



Canadian Satellite and Space Industry Forum
Forum de l'industrie spatiale et satellitaire canadienne

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Comments of CSSIF Re: SMSE-014-20 – *Consultation on the Technical and Policy Framework for Licence-Exempt Use of the 6 GHz Band* –

Introduction

The Canadian Satellite and Space Industry Forum (CSSIF) represents the interests of the satellite and space industry community in Canada. CSSIF is a member of the Radio Advisory Board of Canada (RABC) and participated in the development of the RABC response to the above-referenced consultation (the “Consultation”). We support the RABC contribution, and are pleased to submit these additional comments in response to the Consultation.

Suggested Use of the 6 GHz Band for IMT Services

Some commenters have suggested that the Department consider use of portions of the 6 GHz band for IMT services¹ and that a Mobile allocation be added to the *Canadian Table of Frequency Allocations* (CTFA). The CSSIF believes that such a proposal is out of scope with respect to the Consultation, which deals only with the introduction of licence-exempt uses in the 6 GHz band. Should the Department wish to consider the introduction of IMT into the band, it would require a separate consultation, consideration of different technical and policy issues, and the establishment of a separate record.

Use of the 6 GHz Band by Satellite Services

The Department has correctly referenced in the Consultation² the use of the 6 GHz band by the Fixed Satellite Service (FSS). Of particular importance is the use of C-band spectrum to provide critical (and often the only) communication links to communities in satellite-dependent areas, as has been acknowledged in paragraph 39 of the Consultation. The vast majority of these services are provided in the 5925-6425 MHz portion of the 6 GHz band in the Earth-to-space (uplink) direction and the 3700-4200 MHz band in the space-to-Earth (downlink) direction. The band 5925-6425 MHz is also extensively used to provide broadcasting and enterprise services within Canada. In the future, such services may also be carried in the 6425-6725 extended C-band and the 6725-7025 MHz planned Appendix 30B band. The 6875-7055 MHz portion of the band is used in the space-to-Earth direction to provide feeder links to the Mobile Satellite Service (MSS). Currently two gateway earth stations are located in Canada. MSS

¹ See RABC Comments at ¶17

² Consultation at ¶37-40



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services are important for the provision of aero and marine applications as well as personal communications in remote areas of the county.

The Department must ensure that its decisions do not result in unacceptable interference to these important satellite applications of the band. The Department is urged to take into account the unique conditions that apply within Canada, and not to merely adopt without careful consideration the measures adopted by other administrations.

Interference with Satellite Services

The CSSIF recommends that the condition contained within the proposed footnote Cxx should adhere more closely to existing footnote C39A in the CTF that applies to similar licence-exempt devices in the adjacent 5725-5825 MHz band. In particular, licence-exempt services must comply with the policy and technical framework established by the Department, based on not causing interference to, nor claiming protection from, licensed systems operating in the band. In the context of satellite services, this means that introduction of licence-exempt services must not in any way constrain the location, design or operation of current and future earth stations that transmit in the 6 GHz band. Similarly, current and future receive earth stations that provide gateway services for the MSS must be protected from unacceptable interference through the use of technical constraints on the licence-exempt services, and the proposed AFC system that would also protect stations in the fixed service and radioastronomy stations.

Protection of satellite links in the Earth-to-space direction should be addressed differently. In this direction, unacceptable interference could occur at the satellite receiver, should suitable measures not be adopted. Since the proposed power levels for each individual licence-exempt device are quite low, the risk is not for single-entry interference. Rather, it is aggregate interference that is the concern. Because of the wavelengths in the 6 GHz band, satellite antenna coverage is broad, typically covering all of Canada or even all of North America. This means that all licence-exempt devices simultaneously operating co-frequency within the satellite antenna coverage will contribute to the aggregate interference. The impact of the aggregate interference is to raise the noise floor at the satellite receiver. Standard Power devices operating outdoors will be the largest contributors. Once the noise floor at the satellite receiver reaches an unacceptable level, satellite services will be impaired or even precluded.

Technical analyses form part of the technical record^{3,4} in other jurisdictions. Results are highly dependent on the assumptions made, e.g. how many licence-exempt devices would transmit simultaneously in the same frequency range within the satellite receive antenna coverage area; what EIRP would be transmitted on average by the licence-exempt devices; what percentage would be located outdoors; what antenna pattern in elevation would the licence-exempt devices have; etc. The key point for the Department is that the interfering services are licence-exempt (so that their locations are unknown), ubiquitous, and unlimited in number. Hence, remedial action at the point when a satellite

³ FCC Report and Order and Further Notice of Proposed Rulemaking, Docket No. 18-295, referring to RKF Study submitted Jan. 25, 2018.

⁴ [https://docdb.cept.org/download/50365191-a99d/ECC%20Decision%20\(20\)01.pdf](https://docdb.cept.org/download/50365191-a99d/ECC%20Decision%20(20)01.pdf)



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network experiences unacceptable interference would be extremely difficult, if not impossible. It is therefore incumbent on the Department to adopt conservative and appropriate measures before licence-exempt devices are permitted in the band.

CSSIF recommends that the Department do the following:

1. Carefully review the record and decisions in other jurisdictions (not just the U.S.) to determine appropriate power and power-density limits for licence-exempt devices, in particular for the proposed Standard Power devices operating outdoors.
2. Adopt power/ power-density limits for both the Access Points (APs) and the client devices that communicate with the APs.
3. Introduce a vertical-elevation mask for licence-exempt devices that takes into account Canadian geography and the longitudes on the geostationary arc where satellites provide C-band services to Canadians. For example, for the key orbital position of 107.3°W, the elevation angles from major Canadian population centres (i.e. where we can anticipate the greatest deployment of licence-exempt devices) fall in the 20-30° range. Elevation angles would be lower from some cities to satellites located more at the edges of the North American arc. Hence an elevation mask for licence-exempt devices that begins at 30° would be ineffective in these cases. The CSSIF recommends that the Department consider reducing the elevation mask angle applicable in Canada (e.g., from 30° to 15°).
4. Investigate the necessity of, and potential approaches for, ensuring that licence-exempt devices across Canada spread their EIRP evenly across the portions of the 6 GHz band allocated for their use as a result of this consultation, without peaks in some sub-bands. For example, one approach would be to require AFCs to communicate with each other and establish a real-time database of the characteristics of licence-exempt devices that are in use, and to cap the total number of devices transmitting simultaneously in a given channel.