, terrestrial networks have their coverage limitations, especially in rural and remote areas. Allowing RPAS aerial UEs to connect via both terrestrial and satellites via SMCS, will enable more ubiquitous coverage. This approach may ensure that aerial UEs can maintain communications as they transition from a terrestrial connected area into a satellite connected rural or remote area. Permitting

RPAS aerial UEs to operate under the SMCS framework provides greater connectivity range and enhances the safety and reliability of BVLoS long-range operations.

Q27: Changes to the CTFA

Q27. ISED is seeking comments on its proposal to modify the CTFA by adding new Canadian footnote CYY, as shown above, to permit RPAS aerial user equipment operations under the mobile service allocations in relevant commercial mobile bands.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

34. TELUS agrees with ISED's proposed modification to the CTFA to add a new Canadian footnote permitting aerial UEs for Remotely Piloted Aircraft System (RPAS) operations under the mobile service allocations in the following initial frequency bands: 617-652 MHz/663-698 MHz, 698-756 MHz and 777-787 MHz, 1850-1915 MHz/1930-1995 MHz, 1710-1755 MHz/2110-2155 MHz, and 1755-1780 MHz/2155-2180 MHz. RPAS operations in these bands are limited to command and non-payload communications (CNPC) and payload communications. TELUS encourages ISED to study whether more bands can be permitted for RPAS as noted in Questions 23-24.

Q28: RPAS licensing framework in commercial mobile spectrum

Q28. ISED seeks comments on its proposal to permit RPAS aerial UE operations under the existing spectrum licence issued to commercial mobile licensees in specified bands. Third-party operators deploying RPAS services would be subscribers of the commercial mobile operator.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

35. Recreational drones operate in licence exempt bands (2.4 GHz and 5 GHz), while new commercial use cases and BVLoS operations would benefit from the characteristics of commercial mobile networks. TELUS strongly supports ISED's proposal to authorize RPAS operations under existing commercial mobile spectrum licences. ISED should avoid creating a separate licensing regime for RPAS in commercial mobile bands. By allowing the industry to leverage existing MNO licences through subscription, ISED will ensure that spectrum access is not a barrier to innovation. This approach provides the flexibility needed for the diverse use cases of the future but maintaining a clear jurisdictional boundary between wireless standards and aviation safety is critical.
36. We believe that leveraging the existing licensing frameworks is the most effective way to foster the rapid expansion of the Canadian RPAS industry. Allowing RPAS operators on existing commercial mobile networks as subscribers is the most direct path to achieving BVLoS operations and enabling innovative use cases. Conversely, creating a separate spectrum licensing process for drone operators would create unnecessary regulatory complexity that would undoubtedly introduce barriers to innovation.

37. Allowing commercial mobile networks to be used by RPAS operators as subscribers will allow market entry without the prohibitive costs and delays associated with obtaining individual spectrum licences. In the unlikely event an aerial UE does cause interference, MNOs are best positioned to manage intra-network interference. Under the subscriber model, MNOs can enter into private service agreements with RPAS operators to ensure only suitable devices and known quantities are operating so that the mobile network operator may determine whether any additional restrictions are required. For clarity, TELUS considers that the requirement to seek and obtain a service agreement with an MNO rests entirely with the RPAS operator.
38. Currently, MNOs provide best effort connectivity to a vast ecosystem of User Equipment (UEs) based on 3GPP standardized protocols. Today, there is no inherent technical mechanism to distinguish a terrestrial device from an RPAS, nor can it be expected in the future. ISED should have no expectation that MNOs can, or will be able to, "police" rogue drone usage (i.e., subscribers operating without a service agreement) on commercial networks.
39. In BVLoS applications, RPAS operators should be able to use commercial mobile networks for CNPC and payload. Whether a commercial mobile network is a viable option for a particular operation depends on several factors, including whether the drone hardware is certified and authorized to connect to the network, and importantly if the network provides sufficient coverage and reliability for the specific flight profile. The responsibility for compliance with Canadian Aviation Regulations (CARs) and Transport Canada safety rules must rest solely with the RPAS operator. MNOs are connectivity

providers, not aviation regulators. For flight profiles where operating on a commercial mobile network is not suitable, TELUS considers that the dedicated CNPC specific spectrum in the 5030-5091 MHz band, which is allocated and intended for aeronautical safety services, should be used.

40. TELUS is of the view that regulation must be distinguished between spectrum management (ISED) and aviation safety (Transport Canada). It is unreasonable for ISED to impose responsibility on MNOs to “ensure the operation of an RPAS aerial UE in commercial mobile spectrum comply with all relevant rules and regulations, including ... [Transport Canada’s] regulations governing the operations of RPAs in Canada.” [emphasis added] MNOs are providing connectivity for RPAS but are not subject to TC’s rules regarding how RPAS are operated by their operators. Moreover, MNOs do not have visibility as to whether an operator is within or outside compliance of Transport Canada’s obligations. Therefore, ISED must not create rules that somehow impose Transport Canada’s requirements onto MNOs or obligate MNOs to perform a role that is already the responsibility of Transport Canada based on its direct statutory purview to regulate RPAs and enforce those regulations.
41. Therefore, if an RPAS operator uses a commercial mobile network, it is their responsibility to decide on the suitability of the connection for a given flight risk profile. Matters such as flight paths, proximity to restricted airspace, and situational awareness are strictly operational concerns (see response to Question 31 for further details). These should remain the sole responsibility of the pilot and be regulated under the Canadian Aviation Regulations (CARs) managed by Transport Canada. TELUS considers that it is

the pilot's role to fly safely according to Transport Canada rules while it's the spectrum licensee's role to ensure that the aerial UE does not cause harmful interference.

Q29: RPAS Conditions of licence in commercial mobile spectrum

Q29. ISSED seeks comments on whether existing conditions of licence applied to commercial mobile licences for the applicable band are sufficient to enable RPAS UE operations.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

42. TELUS considers the current conditions of licence for commercial mobile spectrum licences are sufficient to enable RPAS aerial UE operations. TELUS vehemently disagrees with any assertion that commercial mobile licensees have the responsibility to ensure the operation of RPAS aerial UE comply with all relevant laws and regulations, including but not limited to, Transport Canada's regulations governing the operation of RPAS in Canada. MNOs cannot be held liable for all the actions of RPAS operators who choose to use commercial mobile networks. TELUS recommends ISSED establish an RPAS framework which confirms that the onus is on the RPAS operator to adhere to all Transport Canada rules and regulations and to seek a service agreement from the MNO before using their network for RPAS operations. While commercial mobile licensees can and should be responsible for spectrum management related issues, the responsibility for RPAS aerial UEs to comply with TC regulations rests entirely with the remote pilots. If ISSED were to maintain its position that MNOs are required to ensure that RPAS aerial operations comply with all relevant laws and regulations, including Transport Canada's

regulations, the regime will mean that MNOs would likely be forced to prohibit any RPAs on their networks, stifling the use of RPAs on commercial mobile networks altogether.

Q30: RPAS aerial UE operations under the SMCS framework

Q30. ISED seeks comments on its proposal to extend the generic SMCS earth station spectrum licences to also include RPAS aerial UEs connected via SMCS space stations in commercial mobile bands.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

43. As discussed in response to Question 26, TELUS agrees with ISED's proposal to include RPAS operations as part of the SMCS framework. Commercial applications of RPAS view coverage and connectivity as a key operating requirement, adding SMCS to the RPAS framework can vastly improve where drones may operate and increase the potential use cases, such as the remote inspections of pipelines, agriculture and search and rescue. TELUS agrees with ISED that extending the generic SMCS earth station licence to include RPAS aerial UEs is the most direct method to permit its use.

Q31: Technical considerations of envisioned RPAS use cases

Q31. ISED is seeking comments on the anticipated use cases and deployment considerations for RPAS aerial UEs, including their associated altitudes of operations, in commercial mobile bands, particularly with respect to how they could impact the interference environment with other users.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

44. When developing the RPAS framework, TELUS recommends that ISED account for the various potential use cases and the corresponding impact that RPAS aerial User Equipment (UEs) may have on spectrum interference. TELUS notes that other aviation regulations (such as those established by Transport Canada) may need to adopt a risk-based framework that establishes safety requirements commensurate with flight risks and mission criticality. Requirements should not be uniform across the industry, because a micro drone operating at low altitude in rural areas presents a fundamentally different risk profile than a large passenger drone (Advanced Air Mobility) operating at higher altitudes over populated urban centers. For clarity, TELUS considers any flight risk and safety related matters associated with RPAS operations using commercial mobile spectrum should be covered by Transport Canada laws and regulations, with all compliance strictly the responsibility of the RPAS operator and not that of the MNO.
45. Technical studies (such as 3GPP TR 36.777 and ECC Report 309) confirm that the interference potential of an aerial UE increases significantly with altitude. Currently Transport Canada safety regulations limit drone usage to an altitude to 122m (400ft), unless issued a special operations certificate. Most use cases, especially in the near term,

will be operating well below this altitude limit and as such interference will be limited by clutter loss due to buildings and vegetation. Additionally, these lower altitudes limit their line of sight to a smaller number of terrestrial base stations, thereby minimizing the risk of intra-network and inter-network interference.

46. In the future, larger RPAS such as Advanced Air Mobility may fly at altitudes between 300m and 1500m which could be in a clear line of sight environment. At these higher altitudes, an aerial UE may potentially raise the interference potential with multiple base stations simultaneously. For this type of operation more stringent interference mitigation measures, such as directional on-board antennas and dynamic power control, may need to be implemented to prevent degrading the terrestrial mobile network. If and when such operations are permitted, TELUS considers that technical rules may need to be revisited.

Q32: Coexistence between RPAS and commercial mobile systems

Q32. ISED is seeking comments on the effectiveness of ISED's proposed licensing approach (i.e., permitting RPAS aerial UE operations under the existing spectrum licences issued to the commercial mobile licensees in specified bands) in facilitating intra-network coexistence with RPAS, as required.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

47. ISED should permit RPAS aerial UE operations under existing commercial spectrum licence in specified bands identified in Question 23.
48. In reviewing the interference potential for RPAS devices, TELUS has considered an operating model where RPAS users are required to seek and obtain a service agreement

with an MNO, as described in TELUS' response to Question 28. This is important from a technical perspective as drones have potential to cause interference or degrade service for other users on the mobile network under certain operating conditions. In order for mobile network operators to be able to determine whether specific aerial UEs require interference mitigation to be applied, the operators must be aware of the specific devices in use, their quantities, locations and altitudes of operation. Having RPAS operators sign a service agreement is sufficient to enable MNOs to take action to ensure intra-network coexistence as required.

Q33-34: Co-channel inter-network interference

Q33. ISED is seeking comments on its proposal to apply the existing technical rules and coexistence measures, such as the maximum field strength or pfd, in the applicable Standard Radio System Plans (SRSPs) to networks operating RPAS aerial UEs.

Q34. ISED is seeking comments on its proposal to develop new technical requirements such as specific power limits and transmit power control provisions, in the relevant Radio Standards Specifications (RSS) for aerial UEs.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

49. TELUS has reviewed 3GPP and ECC studies on the new interference environment produced with the introduction of aerial UEs operating in commercial mobile bands. We note that internationally commercial mobile spectrum licences are often granted nation-wide whilst Canada uses localized service area boundaries which introduce co-channel interference potential in adjacent areas that the 3GPP and ECC studies have

not considered. Based on technical analysis and many international studies, it is clear that aerial UEs increase the interference potential to both a mobile operator's own network and adjacent systems at the licence boundary. Despite the added interference risk, TELUS agrees with ISED's assessment that through the adoption of appropriate mitigation measures, such as those established by 3GPP, mobile operators are best positioned to address this interference. Further, TELUS agrees with ISED's assessment that considering the highly mobile nature of aerial UEs and that resource blocks within a frequency band are dynamically assigned, any potential interference is expected to be intermittent and minimal.

50. Given the mitigation measures available, TELUS agrees with ISED that introducing RPAS aerial UEs requires no change to technical rules, such as pfd limits, found in applicable SRSPs.

Q35: Adjacent block inter-network interference

Q35. ISED is seeking comments on its proposal to not require any additional interference mitigation measures, beyond the existing out-of-block emission limits, to address adjacent block inter-network interference.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

51. TELUS notes that the potential for adjacent block inter-network interference is fundamentally the same for RPAS devices as that for terrestrial UEs. TELUS considers that the current terrestrial out-of-block emission limits are sufficient for aerial UEs.

Q36: Coexistence between RPAS and fixed and land mobile systems

Q36. ISED is seeking comments on its proposal to not require any additional interference mitigation measures, beyond the existing OOB limits, to address adjacent public safety services (in the 768-776 MHz band) and fixed point-to-point services (in the 1700-1710 MHz, 1780-1800 MHz and 1830-1850 MHz bands) interference.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

52. TELUS agrees with ISED's analysis that existing technical rules in the applicable standards, like the OOB limits, will sufficiently ensure coexistence with adjacent fixed point-to-point services. TELUS supports the ISED proposal that no additional interference mitigation measures are required.

Q37: Coexistence with the radio astronomy services

Q37. ISED is seeking comments on its proposal to establish, in applicable bands, exclusion zones around DRAO, within which transmission and reception of signals for RPAS operations would be prohibited. These exclusion zones would be defined in the relevant technical standards.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

53. TELUS notes that the proposed commercial mobile bands for RPAS use do not include any allocations for radio astronomy services. Furthermore, existing technical and operational requirements for these bands address coexistence with other active and passive satellite services, including radio astronomy where needed. Coordination with

radio astronomy (at the DRAO site) has also been included in the SMCS framework. As such, we do not believe exclusion zones are required for commercial mobile spectrum.

54. If the Department ultimately elects to impose an exclusion zone for the DRAO facility, TELUS considers that the responsibility for ensuring any exclusion zone is respected rests with RPAS operators and is best governed through Transport Canada regulatory requirements, not ISED's RPAS framework policy.

Q38: Coexistence with the meteorological-satellite service

Q38. ISED is seeking comments on whether existing technical rules for UEs, in the relevant RSS are sufficient to facilitate coexistence between RPAS operations and adjacent band MetSat operations in the 1695-1710 MHz band. If the existing technical rules are not sufficient, ISED is seeking comments on the appropriate interference mitigation measure such as a more stringent out-of-band emission limit adopted by CEPT and the 3GPP to protect MetSat earth stations from potential interference from aerial UEs.

In providing comments to the above questions, respondents are asked to include supporting rationale and arguments.

55. TELUS notes that the RABC response highlights that there are more stringent OOB limits in the EU for coexistence between aerial UEs and MetSat services in the 1675-1710 MHz band. TELUS echoes the need for a further Canadian specific study to ensure that any new OOB limits balance interference protection without inadvertently isolating the Canadian market. Any enhanced OOB restrictions must apply exclusively to aerial UEs. Applying these same restrictions to terrestrial UEs would not only be disruptive, but also wholly unnecessary as they do not pose the same line of sight

interference risk.

Q39: Other considerations

Q39. ISED is seeking comments on any other considerations related to RPAS use in commercial mobile bands which may not have been specifically addressed in this consultation.

In providing comments, respondents are asked to include supporting rationale and arguments.

56. Although ISED did not ask a specific question regarding this matter, existing cross border agreements for commercial mobile bands do not explicitly address the use of aerial UEs and its potential interference. TELUS agrees with ISED that any potential interference can be managed through operator to operator agreements until the applicable cross border agreements have been revised.

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