



Technologies Canada Co. Ltd.

October 26, 2020

Innovation, Science and Economic Development Canada  
c/o Director, Spectrum Regulatory Best Practices  
235 Queen Street (6<sup>th</sup> Floor, East Tower)  
Ottawa, Ontario K1A 0H5

Via Email: [REDACTED]  
[ic.spectrumauctions-encheresduspectre.ic@canada.ca](mailto:ic.spectrumauctions-encheresduspectre.ic@canada.ca).

**Re: Comments from Huawei Technologies Canada Co., Ltd.**

Canada Gazette Part I

Consultation on the Technical and Policy Framework for the 3650 – 4200 MHz Band and Changes to the Frequency Allocation of the 3500 – 3650 MHz Band. SLPB-002-20 – August, 2020.

---

Huawei Technologies Canada Co., Ltd. (“Huawei Canada”) is pleased to provide comments in response to the Innovation, Science and Economic Development Canada (“ISED”) Consultation on the Technical and Policy Framework for the 3650 – 4200 MHz Band and Changes to the Frequency Allocation of the 3500 – 3650 MHz Band ... SLPB-002-20 – August, 2020.

As noted in the consultation, wireless services are an important part of Canadians’ lives, and Canadians expect these services to be high quality, providing world-leading innovation and performance, and available in every region of the country including underserved rural and remote areas. Furthermore, connectivity is even more critical during times of disruption, such as COVID-19, a time when business and consumers have relied even more on wireless services to stay connected.

Huawei supports ISED in its commitment that all Canadian consumers, businesses, and public institutions have access to the latest wireless telecommunications services. A robust competitive wireless industry drives the adoption and use of digital technologies and enhances the productivity of the Canadian economy.

We need a strong wireless sector to help bring Canada back from COVID supporting new wireless applications in vertical industries such as healthcare, agriculture, education, manufacturing, and transportation. 5G has arrived driving the global adoption of wireless broadband services and will provide a catalyst in Canada on the road to recovery.

Spectrum is the oxygen that propels the wireless industry and additional spectrum for licensed and flexible use enables providers to increase network capacity to meet traffic demands and supports the provision of next-generation wireless technologies. The development and deployment of new wireless services is essential to Canada maintaining its position as a global leader for innovation and will keep Canada at the forefront of digital development and adoption through its world-class wireless infrastructure.

Around the world, spectrum regulators have released or are planning to release the 3800 MHz band for broadband wireless services. Repurposing this band to flexible use will not only support mobile services, such as smartphones and connected devices, but will also continue to support fixed wireless services. Promoting access to additional flexible use spectrum for mobile and fixed wireless services helps service providers and wireless Internet service providers increase network capacity to meet traffic demands for new wireless applications and services in both urban and rural areas of Canada.

Canadian consumers benefit from the economies of scale that result when manufacturers produce equipment for global markets resulting in access to the latest device ecosystem. By ensuring that the spectrum being made available reflects global trends, Canada will continue to position itself to benefit from the next generation of smartphones and other advanced wireless devices.

Huawei supports ISED's objectives to foster investment and the evolution of wireless networks by enabling the development of high quality wireless networks and technology; support sustained competition for wireless services; and facilitate the deployment and timely availability of services across the country, including in underserved rural and remote regions.

The 3rd Generation Partnership Project (3GPP) includes various organizations that work together to develop industry specifications for equipment used for commercial mobile services. In late 2017, 3GPP identified the 3300-4200 MHz band for its 5G New Radio (NR) standards. Specifications were developed for two NR bands; NR bands n77 (3300-4200 MHz) and n78 (3300-3800 MHz). The initial focus for 5G NR networks has been on achieving much higher data rates, improved connectivity and higher system capacity compared to existing 4G LTE networks. In July 2020, 3GPP finalized specifications for additional advanced 5G features, such as ultra-reliable low latency communication, and massive machine-to-machine communication, and network slicing.

Huawei Canada thanks ISED for its strategic and forward-thinking spectrum policy to develop Canadian communications infrastructure and for its spectrum and technical planning efforts both in Canada and globally with leadership in ITU-R. Huawei Canada agrees that the 3500 MHz and 3800 MHz bands will be extremely important for next generation services, and will emerge quickly driven by global acceptance and ecosystem development.

Huawei agrees with and supports ISED's view of commercial and deployment timelines for 3.8 GHz deployment. Huawei Canada believes being able to aggregate to 50 to 100 MHz traffic channels will provide the channel bandwidth needed to deliver high throughput services.

ISED's vision for the 3000 – 4200 MHz band is one of the most progressive globally and will ensure that Canada maintains leadership in wireless communications for decades to come to the benefit of all businesses and consumers.

Huawei Canada would be pleased to work further with ISED and others in the industry to assist in this important planning process.

Sincerely,

Robert Backhouse  
CTO, VP Marketing and Solution Sales  
Huawei Technologies Canada Co., Ltd.

**Consultation on the Technical and Policy Framework for the 3650 – 4200 MHz Band and  
Changes to the Frequency Allocation of the 3500 – 3650 MHz Band  
Comments of Huawei Technologies Canada Inc.**

**Q1**

**ISED is seeking comments on the timelines for the development of an equipment ecosystem using 5G technologies in the 3800 MHz band. In particular:**

- a) the ecosystem maturity level and readiness of equipment under band classes n77 or n78 for the Canadian market,**
- b) the ability of existing or future base station radios to handle multiple technologies and band classes at the same time (i.e. whether all four band classes (B42, B43, n77 and n78) or a subset of these band classes are able to operate on the same base station radio) and how it may affect the adoption of 5G technologies in the 3800 MHz band.**

A key objective with the submission is to leverage large equipment ecosystems and avoid Canadian-specific equipment requirements that risk fragmenting these ecosystems. It would be desirable to define regulations that would allow users to operate 3500 MHz and 3800 MHz spectrum blocks from the same types of Radio Frequency (“RF”) equipment.

As indicated in the consultation, the proposal is for ISED to follow a plan that broadly aligns with the n77 (3300-4200 MHz) and n78 (3300-3800 MHz) ecosystems which allows Canada to leverage standards – based equipment available from the EU and US markets.

Equipment ecosystem under band class n78 (3300-3800 MHz) is currently more mature than n77 (3300-4200 MHz), mainly driven by European and Asian ecosystems. The n77 ecosystem will mature following the deployment of U.S. C-Band. Both n77 and n78 equipment will be mature at the time of deployment of 3800 MHz in Canada.

Handling multiple technologies and band classes at the same time on the same base station is generally not a technical challenge for base stations operating in the 3800 MHz band. This gives flexibility to service providers. For 5G New Radio (“5G NR”), band classes n77 and n78 can operate simultaneously in 3650-3800 MHz, while 3800-3980 MHz is covered by n77. Radio design is governed by several important technical parameters involving operating bandwidth, channel bandwidth, out-of-band emission specifications, and power tradeoffs.

**Q2**

**ISED is seeking comments on the potential linkages between the equipment ecosystems using 5G technologies in the 3500 MHz and 3800 MHz bands. In particular:**

- a) whether contiguity between the 3500 MHz band and 3800 MHz band is preferred given that 3GPP specifications allows for non-contiguous carrier aggregation**
- b) whether there are any technical or operational impediments (e.g. equipment limitations/challenges to support aggregated use of spectrum, or requirements for additional base station radios) that would be incurred if operators have a large frequency separation between frequency blocks in one or both bands, and at what point (i.e. how wide the frequency separation) such impediments would become significant.**

**c) whether the equipment ecosystem deployed for the 3500 MHz band will be able to operate in the 3800 MHz band, and whether this equipment could easily be extended to 3800 MHz after being deployed.**

Although 3GPP specifications allow non-contiguous carrier aggregation, contiguous blocks are preferred. Contiguous blocks with wider channels provide lower latency and lower control signaling overhead compared to aggregating multiple carriers with carrier aggregation. Wider contiguous channels facilitates higher transmission bandwidth, and generally better spectral efficiency with less guard band requirements.

### **Q3**

**ISED is seeking comments on how the difference in technical rules between the U.S. and EU could impact Canada's ability to leverage the economies of scale from the global 3800 MHz ecosystem. In particular:**

**a) would the difference in technical rules (such as out-of-band-emission (OOBE) power limits) result in two distinct region-specific equipment ecosystems,**

**b) which equipment ecosystem would be more suitable in the Canadian environment (noting that Canada has, for the most part, aligned with the U.S. on low- and high-band spectrum for 5G but in the mid-band, Canada is more aligned with the EU in the 3500 MHz band (3450-3650 MHz)) and specifically, whether Canada should generally align its technical rules with the U.S. or the EU in the 3800 MHz band.**

As discussed earlier, it is recommended that ISED aligns with the 3800 MHz U.S. band plan (which extends from 3700–4000 MHz) and re-align the 3500 MHz to have the band defined as 3400-3700 MHz. This will enable Canada to benefit significantly from both the U.S. and EU equipment ecosystems. In fact, noting that the EU ecosystem extends from 3400-3800 MHz, the department should consider extending the lower limit down to 3400 MHz as a longer-term strategy.

Further analysis will be needed to reconcile technical rules with U.S. specifications in the range 3700-3980 MHz and with EU rules within 3400-3800 MHz. It is not desirable to have different equipment specifications for Canada for these two bands, rather develop RSS and SRSP specifications that maximize the value and commonality of both U.S. and EU ecosystems for Canada.

There is also the practical matter of timing. In Canada, 3450 – 3650 MHz will be deployed first based on auction timing, followed by 3700 – 3980 MHz. Clarifications on 3400 – 3450 MHz and 3650 – 3700 MHz rules may become part of further 3800 MHz consultations but this is yet to be determined. Having a common radio to support 3400 – 4000 MHz in future is a technical stretch for the foreseeable future. It is highly likely that 2 radios will need to be developed and deployed to cover the whole 3400 – 4000 MHz band.

### **Q7**

**ISED is seeking comments on the proposal to implement a 20 MHz guard band between 3980-4000 MHz to protect FSS operations in 4000-4200 MHz band from proposed flexible use operations in the 3700-3980 MHz band.**

FSS or WBS operators in the 3700 – 4200 MHz band not re-allocated to terrestrial services will require protection from in-band and out-of-band emissions (OOBE) of transmitters in the terrestrial portion of the band. This is best achieved through the implementation of both suitable guard-bands and OOBE limits on flexible use equipment. As noted with U.S. studies, 20 MHz is a suitable guard-band between 3980 – 4000 MHz to protect FSS operations in 4000 – 4200 MHz.

### **Q13**

**ISED is seeking comments on:**

**a) establishing unpaired blocks of 10 MHz for the 3650-3700 MHz band**

**b) establishing unpaired blocks of 10 MHz for the 3700-3980 MHz band**

From a technical point of view, the 3GPP 5G NR standard for Bands n77/n78 is defined to accommodate a wide range of block sizes (from 10 MHz to 100 MHz). It is noted that to fully benefit from 5G NR technology, each operator would need on the order of 100 MHz of spectrum, preferably contiguous. The block size, should be flexible enough to allow the aggregation of licensed spectrum to create as large a block size as possible. It is noted that the U.S. band plan for 3700 - 3980 MHz includes two blocks of 100 MHz and one block of 80 MHz to align with clearing timelines, however, the spectrum is auctioned in 20 MHz TDD blocks. The recommendation is ISED uses 10 MHz block sizes to maximize options for flexible use licensees and to align with the 3500 MHz band plan block size in Canada.

### **Q43**

**ISED is seeking comments on the proposal to rely on technical limits and coordination procedures rather than mandate specific technology solutions (e.g. TDD synchronization between systems) to address interference issues between TDD flexible use systems in the 3650-3980 MHz band.**

TDD synchronization provides coexistence benefits that should be considered. ISED is recommended not to mandate but to encourage parties to explore synchronization of TDD operations to minimize interference between adjacent channels. This would be aligned with C-Band operations in U.S., where MNOs indicate that synchronization of two different carriers can be implemented using traditional 3GPP methods based on coordinated timing reference.

### **Q59(a)**

**Telesat's proposal includes ISED allocating an additional 80 MHz for flexible use in the 4000-4100 MHz band. ISED is seeking comments on the feasibility of making this extra spectrum available, specifically:**

**a) whether there would be standardized 5G equipment available for this 80 MHz, given that it does not align with the U.S. band plan,**

The 80 MHz proposed band falls within 3GPP band n77. Base station implementation of n77 depends on technical specs of each region such as the band plan, OOBE, power, etc. The support of the proposed band plan could be done through a separate SKU (Stock Keeping Unit) of equipment that covers the band from 4000 to 4100 MHz. However there is a technical possibility of supporting the U.S. band plan from 3700 to 4000 MHz along with the additional 100 MHz from 4000 to

4100 MHz in a single equipment SKU depending on the OOBE band plan, power requirements, and filtering requirements, however, further technical study needs to be conducted.