Before

INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA

Ottawa, ON K1A 0H5

In the Matter of	)	
	)	
Addendum to the Consultation on Releasing	)	Canada Gazette, Part I
Millimetre Wave Spectrum to Support 5G	)	June 2018
	)	Notice No: SLPB-005-18

COMMENTS OF NOKIA

Nokia respectfully submits Comments in response to the above-captioned Consultation from Innovation, Science and Economic Development Canada (ISED) on releasing millimetre wave (mmWave) spectrum in the 26.5–27.5 GHz band (26 GHz band).

Question A1: ISED is seeking comments on the development of a flexible use licensing model for fixed and mobile services in the 26 GHz band (in addition to the bands currently under consultation through the mmWave

Consultation), taking into account the timing of WRC-19, 5G technology standards development, international ecosystems and harmonization of spectrum use with other countries.

Nokia supports ISED's proposal to develop a flexible use licensing model for fixed and mobile services in 26.5-27.5GHz (26 GHz band) in addition to the bands currently under consultation through ISED's mmWave Consultation, taking into account the timing of WRC-19, 5G technology standards development, international ecosystems and harmonization of spectrum use with other countries.

Question A2: ISED is seeking comments on the changes proposed above to introduce flexible use licensing in the 26 GHz band, including the ensuing changes to the CTFA Canadian footnotes and the policy on this band contained in SP 3-30 GHz, Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation.

Nokia supports the changes proposed by ISED to introduce flexible use licensing in the 26 GHz band, including the ensuing changes to the CTFA Canadian footnotes and the policy on this band contained in SP 3-30 GHz, Revisions to Spectrum Utilization Policies in the 3-30 GHz Frequency Range and Further Consultation.

Question A3: ISED is seeking comments on the importance of harmonizing the Canadian band plan with the United States in the 26

GHz and 28 GHz bands, recognizing that the 26 GHz band is not available for 5G services in the United States at this time.

For various reasons, including the possibility to leverage an ecosystem, for roaming purposes and cross-border coordination, it is important to harmonize the Canadian band plan with the United States. While the 28 GHz band is already available in U.S., the 26 GHz is currently not available. However, on June 8, 2018, the U.S. Federal Communications Commission (FCC) released a Third Report and Order (Third R&O), Memorandum Opinion and Order (MOO), and Third Further Notice of Proposed Rulemaking (Third FNPRM) on expanding flexible use in millimeter wave (mmW) spectrum, in which it proposes to make available 25.25-27.5GHz band (26 GHz band) for flexible 5G wireless use. This is above the upper segment of 24GHz (24.75-25.25 GHz) and below 28GHz (27.5-28.35GHz), both of which have been announced for auction by FCC. We are confident that FCC will issue service rules for the 26 GHz Band in 2019.

Beyond the United States, the 26 GHz band has substantial interest with the potential for a global ecosystem for the band. South Korea just auctioned 26.5-28.9 GHz providing 24 blocks of 100 MHz each. While Europe is studying 24.25-27.5 GHz, it may restrict the spectrum available to 26.5-27.5GHz for a while. China is studying 24.75-27.5 GHz.

Question A4: ISED is seeking comments on the minimum block size that should be made available for the 26.5–28.35 GHz band. Is it necessary

that the frequency blocks be multiples of the 3GPP channel bandwidths (50 MHz, 100 MHz, 200 MHz and 400 MHz)?

While it is preferable that frequency blocks be multiples of the 3GPP channel bandwidths (50 MHz, 100 MHz, 200 MHz and 400 MHz), this is not necessary. The U.S. 28 GHz band plan, which has 2 blocks of 425 MHz each instead a multiple of the 3GPP channel bandwidths, is a prominent example of a band plan that does not use 3GPP channel multiple bandwidths.

Question A5:

A. ISED is seeking comments on whether it should impose any limits on the aggregate emissions of the terrestrial services in the 26.5–27.5 GHz band to ensure coexistence with ISS.

We agree with ISED's proposal not to impose any limits on the aggregate power levels produced by terrestrial systems in order to protect ISS. As ISED notes in the Consultation, 5G technologies considered for the mmWave bands will employ dynamic beam forming with narrow beamwidths, which will lessen the potential of interference to ISS and ITU's preliminary studies indicate that harmful interference to space stations due to aggregate emissions from 5G systems is not likely.

B. If limits are proposed, ISED is inviting detailed proposals on what the limits should be, and why they should be implemented.

N/A

Question A6:

A. ISED is seeking comments on the proposal to require site-by-site coordination between proposed flexible use terrestrial stations and EESS/SRS earth stations in the 26.5–27.0 GHz band when a pre-determined trigger threshold is exceeded.

As ISED notes, no EESS or SRS earth stations have been deployed in Canada and it is expected that the overall deployments will be limited in number. Therefore, we do not see a need to impose any specific cumbersome regulatory or technical solution on terrestrial stations to facilitate sharing between the proposed flexible use terrestrial stations and EESS/SRS earth stations in the 26.5–27.0 GHz band. Practical solutions, such as site shielding around EESS/SRS earth stations, should be explored.

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

However, if ISED was to adopt a different approach based on a coordination trigger, such an approach should minimize the burden on and cost of deployment of flexible terrestrial stations in the band. In addition, the approach should be based on reasonable engineering methods and consider additional best practice procedures such as the use of site shielding.

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

As mentioned in A6A above, there are currently no EESS/SRS earth station deployments in Canada, and very few (if any) are expected to be deployed in the future. Nokia believes that the terrestrial use operators can coordinate with the limited number of EESS/SRS earth stations that may be deployed in the future, to facilitate sharing.

Question A7:

A. ISED is seeking comments on whether there should be restrictions on the geographic areas in which new EESS and SRS earth stations can be deployed in the 26.5–27.0 GHz band.

We agree with ISED that there should be restrictions on the geographic areas in which new EESS and SRS earth stations can be deployed in the 26.5–27.0 GHz band.

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

Nokia does not provide any additional inputs at this time.

Question A8:

A. ISED is seeking comments on the proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the 27.0–28.35 GHz band when a pre-determined trigger threshold is exceeded.

Nokia agrees with ISED's proposal to require FSS earth stations to do site-by-site coordination with terrestrial stations in 27.0–28.35 GHz band when a pre-determined trigger threshold is exceeded.

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

As Nokia noted in its response to ISED's consultation SLPB-004-17,[1] Nokia believes that a power flux density (PFD) limit threshold can be used as a trigger for an FSS earth station to coordinate with terrestrial earth stations. Nokia proposed a threshold of -77.6 dBm/m2/MHz at 10 meters above ground level which was adopted by the FCC for the U.S. and the same threshold should be adopted for Canada.

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

Nokia conducted measurements that showed that mitigation techniques such as shielding may be needed around FSS earth stations in order to meet the PFD limit, when the FSS earth stations are deployed in close proximity to the 5G systems.

Question A9:

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 27.0–28.35 GHz band.

[1] Consultation on the Releasing Millimetre Wave Spectrum to Support 5G, Canada Gazette, Part I, July 15, 2017, Notice No. SLPB-004-17.

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.

Nokia agrees with ISED that there should be restrictions on the geographic areas in which new FSS earth stations can be deployed in the 27.0–28.35 GHz band.

Question A10:

A. ISED is seeking comments on whether it should impose any limits on the aggregate emissions of the terrestrial services in the 27.0–28.35 GHz band to ensure coexistence with FSS space stations.

As Nokia noted in its response to ISED's consultation SLPB-004-17, the FCC concluded that that harmful aggregate interference is unlikely to occur from the mobile operations to satellite operations and therefore, there is no need to impose any limits on the aggregate emissions of the terrestrial services in the 27.0–28.35 GHz band to ensure coexistence with FSS space stations. In addition, the satellite industry has not shown that it has a legal right to protection from aggregate interference during the proceeding in U.S.

B. If limits are proposed, ISED is inviting detailed proposals on why they should be implemented, and what the limits should be.

N/A

Question A11:

A. Further to section 9 of the mmWave Consultation, are there any new considerations or suggested approaches regarding the licensing of flexible use mmWave spectrum, given the addition of the 26 GHz band?

B. ISED is also seeking comments on licensing considerations in the 26 GHz and 28 GHz bands that would encourage innovative use cases while also supporting competition for existing mobile network services.

Nokia recommends exclusive licensing over a shared use approach as a way to provide certainty for investment. The commercial mobile market has blossomed under a framework of access to exclusively licensed spectrum. This paradigm has driven the deployment of robust 4G broadband networks, and will best facilitate widespread deployment in 5G as well. Continuing to identify additional spectrum for exclusive licensing, including in the mmW bands, must remain the top objective for government spectrum decision-makers.

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Nokia appreciates ISED's efforts to ensure that Canadian consumers, businesses and public institutions continue to benefit from the latest wireless telecommunications services across the country. Nokia stands ready to work with ISED to meet this goal and urges ISED to unlock the promise of spectrum for 5G as discussed in these Comments.

Respectfully submitted,

Nokia

/s/Richard T. Herald
Richard T. Herald
Country Senior Officer

Nokia
1380 Rodick Road
Markham, ON, L3R 4G5

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