



To: Senior Director

Spectrum Licensing and Auction Operations

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Via email: ic.spectrumauctions-encheresduspectre.ic@canada.ca

Subject: **Canada Gazette Notice No. SLPB-001-17, Consultation on Releasing Millimetre Wave Spectrum to Support 5G, published 5 June 2017 – Comments**

The Canadian Space Agency (CSA) is pleased to submit the following in response to the above-referenced Consultation. The decision that the Department will make regarding this Consultation may unlock access to higher frequency bands for fixed and mobile services by establishing a flexible regulatory framework for several bands in the millimeter wave range in order to facilitate the development and deployment of 5G services and applications. CSA is afraid to note that appropriate safeguard for protection of EESS services might not be addressed appropriately in the decision.

The Consultation has sought comments on its proposal to create flexible licensed services in the 27.5-28.35 GHz, 37-40 GHz frequency bands as well as allowing unlicensed operations in the 64-71 GHz frequency band.

The Agency agrees that the Consultation process can provide an opportunity to develop a flexible and streamlined regulatory framework that can encourage innovative use of the spectrum; accommodate potential future developments in technology and equipment; and can advance spectrum sharing between various services. While the Agency is fully supportive of this initiative, it is of the view that proper sharing mechanism under realistic technical parameters and assumptions should be used to protect the current in band and adjacent band allocated services.

The Agency notes that Canada is a signatory of the Final Acts of WRC-15. CSA also notes that Resolution 238 (WRC-15) resolves “... When conducting studies in the band 24.5-27.5 GHz the need to ensure the protection of existing earth stations and the deployment of future receiving earth stations under the EESS (space-to-Earth) and SRS (space-to-Earth) allocation in the frequency band 25.5-27 GHz will be taken under account.”

CSA is of the view that its earth stations operating in the frequency band 25.5-27 GHz should be protected from potential interference from mobile devices as it is further explained below.



With the advances in very small satellites such as cubesat, CSA has already witnessed more demand for ground station facilities as this sector grows. X-band and Ka band are all extremely important bands for EESS data downlink as well as for its future TT&C operation. The majority of data download currently uses the 8025-8400MHz allocation. However, with increased demand for high resolution images (i.e., the need for greater downlink bandwidth), requirement for more frequent data transmission to ground (i.e., the need for more earth stations), unprecedented demand for cubesat services and their thirst for 8 GHz spectrum, and specially that 25.5 – 27 GHz being the only spectrum being available to EESS in the near future, CSA is strongly of the view that this spectrum should properly protected for its future use.

A particularly critical situation concerns the band 25.5-27 GHz which is expected to be heavily used by many future EESS and SRS satellite missions for data downlinks, as it will be further explained below.

As recognized in Resolution 238 (WRC-15) (footnote 2 of *resolves* 2) for the 25.5-27 GHz band, it is fundamental for the Agency to be assured that EESS earth stations will continue to be able to expand in the future both in terms of number of satellites serviced and number of earth stations. Licences for these earth stations, which inherently provide protection from interference by 5G systems, must not be refused or restricted on the basis that such action may limit 5G operational areas.

Furthermore, the question of what constitutes efficient use of the radio spectrum arises frequently. In CSA's view, efficient use involves transmission of important information using a minimum spectral bandwidth, since the use of the same spectrum by other services within the same geographic region is thereby limited or denied. However, in the case of *passive* services, efficient use of the allocated bands requires simply that these bands be free from wanted and/or unwanted transmissions of other services down to a level that allows the passive services to operate at the limits of sensitivity set only by the intrinsic noise levels of their instruments.

In most cases it is *unwanted* (out-of-band and spurious) emissions falling within EESS bands that result in interference to passive services. Thus CSA emphasizes that it is essential to take account of how well 5G applications can avoid causing any deterioration of the spectrum outside its allocated band, in addition to how well it makes use of its allocated spectrum measurement of unwanted emissions within a passive band, at the threshold levels of power spectral density that result in detrimental loss in sensitivity of the passive services, is necessarily difficult.

To enhance the ability of the Agency's mission to fully use the spectrum that has been primarily allocated for passive research allocations and service the Department's decision on 5G should acknowledge the vulnerability of EESS passive services to out-of-band and spurious emissions from neighboring services. Thus, in allocating spectrum for new services, care must be taken to avoid, wherever possible, placing services that have the greatest likelihood of causing harmful



interference next to passive science bands. A hasty decision of the allocation of spectrum to 5G in frequencies adjacent or close to bands allocated for the EESS would be detrimental to CSA's current and planned missions.

In conclusion, CSA appreciates the opportunity to provide comments in the Consultation. The Agency is confident that the Department will adopt a balanced approach that will enable the Agency to have meaningful access to the allocated spectrum to EESS and SRS without improperly constraining 5G deployment.

Sincerely

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