



**COMMENTS OF TELESAT CANADA**

**In response to:**

*Canada Gazette, Part I, June 17, 2017, Consultation on Releasing Millimetre Wave Spectrum to Support 5G, SLPB-001-17*

**TELESAT CANADA**

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## Executive Summary

Telesat Canada (“Telesat”) welcomes ISED’s review of regulatory policy for the millimeter wave bands.

For the reasons set out in these comments, Telesat submits that the Department should:

1. develop a regulatory policy that promotes the rollout of innovative wireless infrastructure, (including satellite infrastructure) but does not prevent the efficient deployment and operation of satellite facilities;
2. ensure that the policy reflects Canada’s unique geography and demographics, and aligns with the Department’s goal of making innovative telecommunications services available to all Canadians, including satellite-dependent communities in rural Canada and the North, and not uncritically adopt the FCC’s decisions in its Spectrum Frontiers Report and Order;
3. require licensed, rather than licence-exempt, use for the 28 GHz and 37-40 GHz bands and, in particular, not adopt licence-exempt dynamic access using a database in the 28 GHz or 37-40 GHz bands;
4. grandfather already-licensed FSS earth stations and those for which applications were received prior to the release of the Consultation, so that they are not subject to any additional constraints due to the deployment of terrestrial flexible use stations in the vicinity;
5. license future earth stations on a case-by-case basis, considering their unique circumstances and characteristics;
6. not mandate site shielding for all earth stations, when other coordination measures may be less restrictive and more effective;

7. require coordination of new FSS earth stations with flexible use terrestrial stations only where the terrestrial station has been previously licensed, an application has previously been made to the Department to licence the terrestrial stations, or where they must be built because of a terrestrial build-out requirement previously imposed by the Department;
8. ensure that newly licensed FSS earth stations which have completed such coordination will not thereafter be subject to any additional constraints as a result of future deployment of terrestrial flexible use stations in the vicinity; and
9. initiate and lead a technical study (or studies) to determine:
  - a. appropriate trigger mechanisms for coordination in the 28 GHz and 37.5 – 40 GHz bands, to facilitate the determination of compatibility between FSS earth stations and terrestrial 5G without performing unnecessary calculations;
  - b. appropriate restrictions on the geographic areas in which an earth station that transmits in the 28 GHz band or receives in the 37.5-40 GHz band may be located, taking into account Canadian geography, demographics and telecommunications needs;
  - c. appropriate limits on skyward transmissions from terrestrial base stations that transmit in the 28 GHz band to prevent excessive interference into satellite receivers resulting from aggregate terrestrial emissions.

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## COMMENTS OF TELESAT CANADA

1 Telesat welcomes the opportunity to provide these Comments in response to the *Consultation on Releasing Millimetre Wave Spectrum to Support 5G*, SPLB-001-17 (the “Consultation Document”)<sup>1</sup> issued by Innovation, Science and Economic Development Canada (ISED).

### I. INTRODUCTION

#### A. TELESAT’S ROLE IN SUPPORTING ISED POLICY

2 Telesat fully supports the policy objectives set out by ISED in the Consultation Document, including ensuring that Canadians continue to benefit from the latest wireless telecommunications services across the country and developing 5G to promote Canada’s development as a global centre for wireless innovation.

3 However, Telesat notes that the mobile industry is in the early stages of exploring services and business models to exploit millimeter wave technologies, whereas Ka-band satellite technologies have already been deployed for a number of years<sup>2</sup> providing innovative and high-capacity broadband services across Canada. The satellite networks are providing valuable services to users across Canada and advancing the Government’s policies. Satellite networks are an essential component of the Canadian telecommunications system, and they will continue to play a critical role in the delivery 5G broadband services.

4 Since its creation in 1969, Telesat has met the Canadian government’s original policy objective for the company: to connect all of Canada, including its most remote and rural areas,

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<sup>1</sup> Published in the *Canada Gazette*, Part I, June 5, 2017 [*Consultation Document*].

<sup>2</sup> Anik F2 entered commercial service in 2004.

with innovative and highly reliable satellite communications services. Telesat has reached far beyond that original objective. It has become one of the largest and most successful satellite operators in the world. In the process, it has become one of Canada's most successful exporters of technology-based services and it continues to be a major driving force in innovation and development in the Canadian space industry.

5 Several of Telesat current initiatives can play a key role in achieving a core objective set out in the Consultation Document: to “bring Canada to the forefront of digital development and adoption through the creation and strengthening of world-leading infrastructure”<sup>3</sup>. Telesat is not simply waiting to procure the latest advanced wireless technology being developed in other countries. Instead, Telesat has committed major financial, technical and human resources within Canada to develop world-leading satellite infrastructure, that will place it and Canada in the forefront of new digital development and adoption.

6 One key element among the innovative new infrastructure Telesat is developing is a cutting-edge, next generation Non-Geostationary Satellite Orbit (NGSO) constellation. This NGSO constellation will deploy more than 100 satellites to deliver ubiquitous, high speed, low latency, secure, and affordable broadband communications to underserved areas, including rural and Northern Canada, and all other areas of the planet.<sup>4</sup> This Canadian-designed and Canadian-

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<sup>3</sup> *Consultation Document*, para. 4.

<sup>4</sup> A description of Telesat's NGSO constellation is set out in Telesat's Comments in response to *Consultation on the Licensing Framework for Non-Geostationary Satellite Orbit (NGSO) Systems and Clarification of Application Procedures for All Satellite Licence Applications*, SMSE-009-17, online: <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11286.html>; see also Telesat's Petition for Declaratory Ruling, File No. SAT-LOI-20161115-00108 (Nov. 15, 2016).

operated wireless infrastructure will accelerate digital adoption not only among all 35 million Canadians coast to coast to coast, but all 7.5 billion global citizens that will have access to it.

7 Telesat’s NGSO project will require an enormous capital and technical investment and its success will help maintain Canada’s place as a leading space industry nation. The project is directly aligned with both the government’s Innovation and Skills Plan, which emphasizes the critical importance of supporting and retaining home-grown innovation and talent,<sup>5</sup> and the Department’s policy goals set out in the Consultation Document to promote innovation-led growth in the Canadian economy and to facilitate deployment and timely availability of services across the country.<sup>6</sup>

#### **B. TELESAT’S POSITION**

8 In developing ISED’s regulatory policy for the millimeter wave bands, it will be vitally important to avoid imposing unnecessary burdens that would undermine the home-grown innovation that the Department seeks to promote.

9 Terrestrial 5G services can offer significant advantages to Canada in the future. However, 5G is not limited to terrestrial services. Moreover, it would be misleading to think of 5G as a uniform set of performance characteristics. Not all performance indicators identified for 5G will be required by every terminal and service, everywhere and all the time. Each connected device and use case will typically have its mix of latency, bandwidth and traffic intensity needs

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<sup>5</sup> Government of Canada, “Innovation for a Better Canada”, <http://www.ic.gc.ca/eic/site/062.nsf/eng/home>.

<sup>6</sup> *Consultation Document*, para. 6.

and characteristics. Canada's telecommunications infrastructure has to be adapted to the characteristics of the service demand expected at each area, in particular in low population density regions.

10 5G infrastructure will rely on a "network of networks" and the benefits of 5G will be fully realized by networking terrestrial 5G services with other infrastructure, including terrestrial fibre and Fixed Satellite Services (FSS). Satellite services, including Telesat's planned NGSO service, will not be an alternative to 5G; they will be a fundamental part of how 5G services are delivered to Canadians, particularly in the underserved rural and northern regions of the country regardless of their location, including over the Canadian territorial waters.<sup>7</sup>

11 In order to meet increasing throughput demands and deliver 5G benefits, adequate spectrum resources will be required for both terrestrial and satellite networks and the regulatory regime should take this into account. In the case of satellite networks, spectrum is required for both user links (that require ubiquitous earth terminal siting) and feeder or gateway links that require a relatively small number of individually-licensed earth stations. To avoid intra-system interference, it is necessary to use different bands for satellite user links and feeder links.

12 Satellite infrastructure integrated with terrestrial 5G will have a major role in providing backbone transmission and backhauling, in broadcasting and multicasting, and in providing wide coverage, network security, and resilience in case of disasters to all Canadians regardless of

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<sup>7</sup> For example, the Satellite Industry Association has recently announced a conference, to be held on October 23, 2017, entirely dedicated to the topic of "Satellites as Part of the 5G Ecosystem". See <https://globenewswire.com/news-release/2017/08/24/1100129/0/en/SIA-Conference-to-Focus-on-Role-of-Satellites-in-Deployment-of-5G-Connectivity-and-Broadband.html>.

where they are located. Satellite networks require long operational lives to amortize their capital costs. As a result, maintaining a stable and predictable regulatory and spectrum management environment is critical for the long-term investments by satellite operators and service providers.

13 It would be possible to use the 28 GHz band and 37-40 GHz band for satellite gateway earth stations without unduly constraining the development of terrestrial networks, as proposed by the Department. However, gateway earth stations need to be located where there is access to fibre-optic links, reliable prime power and ease of access for technical staff. For any satellite system to be viable, the applicable regulatory framework must accommodate these geographic constraints.

14 The applicable sharing principles and methodologies need to be carefully considered, to ensure coexistence of the terrestrial and satellite infrastructure. Otherwise, there is a significant risk that rules designed primarily around terrestrial applications could severely interfere with (or, in the worst case, prevent) the development of innovative satellite infrastructure.

15 For these reasons, Telesat recommends that:

- already-licensed earth stations and those for which applications were received prior to the release of the Consultation should be grandfathered, and not subject to any additional constraints due to the deployment of terrestrial flexible use stations;
- future earth stations should continue to be individually licensed on a case-by-case basis, considering their unique circumstances and characteristics;

- once the Department determines that a proposed earth station is compliant with the policy and grants a licence for it, that station should not be subject to any additional constraints as a result of future deployment of terrestrial flexible use stations; and
- the Department should impose limits on skyward transmissions from terrestrial base stations in the 28 GHz band to prevent harmful aggregate interference into satellite receivers.

16 The Consultation Document refers to potential triggers for coordination between terrestrial stations and FSS earth stations.<sup>8</sup> Telesat agrees that trigger mechanisms and guidelines will be helpful in determining when coordination will be required, but the associated threshold values and other conditions require careful technical study. Each earth station will have different characteristics and therefore a different ability to cause interference to, or suffer interference from, flexible use terrestrial stations. Therefore, site-by-site coordination is required, rather than universally applied rules to attempt to ensure compatibility. Given the relatively small number of earth station sites, such coordination should not be problematic.

17 It is important to recognize that the U.S. decisions, particularly in respect of the 28 GHz band, do not reflect an established international consensus.<sup>9</sup> Canada has always been a supporter of international harmonization through the ITU. Sharing studies between future 5G/IMT and

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<sup>8</sup> *Consultation Document*, Question 6-4.

<sup>9</sup> The Radio Spectrum Policy Group of the European Commission has instead recommended a different band for this purpose. See Radio Spectrum Policy Group, “Opinion on spectrum related aspects for next-generation wireless systems (5G)”, (9 November 2016), RSPG16-032 FINAL at 3 (“The RSPG recommends the 24.25-27.5 GHz as a pioneer band for 5G above 24 GHz”).

satellite services in the WRC-19 Agenda Item 1.13 bands are underway at the ITU. To the extent that future 5G/IMT mobile and satellite services are to share the same spectrum, the Department may wish to consider relevant and reasonable sharing conditions based on these studies when they are concluded.

18 In any case, while it certainly would be imperative for Canada to remain cognizant of relevant developments at the ITU, CITEL, as well as in the U.S., Europe, and other major markets, the Department's mandate is to regulate in the interests of Canada and Canadians. It must consider the issues on their merits and make determinations that will best serve its policy objectives.

19 The Canadian telecommunications market has vastly different geographic characteristics and usage needs than the U.S. market. Canada is far more dependent on satellite services than the U.S. is, particularly in rural Canada and the North. Because of this, Canada must chart its own regulatory path if it wants to ensure that all Canadians have access to innovative, advanced telecommunications platforms and the services they will enable.

## **II. DETAILED COMMENTS**

20 In this section, Telesat will respond to a number of specific issues raised in the Consultation Document. Telesat has participated in the Radio Advisory Board of Canada's (RABC) development of common industry positions on many issues and Telesat endorses and adopts the positions set out in the RABC submissions, subject to the comments and exceptions set out below.

21 For convenience, the questions and issues set out in the Consultation Document are set out below, highlighted in grey, with Telesat's comments on each issue following.

## **B. BACKGROUND AND CONTEXT**

Question 4-1: Given the disruptive nature of 5G, will new business models and network applications develop that may require policy and regulatory consideration from ISED? Please describe potential new business models and network applications as well as their benefits to Canadians.

22 As noted above (and in the RABC submissions), satellite systems will be necessary to ensure that the benefits of 5G networks are accessible to all Canadians. To that end, Telesat submits that it is critical to ensure that the Department's policy is sufficiently flexible to allow innovative Canadian satellite services, such as Telesat's authorized NGSO constellation, to develop and thrive.

23 Accordingly, Telesat strongly endorses the RABC's call for policy and regulatory measures that support innovation in satellite services and integration of such innovative services into 5G networks.

## **C. CANADIAN APPROACH AND TIMING**

Question 5-1: ISED is seeking comments on developing a flexible use licensing model for fixed and mobile services in the 28 GHz and 37-40 GHz frequency bands, and allowing licence-exempt use of the 64-71 GHz frequency band ahead of WRC-19 and before 5G technology standards are finalized.

24 As a general proposition, Telesat agrees with the RABC that 28 GHz and 37-40 GHz terrestrial use should be licensed, not licence-exempt. This will be addressed further in section L, below.

25 Telesat also agrees with the Department (and the RABC) that Canada should position itself “at the leading edge of the digital economy” and that all Canadians should reap the benefits that 5G (which includes satellite 5G) will offer. However, the Department will need to consider policy developments in Latin America, Europe and Asia, as well as the outcome of WRC-19. There is no clear international consensus in favour of flexible use of the 28 GHz band, in particular. Some fine-tuning of the Department’s policy may be required as a result.

26 Moreover, while Telesat supports more effective use of spectrum, caution needs to be exercised regarding the introduction of flexible use licensing in bands (such as the 28 GHz band) that are shared co-primary for fixed, fixed satellite, and mobile services.

27 Interference from fixed services does not vary in the short term and may be predicted if the location of the fixed transmitter is known. In contrast, interference from mobile transmitters is unpredictable and variable over short time periods, making co-existence with other services much more problematic. A sharing regime designed for one case may not work well in the other.

28 Satellite services delivered to end users in other portions of the Ka and V frequency bands are dependent on a relatively small number of fixed gateway stations, which will operate in the 28 GHz and 37-40 GHz bands. A predictable and stable licensing regime is required to support investment in these stations. This context demands both a flexible approach to licensing to enable coexistence with the large scale deployment of fixed or mobile services and a means to ensure that authorizations for FSS earth stations are not undermined by future claims for protection by subsequently installed terrestrial stations.

#### **D. CHANGES TO SPECTRUM UTILIZATION POLICIES – 28 GHz**

Question 6-1: ISED is seeking comments on the changes proposed above to introduce flexible use licensing in the 28 GHz band, including consequential changes to the CTFA domestic footnotes and the policy on this band contained in SP 3-30 GHz,

29 Telesat supports the proposed introduction of flexible licensing in the 28 GHz band, provided that adequate measures are taken to enable reasonable siting of 28 GHz earth stations and protection of satellite receivers from harmful interference.

30 Telesat currently has four licensed feeder link earth stations in the 28 GHz band, operated in compliance with the current footnote C47A. Telesat plans to expand its network of Ka-band satellites, both GSO and NGSO, and will require additional feeder link earth stations in the 28 GHz band in order to expand high capacity data services, including services to remote and underserved areas of Canada.

31 Given Canada's geography, the growth of satellite infrastructure must be a critical component of a strategy to make advanced communications services available to all Canadians. As a result, a regulatory policy that inhibits the deployment of additional feeder capacity would be inconsistent with the Department's policy goals of facilitating deployment and timely availability of services across the country, as articulated in the Consultation Document.<sup>10</sup>

32 Telesat supports RABC's suggestion that the wording of proposed footnote C47C be modified to reflect a need for individual licensing of FSS earth stations in the 28 GHz band, with due consideration of their unique circumstances and technical characteristics. Further comments

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<sup>10</sup> Consultation Document, paras. 3, 6.

on the appropriate approach to coordination for such earth stations, to permit optimal development of both terrestrial and satellite services follow below.

33 Telesat also supports the RABC view that the phrase “large antennas”, which appears in several footnotes to the Canadian Table, is imprecise and needs review.<sup>11</sup>

#### **E. BAND SHARING WITH OTHER SERVICES – 28 GHZ**

Question 6-4:

A. ISED seeks comments on its proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the 28 GHz band when a pre-determined trigger threshold is exceeded.

B. If site-by-site coordination is proposed, what coordination trigger and value would be the most appropriate (e.g. PFD or distance threshold)?

C. ISED is also inviting proposals for specific technical rules on proposed flexible use stations and FSS earth stations (e.g. site shielding) that could facilitate more efficient sharing between terrestrial and earth stations.

34 Telesat supports a policy that requires coordination of individual earth stations in the 28 GHz band.

35 As noted above,<sup>12</sup> there are already constraints on where a FSS gateway station can practically be located. If the Department adopts overly restrictive siting rules, the practical effect

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<sup>11</sup> ITU practice typically refers to the ratio of antenna diameter to wavelength when characterising antenna size; one relevant size threshold would be 100 wavelengths which, at 30 GHz, would correspond to about 1 m. See, for example Rec. ITU-R F.1245 2, drawing the distinction in paras 2.1 ( $D/\lambda > 100$ ) and 2.2 ( $D/\lambda \leq 100$ ). To similar effect, see also Rec. ITU-R S.465-6, Note 4. Other threshold sizes apply for other purposes. For example, Rec. ITU-R S.580-6, considering emission limits for GSO earth station antenna side lobes, applies where  $D/\lambda > 50$ .

<sup>12</sup> See para. 13.

may well be to effectively deny the use of the band for FSS. As noted above, this would not serve the Department's policy goals.

36 Telesat agrees with the RABC that a trigger mechanism for coordination would be useful to avoid needless calculations, provided that the relevant framework acknowledges that coordination is, ultimately, a site-specific problem. Telesat also agrees that it would be impossible to properly define such a coordination trigger without further study. Telesat endorses the RABC's recommendation that such a study be carried out as soon as feasible. Telesat agrees that broad industry-wide participation in such a study is desirable and Telesat is ready and willing to be involved. However, to ensure fairness and a smooth path between the study and ultimate adoption of policies by the Department, Telesat recommends that the Department should initiate and lead this study.

37 Site shielding may be a useful means of enabling coordination in some cases. However, it will not be the only way to achieve coordination. Where lower cost measures are equally effective, it would be counter-productive to require shielding. Accordingly, Telesat agrees with the RABC that site shielding should not be mandated by the Department for all future earth stations.

38 Once an FSS earth station has been licensed (whether grandfathered under the existing regime or licensed under the new regime), the first-come-first-served principle should apply and the station should be protected against subsequently-licensed facilities. Operators should not face an indefinite prospect that they may have to change the technical characteristics of a licensed earth station in order to accommodate new terrestrial flexible use.

39 Accordingly, Telesat recommends that new FSS earth stations in the 28 GHz band should only be required to coordinate with flexible use terrestrial stations that, as of the application date for the FSS earth station, i) have previously been licensed by the Department; ii) are the subject of a pending licensing application to the Department; or iii) that are required to be installed due to a build-out requirement previously imposed by the Department. Once licensed, FSS earth stations should be protected from interference from all subsequent terrestrial stations.

**F. GEOGRAPHIC RESTRICTIONS ON THE DEPLOYMENT OF FIXED-SATELLITE SERVICES EARTH STATIONS – 28 GHz**

Question 6-5:

A. ISED is seeking comments on whether there should be restrictions on the geographic areas in which new FSS earth stations can be deployed in the 28 GHz band.

B. If geographic restrictions on FSS earth stations are proposed, ISED is inviting detailed proposals on how they could be implemented, and what areas should be targeted.

40 Telesat accepts that some geographic restrictions on FSS earth stations may be appropriate. However, Telesat agrees with the RABC that the Department should not adopt the earth station siting constraints set out in the FCC Spectrum Frontiers Report and Order.<sup>13</sup> These specific constraints do not appear to be based on robust technical evaluations and they are unduly restrictive for FSS earth stations. In the best case, poorly designed rules of this sort would drive up Telesat's costs to expand its network, which would eventually impact the end users. In the worst case, they could be prohibitive. Either case would have a direct adverse impact on Telesat's ability to deliver innovative services to Canadians.

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<sup>13</sup> See *Report and Order and Further Notice of Proposed Rulemaking*, FCC-16-89 (14 July 2016).

41 Furthermore, such overly restrictive limitations are likely to have a significant adverse impact on Telesat's ability to deliver FSS services in Canada. As an example, Telesat's headquarters, where it operates a number of key earth stations, is located less than 500 m from Regional Road 174 and the Confederation Line LRT. Rigid siting rules based on distance from a highway or rapid transit line could well bar Telesat from using the 28 GHz band from this site, despite the fact that for an antenna facing a GSO satellite, most of the off-axis radiation would fall into sparsely populated areas (a golf course and parking lot) where terrestrial 28 GHz infrastructure is very unlikely to be installed.

42 While not every existing earth station site will be suitable for use as a 28 GHz gateway, the practical consequences of policy restrictions on adding feeder capacity at suitable locations warrant serious consideration. It would be inappropriate, and contrary to the Department's policy goals of promoting service to Canadians, to impose such a policy in cases where coordination would offer a reasonable alternative that would permit a greater diversity of innovative services to coexist.

43 While the rules adopted and proposals made in the U.S. may provide useful background, Telesat agrees with the RABC that technical study would be required before the specific parameters of such restrictions could be properly defined and applied. This study needs to be oriented to Canadian geography and conditions to determine the optimum solution for Canada.

As with the proposed study of trigger coordination mechanisms, the Department should initiate and lead this study.<sup>14</sup>

44 The RABC submissions set out a number of considerations that should be included in such a study. Without pre-judging what metrics would be the most useful, Telesat agrees that these are relevant considerations that should be addressed.

45 In particular, given the critical role that satellite services play in delivering vital telecommunications services to Northern and rural Canadians, the Department should pay particular attention to the proposals made by the “Satellite Broadband Companies” in the FCC proceeding, including the tiered approach to setting limits on affected population based on population density.

**G. COEXISTENCE BETWEEN FLEXIBLE USE TERRESTRIAL STATIONS AND SPACE STATIONS IN THE FIXED-SATELLITE SERVICES (EARTH-TO-SPACE) – 28 GHZ**

Question 6-6: ISED is seeking comments on whether it should impose any limits on the aggregate emissions of the terrestrial services. If limits are proposed, ISED is inviting detailed proposals on why they should be implemented, and what the limits should be.

46 From a practical perspective, Telesat’s primary concern is to ensure that the 28 GHz band is available for use for feeder links. It will also be important to avoid interference with satellite receivers operating in the adjacent 28.35-28.6 GHz band. In the absence of any constraints on terrestrial transmitters (especially base stations), there is a risk that aggregate interference at the satellite receiver could seriously impair these uses.

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<sup>14</sup> See para. 36.

47 However, while aggregate interference is the concern, aggregate interference is difficult to determine, regulate, or attenuate. Since aggregate interference is inherently a cumulative effect arising from many sources, it is conceptually difficult to allocate responsibility for it or to identify appropriate corrective actions.

48 A better approach is perhaps to prevent harmful aggregate interference by imposing an EIRP density mask as a function of elevation angle for all terrestrial base stations. Telesat agrees with the Department that the characteristics of terrestrial 5G transmitters (e.g. narrow beam antennas, indoor use) will tend to naturally limit skyward transmissions and therefore an appropriately defined mask should pose minimal constraints on terrestrial flexible use of the band.

49 Telesat supports the RABC proposal for a technical study of the matter. As with the proposed studies of trigger mechanisms for coordination and geographic restrictions on earth station siting, the Department should initiate and lead this study.<sup>15</sup>

#### **H. TREATMENT OF EXISTING USERS – 28 GHZ**

Question 6-7: ISED proposes that all existing FSS earth stations and those in applications pending approval for operation would be permitted to continue to operate under the current conditions of licence as described above. Comments are sought on this proposal.

50 Telesat notes that it has made significant investments in its existing FSS earth stations and would incur substantial costs if it was forced to relocate them. Moreover, as noted

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<sup>15</sup> See paras. 36 and 43.

previously, there are relatively few ideal candidate locations in Canada where such stations could be located.

51 Telesat agrees with and supports the RABC position that the “existing” FSS feeder link earth stations, pose minimal constraints on the deployment of fixed service and mobile service systems. Telesat also supports and welcomes the ISED proposal that existing FSS earth stations, including “those in applications already submitted as of the publication of [the Consultation Document]” be grandfathered and be permitted to continue operation under their “current parameters conditions of licence”.<sup>16</sup> Furthermore, Telesat suggests that this should extend to cover changes and expansions at (or in close proximity to) the same geographic site that do not materially affect the PFD-based coordination contour,<sup>17</sup> since this would have little or no incremental impact on terrestrial services. This would be entirely consistent with the Department’s goals to facilitate deployment and availability of services and to maximize the economic and social benefit of spectrum.

#### **I. CHANGES TO SPECTRUM UTILIZATION POLICIES – 40 GHz**

Question 7-1: ISED is seeking comments on the proposal to implement flexible use licensing in the frequency band 37-40 GHz, including the consequential changes to CTFA footnote C51, while continuing to allow for fixed-satellite service (space-to-Earth) in the band.

52 Telesat has plans for a V-band NGSO constellation to supplement its Ka-band LEO constellation. As in the case of Ka-band, V-band spectrum will be required for both user links and feeder links. The 37-40 GHz band is well-suited for feeder link downlinks. As a result,

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<sup>16</sup> *Consultation Document*, para. 39.

<sup>17</sup> Or such other criteria that may arise from the studies mentioned in paras. 36 and 43.

Telesat’s comments in Section D, above, in response to question 6-1 in relation to the 28 GHz band, apply, *mutatis mutandis*, to the 37-40 GHz band.

53 Furthermore, in a LEO constellation, the distinction between feeder links and user links may not be relevant. Provided that the FSS earth stations are few in number, and individually licensed, there should be no practical difference. Accordingly, Telesat suggests that the words “large” and “for feeder links” should be removed from the revised draft of footnote C51.

#### **J. BAND SHARING WITH OTHER SERVICES – 40 GHz**

Question 7-4:

A. ISED seeks comments on the proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the frequency band 37.5-40 GHz when a pre-determined trigger threshold is exceeded.

B. If site-by-site coordination is proposed, what coordination trigger and value would be the most appropriate (e.g. PFD or distance threshold)?

C. ISED is also inviting proposals for specific additional technical rules on flexible use stations and FSS earth stations (e.g. site shielding) that could facilitate more efficient sharing between terrestrial and earth stations.

54 Telesat supports flexible use licensing in this band, provided sufficient allowance is made for protection of licensed FSS earth stations through coordination and exclusion zones.

55 Telesat supports coordination of individual earth stations in the 37-40 GHz band. As in the case of Ka-band, adoption of a trigger mechanism would be useful to avoid needless calculations. Similarly, site shielding may be an appropriate mechanism to facilitate coordination in some cases, but will not always be the best option and should not be mandated in every case.

56 The determination of an appropriate trigger value and specific technical rules is a complex matter. Telesat supports the RABC suggestion of technical study, which should be initiated and led by the Department, to study these issues from a Canadian perspective, with due regard for Canada's unique circumstances.

57 Furthermore, Telesat reiterates that the phrase "large antennas" that appears in several footnotes to the Canadian Table is imprecise and needs review. This concept should be clarified with an objective measure, likely based on an appropriate number of wavelengths in each case.

**K. GEOGRAPHIC RESTRICTIONS ON THE DEPLOYMENT OF EARTH STATIONS – 40 GHz**

Question 7-5:

A. ISED is seeking comments on whether there should be restrictions on the geographic areas in which new FSS earth stations can be deployed in the frequency band 37.5-40 GHz.

B. If geographic restrictions on FSS earth stations are proposed, ISED is inviting detailed proposals on how they could be implemented, and what areas should be targeted?

58 As with Ka-band, Telesat agrees with the RABC that technical study would be required before the specific parameters of any such restrictions could be properly defined and applied. Accordingly, Telesat supports the RABC's suggestion that such a study be conducted.

**L. LICENCE-EXEMPT USE – 28 GHz AND 40 GHz**

Question 9-1: ISED is seeking comments on:

A. Whether flexible use access in these bands should be exclusively licenced or licence-exempt.

B. If a licencing approach is proposed, which types of licences (radio licences, spectrum licences with user-defined licence areas, spectrum licences with service areas for competitive licensing, or others) are expected to best lend themselves to licensing flexible use in the 28 GHz and 37- 40

GHz frequency bands in order to support a variety of 5G technologies, applications and business cases?

C. Whether a licence-exempt dynamic access using data base should be implemented in all, or portions of the 28 GHz, 37-40 GHz, particularly in the band 37-37.6 GHz.

59 Telesat agrees with the RABC that shared use of these bands, and the corresponding need for coordination, indicates that any use of these bands should be licensed.

60 Telesat also agrees with the RABC that terrestrial service area licensing is more practical than individual site licenses. However, area licensing should not conflict with siting of individually licensed FSS earth stations, as discussed in previous responses. Accordingly, any area licence should be subject to coordination requirements based on a first-come, first-served principle, as described above in Section E.

61 Finally, Telesat agrees with RABC that licence-exempt dynamic access using a database should not be adopted, for the reasons set out in the RABC submissions. Such a dynamic access regime offers no practical advantages to Canada to justify its considerable costs and complexities.

### **III. CONCLUSION**

62 In view of the foregoing, Telesat submits that the Department should:

1. develop a regulatory policy that promotes the rollout of innovative wireless infrastructure, (including satellite infrastructure) but does not prevent the efficient deployment and operation of satellite facilities;
2. ensure that the policy reflects Canada's unique geography and demographics, and aligns with the Department's goal of making innovative telecommunications services available

to all Canadians, including satellite-dependent communities in rural Canada and the North, and not uncritically adopt the FCC's decisions in its Spectrum Frontiers Report and Order;

3. require licensed, rather than licence-exempt, use for the 28 GHz and 37-40 GHz bands and, in particular, not adopt licence-exempt dynamic access using a database in the 28 GHz or 37-40 GHz bands;
4. grandfather already-licensed FSS earth stations and those for which applications were received prior to the release of the Consultation, so that they are not subject to any additional constraints due to the deployment of terrestrial flexible use stations in the vicinity;
5. license future earth stations on a case-by-case basis, considering their unique circumstances and characteristics;
6. not mandate site shielding for all earth stations, when other coordination measures may be less restrictive and more effective;
7. require coordination of new FSS earth stations with flexible use terrestrial stations only where the terrestrial station has been previously licensed, an application has previously been made to the Department to licence the terrestrial stations or where they must be built because of a terrestrial build-out requirement previously imposed by the Department;
8. ensure that newly licensed FSS earth stations which have completed such coordination will not thereafter be subject to any additional constraints as a result of future deployment of terrestrial flexible use stations in the vicinity; and
9. initiate and lead a technical study (or studies) to determine:

- a. appropriate trigger mechanisms for coordination in the 28 GHz and 37.5 – 40 GHz bands, to facilitate the determination of compatibility between FSS earth stations and terrestrial 5G without performing unnecessary calculations;
- b. appropriate restrictions on the geographic areas in which an earth station that transmits in the 28 GHz band or receives in the 37.5-40 GHz band may be located, taking into account Canadian geography, demographics and telecommunications needs;
- c. appropriate limits on skyward transmissions from terrestrial base stations that transmit in the 28 GHz band to prevent excessive interference into satellite receivers resulting from aggregate terrestrial emissions.

All of which is respectfully submitted on behalf of TELESAT CANADA

/s/  
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