RADIO ADVISORY BOARD OF CANADA
CONSEIL CONSULTATIF CANADIEN DE LA RADIO

Response to SMSE-016-18:
Consultation on the Utilization of the Bands 18.8-19.3 GHz and 28.6-29.1 GHz, and the Bands 17.3-17.7 GHz, 19.3-19.7 GHz and 29.1-29.25 GHz by the Fixed-Satellite Service

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The Radio Advisory Board of Canada (RABC) is pleased to submit these comments in response to the questions raised in Innovation, Science and Economic Development Canada ("ISED") consultation SMSE-016-18.

FSS USE OF THE BANDS 18.8-19.3 GHZ AND 28.6-29.1 GHZ

Status of GSO networks and NGSO systems in the FSS

Question 1: ISED is seeking comments on the proposal to give co-primary status to both GSO networks and NGSO systems in the FSS in the bands 18.8-19.3 GHz and 28.6-29.1 GHz.

RABC members believe that NGSO FSS systems in this band should be given an opportunity to develop to their full potential noting that these are the only bands that are allocated internationally on an equal footing to NGSO and GSO Fixed-Satellite Service (FSS). Other FSS bands are subject to RR No. **22.2** which states that:

> **22.2** § 2 1) Non-geostationary-satellite systems shall not cause unacceptable interference to and, unless otherwise specified in these Regulations, shall not claim protection from geostationary satellite networks in the fixed-satellite service and the broadcasting-satellite service operating in accordance with these Regulations. No. **5.43A** does not apply in this case. (WRC-07)

As a result of the application of this provision, even in bands where the protection requirements for GSO networks are quantified through EPFD limits in Article 22, NGSO FSS systems are still, in effect, secondary to GSO networks. GSO and NGSO FSS have co-primary or equal status in the bands 18.8-19.3 GHz and 28.6-29.1 GHz, on a first-come, first-served ("FCFS") basis in the ITU Radio Regulations. It is worth noting that the application of RR No. **9.11A** to these bands was adopted by WRC-95 (for two 400 MHz bands) and subsequently confirmed and extended by WRC-97 to the 1000 MHz that are now subject to this consultation. At the time of adoption, there were only a handful of GSO networks filed with the ITU from Japan, Russia and Italy. The adoption of RR No. **9.11A** was deemed a practical solution since the main NGSO proponent at that time, Teledesic, would have had to coordinate and protect only these few GSO networks.

In the years since WRC-97, a very large number of GSO FSS networks have been filed in the 18.8-19.3 GHz and 28.6-29.1 GHz bands (or "Teledesic bands"), while earlier NGSO FSS filings in these bands were cancelled due to their failure to meet the 7-year regulatory time limit to Bring into Use ("BIU") their frequency assignments. Since 2012, there has been a resurgence in the filings for NGSO FSS systems, with the filing of the Canadian COMMSTELLATION system, which was subsequently awarded to Telesat, and then other NGSO FSS projects such as OneWeb (L5, MCSAT-LEO, CAN102 filings), and others[1]. However, these more recent NGSO FSS filings have come at a time where there are over hundreds pending GSO FSS applications at the ITU, from numerous administrations that have ITU date priority over these NGSO FSS filings. These NGSO

[1] CANPOL, CANPOL-2, STEAM-2, O3B-C, NORSAT-H1, among others.

FSS systems will need to be coordinated with the prior-filed GSO FSS networks on a FCFS basis if GSO networks and NGSO systems were to have co-primary status in the Teledesic bands.

RABC members expressed that some of the GSO operators with date priority may seek to impose burdensome coordination conditions on later-filed NGSO FSS systems. Consequently, the RABC members support maintenance of the Teledesic bands primarily for NGSO FSS operations, by making GSO networks secondary to NGSO FSS, as is the case in the United States.[2] As stated in paragraph 28 of the Consultation Document, this "approach is consistent with ISED's long-standing recognition of the importance of aligning spectrum use regionally, particularly for satellite service." In addition, as Canada shares a long border with the United States (e.g., with CONUS and Alaska), the reality of both GSO and NGSO satellites having both Canada and the US in their respective service areas lends itself well to regional harmonization of policies.

Status of incumbent FSS licensees

Question 2: ISED is seeking comments on the proposal to use the original date of authorization for domestic systems for domestic coordination purposes.

Date priority is relevant to coordination between co-primary filings and, as discussed above, RABC members propose that GSO networks be accorded secondary status to NGSO systems. Under this approach, date priority would remain relevant to NGSO-NGSO coordination, but not for GSO-NGSO coordination. For NGSO-NGSO domestic coordination, RABC members support the application of ITU priority. This will harmonize the date used for domestic and international coordination.

Domestic coordination

Question 3: Is there additional information on coordination practices for GSO networks and NGSO systems in the FSS that should be considered? If so, please explain in detail.

As NGSO satellite receivers are much closer to the earth than GSO satellite receivers, NGSO receivers are more sensitive to interference. On-axis and off-axis e.i.r.p. limits for GSO earth stations would mitigate this interference to NGSO satellite receivers. The RABC agrees that on-axis and off-axis e.i.r.p. limits for GSO earth stations are an appropriate metric for mitigating interference into NGSO satellite receivers, however, there is no agreement on what values of e.i.r.p. limits would be appropriate at this time.

[2] One satellite operator has expressed no objection to the NGSO primary / GSO secondary approach adopted in these comments, but will indicate a preference for co-primary status in separate individual comments.

Question 4: ISED seeks comments on its view that, at this time, the existing approach to addressing domestic coordination disputes is sufficient.

Subject to the comments above relating to use of ITU date priority, RABC members support[3] the existing approach to addressing domestic coordination disputes.

Revisions to the Canadian Table of Frequency Allocations

Question 5: ISED is seeking comments on the proposed changes to the CTFA. In providing responses, include supporting arguments for or against the proposed changes.

ISED is proposing to update the status of fixed service (FS) in the bands in the CTFA to reflect existing policy, and to modify footnotes C16E and C16F consistent with the proposal to designate GSO and NGSO FSS as "co-primary" in the bands.

RABC supports the proposal to update the CTFA to reflect existing policy that FS systems are secondary in the Teledesic bands.

With respect to footnotes C16E and C16F, RABC supports amendments consistent with the views expressed in response to question 1 above. Specifically, RABC members support the deleted sentence identified by the Department and a new sentence stating that the bands are designated for use by NGSO systems in the FSS on a primary basis and by GSO networks in the FSS on a secondary basis. The RABC does not propose any special treatment of currently authorized GSO networks in the bands. Thus footnotes C16E and C16F would read as follows:

> MOD
> **C16E (CAN-18)** In the frequency band 18.3-19.3 GHz, the use of this band by the fixed-satellite service has priority over the use by the fixed service. Use of this band by the fixed service ~~in~~ shall be limited to applications that pose minimal constraints on the deployment of fixed-satellite services. ~~Domestic implementation of fixed-satellite services in the band 18.8019.3 GHz will be governed by spectrum utilization policies to be developed. These policies will take regional developments into consideration in the designation and authorization of spectrum for particular systems and technologies.~~ The band 18.8-19.3 GHz is designated for use by NGSO systems in the FSS on a primary basis and GSO networks in the FSS on a secondary basis.
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> MOD
> **C16F (CAN-18)** In the frequency band 28.35-29.1 and 29.25-29.5 GHz, ~~the~~ use ~~of this band~~ by the fixed-satellite service has priority over the use by the

[3] OneWeb supports the existing approach in principle.

fixed service. Use of these ~~this~~ bands by the fixed service ~~in~~ shall be limited to applications that pose minimal constraints on the deployment of fixed-satellite services. ~~Domestic implementation of fixed-satellite services in the band 18.8019.3 GHz will be governed by spectrum utilization policies to be developed. These policies will take regional developments into consideration in the designation and authorization of spectrum for particular systems and technologies.~~ The band 28.6-29.1 GHz is designated for use by NGSO systems in the FSS on a primary basis and GSO networks in the FSS on a secondary basis.

CHANGES TO THE SPECTRUM UTILIZATION POLICY FOR USE OF THE BANDS 17.3-17.7 GHZ, 19.3-19.7 GHZ AND 29.1-29.5 GHZ

Revisions to the Canadian Table of Frequency Allocations

Question 6: ***ISED is seeking comments on the proposed changes to the CTFA. In providing responses, include supporting arguments for or against the proposed changes.***

(i) 17.3-17.7 GHz

At paragraph 52 of the Consultation Document, the Department indicates that it received a request from a licensee to consider facilitating the operation of gateway stations for GSO FSS in in relation to the 17.3-17.7 GHz band. At paragraph 64 of the Consultation Document, the Department has proposed to allow the requested use of the 17.3-17.7 GHz band by the FSS (space-to-Earth) and to add a new footnote **C43A**. The proposed text of the new footnote is:

> **ADD C43A** Assignments to stations in the broadcasting-satellite service in the frequency band 17.3-17.7 GHz may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the *Radio Regulations*. The use of these assignments by the fixed-satellite service (space-to-Earth) is limited to low density deployments of earth stations communicating with geostationary satellite systems.

The RABC supports the proposal of the Department to provide this additional flexibility. However, members have expressed some concern about use of the phrase “low density deployments of earth stations”. This phrase does not appear elsewhere in the CTFA and is not otherwise commonly-used or well-understood regulatory terminology. Accordingly, the RABC suggests an alternate formulation of the footnote using language more consistent with similar limitations expressed in the CTFA:

ADD C43A Assignments to stations in the broadcasting-satellite service in the frequency band 17.3-17.7 GHz may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Radio Regulations. The use of these assignments by the fixed-satellite service (space-to-Earth) is limited to ~~low density deployments of earth stations communicating with geostationary satellite systems.~~ uses that would not unduly constrain feeder link use in the Earth-to-space direction, such as gateway applications in the fixed-satellite service.

Use of the term "gateway" is suggested, as the term implies a small number of specialized Earth stations managing communications within an FSS network, and also to avoid inconsistency with the definition of the term "feeder link" in Article 1 of the *Radio Regulations*. The RABC believes that this alternative formulation of proposed new footnote **C43A** is clearer and would be more easily understood by users.

(ii) 19.3-19.7 GHz and 29.1-29.5 GHz

In further response to the licensee's request noted above, ISED is also proposing to amend footnotes **C46A** and **C48**, to permit use for low density deployments of earth stations communicating with GSOs, in addition to the current ability to use these frequencies for feeder links to NGSO MSS systems.

The 19.3-19.7 GHz and 29.1-29.5 GHz bands are allocated internationally on a co-primary basis to Fixed, Mobile and GSO FSS as well as use by NGSO MSS feeder links. Their coordination would be based on No. **9.11A** and the No. **22.2** does not apply. Per No. **5.523D,** the 19.3-19.7 GHz is also identified for use by NGSO FSS and its coordination would be in accordance with Articles **9** (except **9.11A**) and **11** and No. **22.2** would apply.

The CTFA does not maintain a Mobile service allocation in the 19.3-19.7 GHz band and limits FSS use of the 19.3-19.7 GHz and 29.1-29.25 GHz bands to feeder links of NGSO MSS systems only. Furthermore, in Canada, the fixed service has priority over FSS in these frequency bands. In accordance with this policy, Iridium has been authorized to deploy feeder links in Canada and continues to operate them without posing constraints on Fixed service operations in the 19.4-19.6 GHz and 29.1-29.3 GHz bands. Iridium has been coordinating its operations above 29.25 GHz with GSO FSS networks, requiring establishment of exclusion zones in order of 500 km radius around its feeder link stations to ensure protection from Earth stations deployed with large size antennas.

At paragraph 62 of the Consultation Document, the Department indicates that it is of the view that the 19.3-19.7 GHz and 29.1-29.25 GHz bands could be used for provision of gateway and

feeder links of GSO FSS networks without constraining other services in the bands. Accordingly, the proposed modifications to footnotes **C46A** and **C48** suggest facilitating use of the 19.3-19.7 GHz and 29.1-29.25 GHz bands by GSO FSS networks for "low density deployments of earth stations". As noted above, the term "low density deployments of earth stations" is not commonly-used regulatory terminology and some RABC members have expressed concern about the future interpretation of the term. In contrast, the term "feeder link" has been used repeatedly in the *Radio Regulations* and is understood to mean Earth stations deployed using a large size antenna relative to user terminals, which, due to the complexity and high cost of such stations, would always be limited in number within any given satellite network or system. The RABC therefore proposes to use a more deterministic term, consistent with the requests from the licensee that had raised consideration of these bands. Use of the terms "feeder link" and/or "gateway" for GSO FSS would be also consistent with the current use of the band by NGSO MSS feeder links and fixed service usage, ensuring minimal impact into these systems. Any future interpretations that may result in ubiquitous deployment of FSS terminals, albeit on a limited basis, would further complicate and restrict access to these frequency bands by incumbent services in Canada.

The RABC supports the general intent of ISED's proposal to modify the CTFA, as well as RP-008, allowing GSO FSS to use these bands for specialized Earth station applications such as gateways and feeder links. The RABC also welcomes ISED's recognition of "priority designation to the fixed service" in the 19.3-19.7 GHz band and the goal of "not constraining other services in the band" by allowing new FSS applications, however, the RABC suggests that the intent of the Department may be more effectively achieved through the suppression of footnotes **C46A** and **C48**, and the modification of footnotes **C16D** and **C16G** as shown below:

> **C16D (CAN-18) MOD** In the frequency bands 17.8-18.3 GHz and 19.3-19.7 GHz, the use of these bands by the fixed service has priority over the use by the fixed-satellite service. Use of these bands by the fixed-satellite service (space-to-Earth) shall be limited to applications that pose minimal constraints on the deployment of fixed services. Examples of such applications in the frequency band 19.3-19.7 GHz would be the use of a small number of feeder link stations of the non-geostationary satellite systems in the mobile-satellite service and the use of a small number of gateway stations of the geostationary fixed-satellite service, taking into account existing and potential service areas for ubiquitous deployment of fixed service systems. Earth stations that comply with these requirements shall be coordinated with fixed service systems.~~and may be granted radio authorization on a case-by-case basis.~~
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> **C16G (CAN-18) MOD** In the frequency band 29.1-29.25 GHz, the use of this band by the fixed service has priority over the use by the fixed-satellite service. Use of this band by the fixed-satellite service (Earth-to-space) shall be limited to applications that pose minimal constraints on the deployment of fixed services. Examples of such applications would be the use of a small number of feeder link stations of the non-geostationary satellite systems in the mobile-satellite service

and the use of a small number of gateway stations of the geostationary fixed-satellite service, ~~of large aperture earth stations,~~ taking into account existing and potential service areas for ubiquitous deployment of fixed service systems. Earth stations that comply with these requirements shall be coordinated with fixed service systems.

SUP Suppress Footnotes **C46A** and **C48**

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