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To Whom It May Concern:

**RE: Canada Gazette notice August 2020, Consultation on the
Technical and Policy Framework for the 3650-4200 MHz Band
and Changes to the Frequency Allocation of the 3500-3650 MHz
Band, SLPB-002-20**

<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11627.html>

The North American Broadcasters Association (NABA)^{1 2} respectfully submits the following comments in response to the Innovation, Science and Economic Development Canada (ISED) consultation into future use of the 3650-4200 MHz band (C-Band). Canadian radio and television broadcasters rely heavily on C-Band, an important element in the distribution of content within Canada, and between countries. Any change to the means of broadcast content collection and distribution has bearing on the stability of domestic radio and television broadcasting and the economic viability of Canadian broadcasters.

A decision made in the U.S. to repurpose a portion of the C-Band spectrum currently used for the Fixed Satellite Service (FSS) content distribution will disrupt harmonized spectrum use beyond U.S. borders,

¹ The North American Broadcasters Association (NABA) is a non-profit association of the most influential broadcasting organizations in North America committed to advancing the interests of broadcasters at home and internationally, and to identify and take action on technical, operational and regulatory issues affecting North American broadcasters. Both public and private network broadcasters in Canada, Mexico, and the United States, work together to provide a common voice for the North American broadcast community. As a member of the World Broadcasting Unions (WBU), NABA creates the opportunity for its members to share information, identify common interests and reach consensus on issues of an international nature.

² Bell Media abstains from this submission.

in particular within Canada. CBC/Radio-Canada depends heavily on C-Band for network programming distribution and contribution feeds from northern and remote communities. The introduction of a new spectrum plan does not reduce the public broadcaster's mandate to connect diverse communities and audiences from coast-to-coast-to-coast. Nor does a new spectrum plan eradicate the dependence of private Canadian broadcasters on foreign content, which is distributed to Canada by satellite.

It is imperative that ISED protect C-Band downlink spectrum from the potential of significant harm to existing broadcast satellite users. NABA urges ISED to protect the interim and future role of FSS to distribute content within North America by limiting the amount of spectrum reallocated for 5G/LTE use to no more than the 280 MHz identified in the FCC plan³, or better yet, 250 MHz, and provide safeguards to prevent spurious emissions from affecting the ability of FSS earth stations to receive content. Any newly introduced service in repurposed C-Band spectrum should have operational requirements that are determined by rigorous and careful interference testing and conditions to protect incumbent users. Moreover, any repurposing of C-Band spectrum from FSS should carefully consider cross-border implications. ISED must be clear in awarding spectrum to 5G/LTE operators that the award is subject to avoiding interference for FSS on adjacent bands.

NABA recognizes ISED's intention to allow license exempt FSS earth stations to register in the future and receive policy protection in the 4000-4200 MHz band. This is a prudent step during and following the transition.

Some U.S. telecom operators have suggested the relocation of FSS use well beyond urban communities, or the creation of community gateways that can serve all FSS users. These are unrealistic proposals that do not contemplate the economic burden either option may present to broadcasters, are unlikely to be achievable during the short transition period, and eliminate the important resiliency provided by dual content reception, currently enjoyed by Canadian broadcasters and their immense and vocal audiences.

NABA recognizes that it is essential that spectrum be coordinated between countries. However, we should be clear that Canada, U.S. and Mexico have immense differences that impact how and why satellite resources are consumed. The distribution of citizens in Canada is so different, in fact, that the U.S. approach will not serve the Canadian population well. The dependence of the vast North, and many satellite-dependent rural communities are key differentiators. Proposed alternatives like Ku and Ka band distribution lack the reliability of C-Band in inclement weather, and the construction of fibre optic networks are not economically feasible to all remote communities.

The proposed changes to spectrum will likely result in a requirement for Canadian broadcasters to modify, replace and/or relocate some earth stations. Any new cost borne by broadcasters due to the proposed spectrum change must be reimbursable. Should ISED determine broadcasters must append, modify, shield or relocate earth station apparatus; all applicable costs must be reimbursable as the FCC mandated in the U.S⁴. NABA reminds ISED that Canadian broadcasters were not reimbursed for the material cost of the 600 MHz spectrum repack. This cost burden continues until 2022.

³ <https://docs.fcc.gov/public/attachments/FCC-20-22A1.pdf>

⁴ <https://docs.fcc.gov/public/attachments/FCC-20-22A1.pdf>

NABA has provided responses only to broadcasting specific consultation questions.

Q4: ISED is seeking comments on the proposal to add a primary mobile service, except aeronautical mobile, allocation in the 3700-4000 MHz band to the CTFA and the specific changes shown in annex B

Q5: ISED is seeking comments on developing a flexible use licensing model for fixed and mobile services in the 3650-4000 MHz band.

(Questions answered together)

Flexible use of spectrum between FSS and 5G/LTE mobile, within the same geographical area, is not technically attainable. As Intelsat summarized for the UK regulator, Ofcom, “it is also important to note that ITU studies (ITU-R Reports M.2109, S.2199 and S.2368) clearly showed that sharing between IMT-Advanced systems and FSS in the 3.6 - 3.8 GHz frequency bands is not feasible/ possible in the same geographic area. Intelsat has long argued that the use of C-Band by IMT systems is not practical”.⁵

In 2004, ISED (Industry Canada) noted the extreme sensitivity of FSS downlink earth station LNBS to interference from Fixed Service (FS) microwave transmission⁶. Fortunately, FS is directional, predictable and can be deployed with caution to avoid impact to FSS. Conversely, 5G mobile services will employ many antennas in built-up communities with low directivity that are capable of introducing interference to FSS in-band and adjacent band, and present serious risk to FSS equipment and receive fidelity.

Q6: Given the proposal in section 7.2 on developing a flexible use licensing model for fixed and mobile services in the 3650-4000 MHz band, ISED is seeking comments on the proposal that no new FSS earth stations be authorized in the 3700-4000 MHz band in the future and that the authorization of new FSS earth station licenses be limited to the 4000-4200 MHz band.

No new FSS stations should be authorized in 3700-4000 MHz in towns and urban areas, however, underserved rural communities and the North should be permitted to continue to build new licensed and unlicensed FSS utilizing the entire 500 MHz band as low density rural areas are unlikely to require the proposed 280 MHz spectrum for mobile services over the next decade.

Q7: ISED is seeking comments on the proposal to implement a 20 MHz guard band between 3980-4000 MHz to protect FSS operations in 4000-4200 MHz band from proposed flexible use operations in the 3700-3980 MHz band.

20 MHz guard band is vital and signifies the absolute minimum guard band required. At 20 MHz, wireless emission will still propagate to adjacent frequencies unless additional mitigating steps are taken. In their October 29, 2018 submission to the FCC, Nokia explained

⁵ https://www.ofcom.org.uk/_data/assets/pdf_file/0027/96903/Intelsat.pdf

⁶ “SP 3-30 GHz - Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation.” Spectrum Management and Telecommunications, Innovation, Science and Economic Development Canada, Oct. 2004, www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf05617.html

their examination revealed that the 20 MHz guard band must be utilized, “in conjunction with a stringent spectrum mask for 5G base stations”.⁷ We recommend ISED stipulate no less than 20 MHz and up to 50 MHz guard band to ensure the success of this spectrum plan.

Q8: ISED is seeking comments on the proposal to maintain a primary allocation to FSS in the entire 3700-4200 MHz band and the proposal that existing FSS earth stations in satellite-dependent areas remain licensed in the entire 3700-4200 MHz band.

In satellite-dependent areas, FSS is an essential service connecting communities in rural areas and the North. Recognizing the intent of the consultation is to find a path to sharing scarce spectrum resources, it may be most appropriate to partition spectrum in non-satellite dependent areas per the FCC plan⁸ and reserve the entire 3700-4200 MHz for FSS in satellite dependent areas. Most satellite-dependent communities can likely be well served with existing spectrum and 600 MHz for 5G/LTE.

Q20: ISED is seeking comments on its proposal that existing FSS earth stations licensed in 3650-3700 MHz after June 11, 2009, be permitted to continue to operate on a no-protection basis with respect to proposed new flexible use operations.

NABA has no objection to the proposed change to the 3650-3700 MHz band.

Q23: ISED is seeking comments on its proposal to modify the existing FSS satellite authorizations to limit FSS operations in 3700-4000 MHz in non-satellite-dependent areas of Canada to a no-interference basis. ISED is also seeking comments on the proposal to adjust the conditions of license for FSS operations to reflect the proposals as of the FSS transition deadline, including the possible removal of a high expectation of renewal for the 3700-4000 MHz portion of the band.

It is advisable to permit the continuation of FSS operations in 3700-4000 MHz in satellite-dependent areas of Canada to minimize economic and connectivity challenges for rural communities and the North.

Q24: ISED is seeking comments on its proposed date of December 2023 as the Canadian FSS transition deadline.

December 2023, the proposed FCC and ISED milestone for accelerated clearing, is highly ambitious. To achieve spectrum clearing by the proposed date, SES SA must successfully build and launch four new satellites using two separate launch vehicles.⁹ Intelsat SA must build and launch seven new satellites using four separate launch vehicles.¹⁰ Whereas Telesat is dependent on successful launches by SES and Intelsat for new, leased capacity.¹¹

⁷ <https://ecfsapi.fcc.gov/file/102976959340/Nokia%20Comments%20on%203.7%2010-29-2018%20FINAL.pdf>

⁸ 3700-3980 MHz allocated to 5G/LTE - 20 MHz guard band - 4000-4200 MHz allocated to FSS

⁹ <https://www.satellitetoday.com/5g/2020/06/16/ses-selects-northrop-grumman-and-boeing-to-manufacture-c-band-satellites/>

¹⁰ <https://www.satellitetoday.com/5g/2020/06/22/intelsat-ses-detail-c-band-transition-plans/>

¹¹ <https://spacenews.com/c-band-alliance-pegs-satellite-spectrum-clearing-costs-at-3-3-billion/>

While the U.S. date is aggressive and at significant risk of being missed, Canada is already proceeding at a much slower pace than the U.S. towards the transition. Canada should adopt the FCC mandated date of December 5, 2025 for the Canadian transition.

Q25: ISED is seeking comments on how the U.S. transition will impact the availability of FSS capacity in Canada.

A substantial decrease in the number of C-Band satellites serving North America will have detrimental consequences for broadcasters and MVPDs. While increasing costs to satellite operating companies due to launching and maintaining additional satellites in orbit may seem obvious, the increased cost to broadcasters due to the need to modify earth stations and secure satellite capacity is less obvious, and worthy of note.

American broadcast organizations participating in NABA have stated incontrovertibly that 200 MHz is simply not enough C-Band spectrum to serve their domestic need for full time point-to-multipoint distribution and occasional point-to-point backhauls required for sports and live events. While other distribution is migrating to Ku, as ISED mentions in the consultation, increased need for backhauling program and individual camera feeds for major sporting events is influencing demand. The 60% reduction in C-Band bandwidth will cause capacity shortages, driving production and distribution costs higher. If U.S. networks have insufficient capacity, Canadian broadcasters will invariably be negatively impacted.

CBC/Radio-Canada uses C-Band extensively for news contribution from regional stations across Canada as well as distribution of network feeds from Montreal/Toronto to disparate regions. Canada's private broadcasters utilize C-Band to access remote broadcast programming feeds (transmission from the event venue, popular for live sports), U.S. network and international programming feeds, and international news contribution.

The Canadian transition raises the risk of diminished access to Telesat services, at potentially higher cost, given Telesat's reliance on foreign spacecraft operators. The U.S. transition will cause some U.S. content providers to change frequencies and spacecraft, resulting in an adjustment of look angle and tuning for Canadian broadcast earth stations. We could speculate that some foreign studios may be unable or unwilling to access satellite spectrum in the future, adding risk, complexity, and incremental cost to program acquisition by Canadian broadcasters.

Q27: ISED is seeking comments on its proposed transition deadline of December 2023 for FSS earth stations, in which existing FSS earth station licenses would be modified to 4000-4200 MHz in the relevant areas.

As the Canadian process is already lagging the U.S', Canada is better served by adopting the more realistic FCC mandated end date of December 5, 2025 for clearing 280 MHz of spectrum.

Q28: ISED is seeking comments on making amendments to the relevant conditions of license and technical rules in the 3700-4200 MHz band as well as the 3450-3700 MHz band in order to implement the following proposals with respect to protection from interference:

- a) prior to the transition deadline, existing licensed FSS earth stations may operate in the entire 3700-4200 MHz band in all areas and be protected from interference from flexible use operations both in-band (3700-3980 MHz) and the adjacent 3450-3700 MHz band
- b) after the transition deadline, existing licensed FSS earth stations may continue to operate in the entire 3700-4200 MHz band in satellite-dependent areas and be protected from interference from in-band flexible use operations in 3700-3980 MHz, but would not be protected from flexible use operations in the adjacent 3450-3700 MHz band; however, ISED also proposes that flexible use licensees deploying stations in the 3450-3700 MHz band within 25 km of an existing licensed FSS earth station in the 3700-4200 MHz band be required to provide a notification to these operators, one year prior to the deployment of fixed or mobile stations
- c) after the transition deadline, FSS earth stations would only be licensed to operate in the 4000-4200 MHz band in non-satellite-dependent areas and would be protected from flexible use operations in the adjacent 3700-3980 MHz band
- d) after the transition deadline, FSS earth stations operating in 3700-4000 MHz, in all areas, which are not eligible for licensing could continue to operate as a license-exempt station without protection from flexible use operations both in-band and adjacent band(s)

Flexible use operations are not possible in-band within the same community. The Institute of Electrical and Electronics Engineers (IEEE) concluded that 5G base station can interfere with FSS operations OOB and co-channel within 16 Km if the two antennas are not aligned, and co-channel up to 40 Km if the 5G base station antenna is aligned in the same orientation as the FSS antenna.¹² As such, the stakes are high and ISED is encouraged to provide clear regulation and interference remedies for the use of 5G/LTE in C-Band spectrum.

Q30: ISED is seeking comments on how to ensure the continued operation of gateways that support the provision of services in satellite-dependent areas, specifically:

- a. how much spectrum would be required at these gateway sites?
- b. if these stations could be consolidated into two sites, away from major population centres, and where the best locations for those sites would be

¹² E. Lagunas, C. G. Tsinos, S. K. Sharma and S. Chatzinotas, "5G Cellular and Fixed Satellite Service Spectrum Coexistence in C-Band," in *IEEE Access*, vol. 8, pp. 72078-72094, 2020, doi: 10.1109/ACCESS.2020.2985012. <https://ieeexplore.ieee.org/document/9052737>

Respectfully, ISED's intent in this question is somewhat unclear, so our response assumes the meaning of gateway mirrors that of submissions to the FCC.

In satellite-dependent areas, by definition, satellite receive capability cannot be consolidated into two sites. It is impractical to service the North and many rural areas of Canada with land-based, terrestrial networks. Therefore, many remote communities are in-fact satellite dependent.

The FCC hearings included discussion of consolidating U.S. earth stations into four facilities¹³ for the purpose of vacating geographic areas, so FSS operations would not affect 5G/LTE operations. In that context, a proposal was presented in the U.S. that contemplated the construction of fiber optic connections between communities for the distribution of satellite-originated content. Funding and building a terrestrial network to replace C-Band will take a very long time and is at odds with ISED's desire to move quickly in the face of pressure to transition to 5G.

The task of defining the required spectrum at the gateway sites will necessitate all FSS operators to submit detailed business information that is beyond the scope of this consultation and will require a separate process. Determination of the best gateway locations will require review of the proposed C-Band North American Beam patterns for new spacecraft launching in the next few years.

Q31: ISED is seeking comments on its proposal to issue interim authorizations for certain existing license-exempt earth stations in the 3700-4200 MHz band.

Interim authorizations for radio and television broadcaster FSS sites in the 3700-4200 MHz band are appropriate and essential to maintain interference free reception of domestic and foreign content until C-Band operations are reduced to the 4000-4200 MHz band.

Q32: ISED is seeking comments on the proposed deadline of up to 90 days after the publication of a decision for submitting applications for these interim authorizations of existing license exempt FSS earth stations in the 3700-4200 MHz band.

Provided ISED propose a simple application process that allows organizations to file data in bulk, 90 days is sufficient.

Q33: ISED is seeking comments on its proposal that receive-only earth stations that are not eligible for an interim authorization or whose operators do not seek authorization, could continue to operate as a license-exempt earth station on a no-protection basis.

Members of the general public and organizations receiving content where no commercial arrangement exists between content provider and consumer should continue to operate as license-exempt on a no-protection basis.

¹³ <https://docs.fcc.gov/public/attachments/DOC-362358A1.pdf>

Organizations with commercial dependence on FSS, such as radio and television broadcasters, must participate in a licensing regime and gain regulatory protection.

ISED should provide a mechanism whereby radio and television broadcasters can seek authorization in the future for expansion of FSS capability at existing or new sites. As operational requirements change from time-to-time, it is reasonable to expect that the nature and location of broadcaster needs will change.

Q34: ISED is seeking comments on its proposal that in non-satellite-dependent areas, existing earth stations that operate under interim authorizations receive in-band protection from flexible use operations in the 3700-3980 MHz band until the transition deadline.

Radio and television broadcasters operating in non-satellite-dependent areas should operate under interim authorizations with protection from interference until the transition deadline.

Q35: ISED is seeking comments on its proposal that in satellite-dependent areas, existing earth stations that operate under an interim authorization receive in-band protection from flexible use operations in the 3700-3980 MHz band before and after the transition deadline.

All existing earth stations operating in satellite-dependent areas should operate under interim authorizations with protection until the transition deadline.

Q37: ISED is seeking comments on whether the interim authorization process should also apply to new receive-only FSS earth stations in the 4000-4200 MHz band.

The ISED interim authorization process should apply to new and existing receive-only FSS earth stations in the 4000-4200 MHz band as it is in the best interest of public policy and coordination of spectrum that all enterprise users are documented and commercial users of FSS receive protection from unwanted interference. That protection must extend to OOB power flux density (PFD) emissions that can cause harmful interference to earth stations.

Q38: ISED is seeking comments on the proposed conditions for interim authorizations for license-exempt FSS earth stations in 3700-4200 MHz and new receive-only FSS earth stations in the 4000-4200 MHz portion of the band as detailed in annex G.

Greater clarity is needed with respect to annex G, "Identical earth stations" has the meaning as set out in CPC-2-6-01". CPC-2-6-01 describes "identical earth stations using specific frequencies".

FSS Operators use frequencies across the entire allocated band and regularly relocate the look angle to receive content from different satellites. Radio and television broadcasters must continue to have full band/full arc use of the applicable band, 3700-4200 MHz during the interim period and full band/full arc use of the 4000-4200 MHz following the transition.

For this reason, the proposed conditions must provide protection from in-band PFD emissions during the transition period and OOB PFD emissions following the transition as both can cause harmful interference to earth stations.

Q39: ISED is seeking comments on the proposed eligibility of license-exempt stations that could apply for an interim authorization.

Members of the general public and groups receiving content where no commercial arrangement exists between content provider and consumer should continue to operate as license-exempt on a no-protection basis.

Organizations eligible to apply for interim authorization should include such enterprises where a bona-fide need can be established, such as commercial arrangements whereby premium content is distributed to the enterprises via satellite for consideration. This includes radio and television broadcasters, traditional and non-traditional media organizations, news organizations, theatre operators, broadcast distribution undertakings (BDU), educational institutions, and religious organizations.

Q40: ISED is seeking comments on its proposal to no longer issue new licenses for fixed services to operate fixed point-to-point applications in the 3700-4000 MHz band.

NABA agrees that no new fixed point-to-point services be licensed in the 3700-4000 band due to the risk of interference between FS equipment and 5G/LTE base stations.

Q41: ISED is seeking comments on whether to allow new licenses for fixed services to operate fixed point-to-point applications in the 4000-4200 MHz band.

No new fixed point-to-point services should be authorized in the 4000-4200 band. New fixed point-to-point services should utilize higher frequency spectrum reserved for this use.

Q42: ISED is seeking comments on the proposal to grandfather existing point-to-point operations in the 3700-4000 MHz band under existing licenses for fixed service (as identified in annex A), such that flexible use systems in these two tiers may not claim protection from, nor cause interference to these fixed service stations.

Given the scarcity of spectrum resources, it is incongruent that such an accommodation be granted for only two registered users in Canada.

Q43: ISED is seeking comments on the proposal to rely on technical limits and coordination procedures rather than mandate specific technology solutions (e.g. TDD synchronization between systems) to address interference issues between TDD flexible use systems in the 3650-3980 MHz band.

NABA members require protection of FSS in the 4000-4200 MHz band from OOB Emissions.

Q44: ISED is seeking comments on whether any additional measures should be taken to limit potential interference issues between flexible use systems in the 3650-3980 MHz band.

NABA members require protection of FSS in the 4000-4200 MHz band from OOB Emissions.

Q46: Until the transition deadline, in all areas for flexible use in the 3650-3700 MHz band: ISED is seeking comments on the proposal that until the transition deadline, those flexible use licensees deploying stations in 3650-3700 MHz within 25 km of a licensed FSS earth station (not including interim FSS authorization) in the 3700-4200 MHz band will be required to coordinate with the operators in these earth stations.

The potential for interference exists up to 40 Km if the 5G base station antenna is aligned in the same orientation as the FSS receive antenna¹⁴. During the transition, 5G/LTE operators should not utilize the 3650-3700 MHz band within 40 Km of any FSS site, given the lack of an adequate guard band during the interim period to protect sensitive FSS equipment.

Q47: After the transition deadline, in all areas for flexible use in the 3450-3650 MHz band: ISED is seeking comments on its proposal that the current SRSP-520 coexistence requirements for flexible use operations in the 3450-3650 MHz band to protect FSS operations in the adjacent band 3700-4200 MHz be removed.

NABA has no objection.

Q48: For FSS earth stations licensed in the 4000-4200 MHz band and flexible use in the 3800 MHz band, in all areas: ISED is seeking comments on adjacent band coexistence measures, taking into account the coexistence measures adopted by the EU (i.e. a stringent OOB limit) and the U.S. (i.e. a combination of guard band, a typical OOB limit, pfd limits, and baseline minimum filter specifications for earth station operations) and the current Canadian requirements (i.e. a typical OOB limit and coordination distance):

- a) What are the benefits and technical limitations associated with the above coexistence measures?
- b) Which set of coexistence measures above (i.e. EU, U.S., Canada) is preferred? If applicable, comments are sought on the values of the limits in relation to the supported measures.
- c) Given the proposal in section 9.1 to displace WBS in 3650-3700 MHz and identify 3900-3980 MHz for shared use, are there any additional considerations that may impact the response to a) and b) above?
- d) Which portion of the 3800 MHz band should the above measures be applied to in order to protect FSS in the 4000-4200 MHz band (i.e. how many frequency blocks or MHz)?

¹⁴ <https://ieeexplore.ieee.org/document/9052737>

Any newly introduced service in repurposed C-Band spectrum must have operational requirements that are determined by rigorous and careful interference testing and conditions that protect incumbent users. Because FSS content distribution depends on a carefully designed network requiring a clean RF environment, any decision to repurpose C-Band spectrum from FSS must be carefully staged.

It is crucial that the regulator establish a clear policy framework that protects FSS earth stations, that PFD limits are enforced by the regulator using a clear method and measurement technique, and any interference suffered by the FSS operator must result in an immediate response by the telecom operator to cease 5G/LTE operations until a solution to interference is found.

For greater clarity:

- Regulatory protection is required for all broadcast earth stations, including agile (steerable), fixed, temporary fixed, and transportable, such as those used for major sporting event coverage.
- Resolution of interference is the responsibility of the new entrant to this spectrum, not the incumbent broadcaster.
- The broadcast owner of earth stations is not responsible for in-depth measurement, determination of cause or specific culprit in the case of aggregation of operators. Nor is the broadcaster required to adapt to the new source of interference by way of frequency shifting, or repointing, moving, shielding of antennas or other special efforts to mitigate.

FSS must have the exclusive use of 4000-4200 MHz spectrum with the following protective measures:

- i. A guard band must be established to separate 5G/LTE from FSS. ISED has suggested a 20 MHz guard band in 3980-4000 MHz. A guard band of 20 MHz is an absolute minimum and may be insufficient to eliminate wireless base station emission operating at 3980 MHz from encroaching up to 20 MHz into the 4000-4200 MHz band. NABA recommends a more generous guard band, up to 50 MHz to protect the lower range of the 4000 MHz band.
- ii. FSS operators must be protected from mobile base station interference up to 40 Km ring around the earth station. NABA calls on the regulator to establish a licensing framework requiring 5G/ LTE operators to submit a study to ISED and the FSS incumbent demonstrating proposed base station operation will not exceed the PFD limit at any azimuthal point around a 150m ring centered around the earth station. For greater clarity, the PFD limit should be apportioned to operators in the 40 Km ring, so if there are multiple operators and multiple base stations within the ring, the sum of all operators base stations does not exceed the PFD limit. Aggregate emissions from all mobile base stations/operators in the new network deployment does not exceed a maximum PFD at the FSS earth station LNB of -128 dBm/MHz in 3900-4200 MHz (aggregate power 10 dB below the noise floor), and -81.6 dBm/MHz in 3700-3900 MHz (measured after 43 dB rejection filter in the adjacent band).

- iii. A spectral mask, pursuant to the 3rd Generation Partnership Project (3GPP) guidance¹⁵ should be applied to ensure spurious 5G/LTE base station transmissions do not affect 4000-4200 MHz.

Q49: ISED is seeking comments on what technical requirements should be imposed to ensure co-channel protection of FSS earth stations from flexible use systems, in the relevant scenarios and timeline as stated in sections 9.5 and 9.6. For example, could the pfd limit of -124 dBW/m2/MHz measured at the earth station antenna proposed by FCC above be used to protect co-channel FSS earth station? Alternatively, should other measures be adopted, such as a separation distance as described in section 7.3? Or should a combination of measures be adopted? If applicable, what are the specific values that should be adopted?

In their filings to the FCC, the C-Band Alliance suggested a coordination zone of 150 Km around all FSS sites, while Ericsson advised that up to 70 Km might be required.¹⁶

Shared use of 5G/LTE with FSS operations in the same frequency in the same community is not feasible given the enormous potential for interference. For this reason, flexible use in non-satellite-dependent areas should not be entertained. Flexible use will require the creation of wide exclusion zones to prevent co-channel interference to FSS.

Earth stations require separation distance from 5G/LTE base stations to protect from front-end overload.

Q50: ISED is seeking comments on whether the assumptions made by the FCC about earth stations, including baseline minimum filter specifications for earth station operations as stated above, are applicable to Canadian operations. Is there any additional information that ISED should consider in the development of appropriate technical rules to enable coexistence both co-channel and in adjacent bands?

Flexible use systems in the 3700-3980 MHz band in Canada should not commence operations until the necessary clearing has been completed. Implementation of PFD limits and a 20-50 MHz guard band are essential for Canada. The C-Band Alliance recommended, and NABA agrees that maximum PFD at the FSS earth station LNB, of -128 dBm/MHz in 3900-4200 MHz (aggregate power 10 dB below the noise floor), and -81.6 dBm/MHz in 3700-3900 MHz (measured after 43 dB rejection filter in the adjacent band) is appropriate. ISED must put technical requirements in place to protect adjacent band operators from out-of-band emission interference. In its decision, ISED is urged to stipulate this is the level of compliance as measured at the earth station antenna as a total limit from any and all emissions. This is not a limit for each individual operator and multiple operators cannot assume that they can exceed this level as an aggregate group.

A coordination distance of 25 Km, as outlined in paragraph 173 is insufficient. The previously mentioned IEEE study¹⁷ established that 40 Km is a more appropriate distance between

¹⁵https://www.etsi.org/deliver/etsi_ts/138100_138199/13810102/15.02.00_60/ts_13810102v150200p.pdf

¹⁶ <https://docs.fcc.gov/public/attachments/DOC-362358A1.pdf>

¹⁷ <https://ieeexplore.ieee.org/document/9052737>

mobile base stations and FSS earth stations to mitigate co-channel and OOBE interference. In addition, earth stations require separation distance from 5G/LTE base stations to protect from front-end overload.

The availability of filters suitable for use on a wide variety of earth station equipment and vintage, by December 2023 may be an optimistic assumption given the range and age of existing infrastructure in Canada. The FCC identified that some FSS operators may need to reconfigure or outright replace existing facilities.¹⁸ Should ISED issue a decision that causes Canadian broadcasters to incur expenses to modify, redesign, replace or relocate existing facilities, ISED must establish a provision whereby Broadcasters are reimbursed for appropriate costs required. The FCC set forth guidelines in FCC-20-22 whereby incumbent space station operators and incumbent earth station operators can seek reimbursement for reasonable costs, from earth station modification to relocation, and including engineering, consulting, legal and financing costs resulting from the decision to repurpose spectrum¹⁹. Canadian broadcasters were not reimbursed for the material cost of the 600 MHz spectrum repack and are still incurring these expenses until 2022.

Q53: ISED is seeking general comments on the proposal submitted by Telesat found in annex H, including whether such an approach would be in the best interest of Canadians and more specifically, whether it would result in the faster deployment of 5G services in the affected frequencies; more efficient use of spectrum and what the implications of this repurposing plan would be for other users of the band.

Q54: ISED is seeking comments on whether the Telesat proposal meets ISED's policy objectives outlined in section 3, including:

- a. supporting rural/remote connectivity
- b. promoting competition in mobile services
- c. making more mid-band spectrum available to support 5G services

Q55: ISED is seeking comments on what elements from sections 7 to 10 of this consultation would still apply or need to change if ISED were to implement the Telesat proposal, in particular:

- a. the proposal for maintaining the primary allocation for FSS in the 3700-4200 MHz band
- b. the proposed implementation of an exemption to transition for satellite-dependent areas and the proposed changes to satellite licenses to apply it
- c. the proposal for treatment of WBS incumbents
- d. the proposal to issue interim authorizations for certain existing license-exempt earth stations in the 3700-4200 MHz band

¹⁸ <https://docs.fcc.gov/public/attachments/DOC-351868A1.pdf>

¹⁹ <https://docs.fcc.gov/public/attachments/FCC-20-22A1.pdf>

- e. technical considerations for coexistence between FSS and flexible use
- f. technical considerations for coexistence between FSS and aeronautical radio navigation systems
- g. the overall impact on existing users in the 3700-4200 MHz band

Q56: If ISED were to implement the Telesat proposal, ISED would need to consider the licensing framework for the 3700-3900 MHz band. Thus, ISED is seeking comments on:

- a. whether it should, as proposed by Telesat, issue flexible licenses in the 3700-3900 MHz band using the same conditions of license as those contained in annex H of the 3500 MHz Framework, noting that some conditions may need to be adjusted to reflect the differences in the two bands and the decisions resulting from this consultation process
- b. whether it should issue a single Tier 1 flexible use license as proposed by Telesat or align with the 3500 MHz band and issue Tier 4 licenses
- c. what deployment conditions should apply to these licenses including Telesat's proposal that the deployment requirements would only come into force after the Minister approves a transfer
- d. any additional conditions of license that should apply given the nature of the proposal

Q57: In its proposal, Telesat indicates that it takes no position on ISED imposing a pro-competitive measure such as a spectrum cap or set-aside on the 3700-3900 MHz licenses. ISED would review any request for transfer in accordance with provisions related to commercial mobile spectrum through section 5.6 of CPC-2-1-23, Licensing Procedure for Spectrum Licences for Terrestrial Services. However, ISED would also consider the competitive implications on the 3500 MHz and 3800 MHz bands and consider pro-competitive measures in accordance with the *Framework for Spectrum Auctions in Canada*. As such, ISED is seeking comments on:

- a. the need for a pro-competitive measure (e.g. spectrum cap or set-aside)
- b. the type of competitive measure that should be applied
- c. the amount of spectrum that should be considered under any such competitive measure

Q58: ISED is seeking comments on Telesat's proposals for the transition of FSS earth stations and whether any additional measures are required to ensure a smooth transition.

Q59: Telesat's proposal includes ISED allocating an additional 80 MHz for flexible use in the 4000-4100 MHz band. ISED is seeking comments on the feasibility of making this extra spectrum available, specifically:

- a. **whether there would be standardized 5G equipment available for this 80 MHz, given that it does not align with the U.S. band plan**
- b. **whether there would be FSS filters available, given the reduced amount of FSS spectrum and that it would not align with the U.S. band plan**
- c. **whether there would be enough capacity to continue FSS services in Canada with the proposal to reduce the amount of FSS spectrum to 100 MHz**
- d. **to what degree would the requirement to protect U.S. FSS earth stations in the border areas have an impact on the ability to deploy flexible use stations near the border and to what degree would this impact the value of this spectrum**

(Answered together)

NABA simply cannot support the Telesat proposal. The FCC decided on flexible use in the 3700-3980 MHz band and FSS use in the 4000-4200 MHz band. The Telesat proposal is out of alignment with the FCC by allocating the 3700-4080 MHz band for flexible use and 4100-4200 MHz band for FSS. Spectrum use must be coordinated between all countries in a geographic region.

The proposal is at odds with extensive work the public broadcaster has done to prepare for this transition and reducing available spectrum to only 100 MHz will drive domestic C-Band costs exponentially. The proposal also threatens Canadian access to foreign satellites operating in the 4000-4100 MHz band by introducing 80-100 MHz of in-band 5G/LTE interference. As a result, the supply of foreign programming and delivered on foreign satellites operating in the 4000-4100 MHz band will not be accessible.

The proposed flexible use allocation above 4000 MHz will require customization of infrastructure and consumer handsets, putting the proposal at odds with ISED's policy goals to benefit consumers and operators with the economic benefits of a global supply chain.

Further, Telesat's assertion that their proposal will, "reduce wireless prices by 25% through lower 5G spectrum and infrastructure costs and enhanced sustainable wireless carrier competition"²⁰ is simply not supportable. Telesat is neither a mobile service provider nor LTE equipment manufacturer.

Respectfully,
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²⁰ [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Telesat_Proposal_July_5_2020_EN.pdf/\\$file/Telesat_Proposal_July_5_2020_EN.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Telesat_Proposal_July_5_2020_EN.pdf/$file/Telesat_Proposal_July_5_2020_EN.pdf)