In the matter of the

Government of Canada
ISED Consultation on Releasing Millimetre Wave Spectrum to Support 5G

COMMENTS OF HUAWEI TECHNOLOGIES CANADA CO., LTD.

Huawei Technologies Canada Co., Ltd. ("Huawei Canada") submits these comments in response to the Innovation, Science and Economic Development Canada ("ISED") ***Consultation on Releasing Millimetre Wave Spectrum to Support 5G*** (June 2017) (the "Consultation"). Huawei Canada appreciates the opportunity to share with ISED its vision and experiences related to the suitability of the proposed millimetre wave ("mmWave") spectrum for 5G services. Huawei Canada believes this consultation is a critical first step in facilitating innovation and investment in Canada for future wireless technologies and services through the identification of spectrum for 5G systems with wide contiguous bandwidth.

Spectrum is one of a nation's most precious technology resources and is a basic component in the provision of communications services. The consumer demand for wireless broadband services while at home, while at work and in-transit is skyrocketing and will continue to increase over the next decades. As consumer and industry traffic grows, the demands on wireless networks and the need for access to spectrum continues to increase. The availability of spectrum has become crucial to promoting consumer choice and competition and in fostering innovation in the mobile communications marketplace. Spectrum is fundamental not only for the consumer's radio access link to the network but it is also crucial to the service providers' ability to deploy next generation networks utilizing a mix of spectrum bands that serve diverse services and deployment capabilities including both access and backhaul.

Indeed, as the ISED Consultation recognizes, while low-band spectrum has certain propagation advantages for network deployment over long distances and reaching deep into buildings and urban canyons, the mmWave high-band spectrum allows for transmission of large volumes of information locally. Given that mobile connectivity has already dramatically changed the way Canadians live and work, fulfilling future demand for even higher data rates and the requirements of new applications will not only necessitate technological innovation in mobile systems, but also will necessitate the availability and access to additional low- and high-band spectrum for consumers, industry and mobile service providers.

From Huawei Canada's perspective, the evolution toward 5G mobile technologies and services is dependent on three factors. Firstly, Huawei Canada believes that accelerating technological innovation will create new applications and deliver new experiences, thereby enhancing the commercial value of 5G to Canadian users.[1] Secondly, Huawei Canada believes that the new technical standards,

[1] *See* Huawei News Release, "Huawei Rotating CEO Ken Hu Says 5G Needs Deep Innovation" (July 18, 2015), *available at: http://www.huawei.com/ilink/en/about-huawei/newsroom/press-release/HW_444980*. Huawei is investing $600 million in 5G

application scenarios and business models leveraging 5G technologies should be developed through open cooperation and cross-industry collaboration.[2] This requires active involvement of all stakeholders in the global information and communications technology ("ICT") industry, as well as governments, academia, and vertical industries. And thirdly, Huawei Canada recognises that government has a unique responsibility in managing spectrum resources. Forward-looking policies regarding spectrum allocations are essential to the development of the 5G systems and Huawei Canada submits are the reason why this ISED consultation is of particular importance for the future of mobile communications services in Canada.

These comments primarily focus on the mmWave spectrum bands above 24 GHz proposed to be authorized for the provision of all facets of mobile services. Huawei Canada believes the criteria employed in the Consultation to identify suitable spectrum bands are all highly relevant and that the bands identified in the Consultation satisfy the service criteria and, therefore are economically and technically suitable for mobile services.

While the Consultation and the comments provided here are specific to the 28, 37-40, and 64-71 GHz bands, additional bands are under discussion in Canada and globally for 5G applications and Huawei Canada looks forward to further consultation with ISED regarding these other bands.

Huawei Canada submits these comments in response to the questions in the Consultation and would be pleased to work further with ISED on these topics.

Question 4-1: Given the disruptive nature of 5G, will new business models and network applications develop that may require policy and regulatory consideration from ISED? Please describe potential new business models and network applications as well as their benefits to Canadians.

It is expected that 5G will encompass an amalgam of services, requirements and deployments by combining new technologies and expanding service models. 5G is of a disruptive nature in its further aggregation of mobile communications into new services and applications. 5G integrates not just more mobile voice connectivity with the "PSTN"[3], but also the integration of data, utility and entertainment services and the connection of many industrial and transportation systems. These include the envisioned Internet-of-Things ("IoT"), massive machine type communications ("MTC"),

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research and development through 2018 and has more than 500 experts at nine centres worldwide currently engaged in 5G research that focus on air interfaces, radio access network, network architecture, devices, security, and energy efficiency.

[2] Huawei has played a leading role in defining and promoting 5G around the world and has been actively contributing to the development of the 5G ecosystem as a leading member of METIS (Mobile and wireless communications Enablers for the Twenty-Twenty Information Society) and 5G-PPP (5G Infrastructure Public-Private Partnership), both in the European Union; the 5G Innovation Centre (5GIC) with the University of Surrey in the United Kingdom; IMT-2020 in China; NYU WIRELESS in the United States; and the Fifth Generation Mobile Communications Promotion Forum (5GMF) in Japan. Huawei has also established partnerships with Canadian universities on joint research, including the University of British Columbia, McGill University, INRS, Polytechnique Montréal, University of Waterloo, Carleton University and the University of Toronto. The company has published more than 190 academic papers on 5G. Huawei was named the "Biggest Contributor to 5G Development" for its innovations and industry contributions, particularly for new air interface technologies, at the 5G World Summit 2015 held in Amsterdam, the Netherlands in June 2015. *See* http://www.huawei.com/minisite/5g /en/.

[3] PSTN – Public Switched Telecommunications Network

vehicles and transportation systems[4] with enhanced, ultra-fast mobile broadband, and ultra-reliable/low-latency ("URLL") communications. This creates not only an additional volume of traffic, but more importantly, leads to an increased dependence of the wider economy on the functioning of the mobile and associated communications networks and services. This network growth to 5G encompasses many disparate services, previously served by individual systems, and some changes in regulation and policy, as discussed in the Consultation, are appropriate and needed to enable the advancement, development and deployment of these new services.

Just as the deployment of railways transformed the life of Canadians a hundred years ago by rapidly connecting people and goods nationwide and to markets and services globally, the mobile communications facilities now instantaneously connect Canadians (and Canadian industries) nationwide to their families, their jobs, their markets, their services and their government. Now, instant nationwide connectivity and global information flow is not just a convenience; it forms the basis for a functioning economy.

Continued economic development, both within Canada and globally, is dependent on the efficient and renewed use of spectrum to handle the increased traffic and new services. This requires the policy and regulatory framework to support the widespread adoption of services and to ensure its functionality and reliability for long term development and reliable operation. New business models involving not only large network operators but also local industry and local government/public services will develop to support the expanding network and local applications. Self organising networks and highly reliable, ubiquitous services will be among the basis for the new national communications paradigm. This must be encouraged and supported with sufficient and economically deployable spectrum and regulation tuned to these new diverse businesses. Due to the close integration of the communications services into the workings of Canadians, industry and their governments, the necessary care and attention must be given to ensuring high reliability of these services both under normal usage and under times of stress or national emergency.

New business models may develop that separate the basic transport of information from the user's services and so expand the traditional business and regulatory models. Current arrangements of network resources may be disaggregated, for example, to mirror the separation of information transport from the end-user services. The technical drivers for these changes include improved spectral efficiency enabling lower costs and higher traffic volumes and wider area access. Some of these expected changes in operating arrangements may suggest policy and regulatory consideration from ISED. The message being that expanded services need more spectrum and with that the variety of services will also need more flexibility in licensing. The flexible use licensing model is thus an appropriate step in this direction. The regulatory flexibility to organise the spectrum to suit the local traffic and geographic needs among access and backhaul will be a fundamental enabler of the 5G high throughput mobile services and systems in the mmWave bands.

[4] These are sometime referred to as Vehicle to Vehicle ("V2V") or Vehicle to Infrastructure ("V2I") or more generally Vehicle to anything ("V2x")

In some areas, for example, the user's service may be delivered using a combination of wires/fibre, satellite links, fixed radio links and mobile radio technologies. Synergy among these service delivery mechanisms will require similar flexibility in spectrum assignments, regulatory management, licensing and network connectivity.

For the mobile access links, globally common radio channels are necessary for attractive services to consumers. Users have come to expect their device to work everywhere they travel without the need for a different device for each province or country. It is technically more than just the device being globally compatible, but also that the services are commonly available. Thus it is important that the application of mmWaves for higher bandwidth channel throughputs follows a common global channel plan (including adjacent band usage) so there can be globally common equipment and radio specifications. This emphasises the importance of harmonious spectrum assignments with Canada's major neighbours and trading partners in the USA, Americas, Europe and Asia[5].

Huawei Canada appreciates this ISED Consultation for its timing and forward thinking to help establish globally harmonised bands and channel plans to foster expanded Canadian user services. Huawei Canada also commends and encourages ISED in its global efforts to ensure that the Canadian spectrum assignments are leading the way forward in establishing the globalisation of communication networks and services as additional other bands are being considered by administrations both in North America and globally. Such forward thinking and action by ISED will ensure that Canadian Industry will continue to lead in the global equipment and services markets. Going forward, Huawei Canada will be pleased to assist ISED in its endeavours both nationally and globally.

Question 5-1: ISED is seeking comments on developing a flexible use licensing model for fixed and mobile services in the 28 GHz and 37-40 GHz frequency bands, and allowing licence-exempt use of the 64-71 GHz frequency band ahead of WRC-19 and before 5G technology standards are finalized.

Huawei Canada agrees with the development of a flexible use licensing model for fixed and mobile services in the 28 GHz and 37-40 GHz bands and with the designation for license-exempt use of the 64-71 GHz band as expeditiously as possible and to be in alignment with other early global adopters. The availability of the 28 GHz and 37-40 GHz bands for flexible mobile and fixed use and the availability of the 64-71 GHz band for licence-exempt use will help to further promote innovation in Canada as well as the development and early availability of 5G services to Canadians by providing certainty around the frequency bands to be available for these uses over the long-term. The flexible use licensing is especially important also to provide regulatory flexibility to accommodate a variety of service use cases and therefore support innovative technologies and business cases for the licensees as they emerge.

[5] Huawei notes, for example, the considerations underway in Japan and South Korea to introduce terrestrial mobile service in the 27.5-29.5 GHz band and in Europe in the 24.25-27.5 GHz band.

The various standards (for both licensed and unlicensed bands) are near finalisation. The early Canadian national assignment of the spectrum will further encourage the standards and equipment development programs to rapid completion and enable early technical trials. In the standards process, it is usually not until an operator is assigned a band that the standards details are tailored for the band and its channels. Thus, regulatory action must precede (and be in concert with) the final standardisation completion for the market to be enabled efficiently. Standards can only be written and finalised for bands that are available, so it is important that Canada is making clear its plan for usage of these bands. As these bands are a part of an international consensus of industry, their early availability as proposed in the Consultation will enable Canadians to be at the forefront of the newly available systems technology.

The Canadian assignment of these bands for mobile services is not dependent on the deliberations of WRC-19, as these bands are already globally recognised by the ITU for mobile co-primary services. Awaiting further deliberations at WRC-19 is not necessary. Indeed, their early adoption by Canada (in concert with others) will help to extend and condense global services into these bands, thus enabling a global market and user roaming. Global harmonisation of bands and channels enables common equipment designs for global sales and enables the product price-points that consumers have come to expect (for their mobile communications services). Huawei Canada agrees with, and compliments, the ISED for its past and continuing work with the international community to harmonise the use of spectrum and regulations both globally and locally in Canada.

Question 6-1: ISED is seeking comments on the changes proposed above to introduce flexible use licensing in the 28 GHz band, including consequential changes to the CTFA domestic 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.

Huawei Canada concurs with the proposed modifications to the Canadian footnotes to designate usage of the portion of the band (MOD C47A) 27.35-27.5 GHz giving priority to fixed, and for fixed and mobile in (MOD C47C) 27.5-28.35 GHz. Such usage is consistent with the current Canadian deployment practices. These footnotes will signal the expansion and the continuing usage in these bands for mobile and fixed satellite services.

While Huawei Canada concurs generally with the proposed restrictions on FSS/ESIMs, we have concerns about the potential interference from ESIMs into terrestrial operations (including FS, mobile and FSS earth stations). Huawei Canada agrees that land-based ESIMs should be prohibited from communicating with FSS space stations at this time. The mobile nature of the ESIMs is such that transiting aircraft or vessels while in Canadian territory may cause transient interference with numerous FS, FSS and mobile terrestrial receivers. Such interference – being transient – will be difficult to track to its source and thus disturbing to the services and end users

of the terrestrial FS and MS and FSS stations. This danger is particularly severe for the end user devices operating with the flexible use stations as these typically have wideband receiver front-ends and little antenna directional discrimination. Huawei Canada recommends that ESIM operation should thus be prohibited for all vehicles (including land and marine vessels and aircraft) whose routing may intersect the service areas of the land based FS, FFS stations and flexible use service areas.

Huawei Canada notes also, for example, the considerations underway in Japan and South Korea to introduce terrestrial mobile service in the 27.5-29.5 GHz band and in Europe in the 24.25-27.5 GHz band. These considerations indicate the potential global scope of this mmWave band usage and opportunities for service expansion in Canada. Future ISED consultations may consider this band usage for licensing in Canada.

Question 6-2: ISED is seeking comments on the moratorium for new site specific fixed service licences as described above.

Huawei Canada agrees with the proposed moratorium for new site specific fixed service licences. However, it is also important that Developmental Licences can still be obtained and coordinated for new system development and testing.

Question 6-3: ISED is seeking comments on its proposal to adopt the band plan (as shown in figure 3 above) in the 28 GHz band.

Huawei Canada agrees with these proposals to be in alignment with domestic, US and other international band plans and regulations. We note that the proposed band plan is harmonized with the US. Each frequency block represents the minimum amount of spectrum that would be assigned to a licensee. Operators would determine their own channel plans, typically in harmony with global radio communications standards. Such channel coordination is, of course, a necessity to enable roaming between regions and the economical manufacture/availability of user terminals. Coordination along Canada's southern border is also enabled by the band plan and this is most important for continuity of service for cross border traffic and harmonisation of assignments.

Question 6-4:

A. ISED seeks comments on its proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the 28 GHz band when a pre-determined trigger threshold is exceeded.

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

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

A: Huawei Canada agrees with the proposal to require coordination between proposed flexible use terrestrial stations and FSS earth stations in the 28 GHz band. Such coordination may be triggered when pre-determined conditions are encountered. Such a triggered coordination will limit the necessity for detailed analysis to those stations that are most likely to be affected. In this band (27.5-28.35 GHz), the flexible use terrestrial stations could be subject to interference from the emissions of the FSS earth stations. The severity of interference will be dependent on the transmitter power, antenna directionality and the separation distance among the stations.

B: Typically, detailed coordination is triggered when the undesired signal level [e.g. PFD] at the receiver exceeds a threshold. The undesired transmitter's signal strength and the separation distance have the most significant effect on the undesired signal levels in the receiver. However, in practice the interference perceived is the combination of many additional physical factors. The antenna directional gains, elevation and terrain/buildings also influence the propagation and undesired received signal strength. As many FSS stations utilise high gain antennas pointed at the geostationary arc, there may be more sensitivity to interference in some directions than others[6]. It is thus a technical challenge to define a simple (e.g. circular) coordination distance that suitably covers all site installations.

C: Practically, perhaps it is possible to define a distance function[7] beyond which coordination is not triggered. The distance may be a function of latitude and the azimuth angle and elevation of the FSS boresight and its beam size. Reflection by local structures and geography may also have an effect. Within the triggered range more detailed examination of antennas and terrain is warranted. In some cases shielding to protect antenna side-lobes may be an appropriate remedy to enable coordination. The parameters should be as locally accurate as possible, reflecting deployed practice, recent technology and without being an undue burden. Because of the effects of local conditions it seems generally not appropriate to apply a single simple circular distance trigger for all sites. Also, given the footnote (C47C) that limits FSS implementation to "applications that will pose minimal constraints upon deployment of fixed service and mobile service systems, such as a small number of large antennas for feeder links", coordination is expected to be limited to a manageable number of known cases.

In the context of coordination, Huawei Canada cautions that, while the ISED proposals discussed are in the context of fixed FSS stations and fixed flexible use stations, the mobile devices operating with the flexible use stations may also have additional considerations. The user's chosen operator may not have a common channel assignment nationally (or globally), and the users' devices must accommodate these variations. Typically the mobile devices contain radios that span the whole band

[6] Stations located at higher latitudes may have a lower elevation pointing angle than those in the south and so may have more interaction with terrestrial users.

[7] E.g. by combining transmitter and antenna parameters with local geography.

so they are operable with the local channel plan for any network. While the mobile devices may have some antenna directivity, this may provide only small discrimination in practice. Thus, under some conditions, usage of any part of the 28 GHz band by the (uplink) FSS station may block the flexible use mobile receiver (due to its front end being open across the whole band). Coordination with the flexible use services must thus include both the user device parameters as well as those of the fixed stations.

Question 6-5:
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 28 GHz band.
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.

A: Canada is a complex nation. There is enormous geography and a wide variety of economic diversity and density. While the FS, FSS and MS stations may be in separate areas, sometimes they overlap for reasons of economic concentration. It is thus difficult to establish general criteria for restricted geographic areas for services. While Huawei Canada is not averse to some geographic area guidelines as an aid to coordination, a general restriction may be better developed as experience with deployments and markets develop. In many cases, given the small number of FSS stations, it is to be expected that the flexible use and the FSS licensees may often come to mutually beneficial arrangements.

B: As Huawei Canada has noted elsewhere[8], the coordination of FSS ESIMs is technically very difficult and we recommend that these not be generally permitted and restricted to geographic areas where there are no FS or flexible use systems.

Question 6-6: ISED is seeking comments on whether it should impose any limits on the aggregate emissions of the terrestrial services. If limits are proposed, ISED is inviting detailed proposals on why they should be implemented, and what the limits should be.

The aggregate emissions of the terrestrial services (fixed and mobile) are hard to limit. Generally, Huawei Canada agrees with the FCC's analysis and that aggregate limits are not needed.

Huawei Canada notes that in practice the aggregate emissions from mobile systems are limited by several other existing regulations. For example, the mobile device radiated power is limited to ensure human safety to RF exposure. Practically, mobile devices also have limited battery power availability and this also constrains the RF transmissions. Thus, given the practical density of users and the necessity for frequency re-use, there is, in effect, a limitation on the aggregate emissions in an area. This practical consequence has provided sufficient constraint for general coordination without the need for imposing additional limits on the aggregate emissions of terrestrial mobile services. Huawei Canada is thus of the view that additional limits on aggregate limits of terrestrial services are not needed.

[8] See question 6-1

Question 6-7: ISED proposes that all existing FSS earth stations and those in applications pending approval for operation would be permitted to continue to operate under the current conditions of licence as described above. Comments are sought on this proposal.

Huawei Canada agrees that generally existing FSS earth stations and those for which construction applications are already submitted as of the publication of the Consultation could continue to operate within the coordination parameters and conditions of their actual installation. However, this should generally not exclude detailed coordination changes for individual stations if needed in the future. Licensees should generally render assistance[9] to other stations to facilitate coordination.

Question 7-1: ISED is seeking comments on the proposal to implement flexible use licensing in the frequency band 37-40 GHz, including the consequential changes to CTFA footnote C51, while continuing to allow for fixed-satellite service (space-to-Earth) in the band.

Huawei Canada agrees with proposal for flexible use licensing in the 37-40 GHz band and the amendments to footnote C51. This will align with the similar service adoption in the USA and its similar deployments. In making available the band 37-40 GHz for flexible use for terrestrial services, Huawei Canada notes that practical policy should uphold the principle of not unduly constraining the deployment of terrestrial services throughout this band where other services are also implemented.

Question 7-3: ISED is seeking comments on the proposal to adopt the bandplan as shown in figure 7 for the frequency band 37-40 GHz.

Huawei Canada notes that the proposed Canadian band plan is aligned with the plan being adopted in the USA. Huawei Canada supports this band plan. As noted earlier in the discussion of other bands, Huawei Canada views it is important for there to be common band plans between Canada and the USA. Such commonality eases coordination in the border regions and enables Canadian consumers[10] and equipment manufacturers to also participate in the US market.

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[9] E.g. by making available station parameters such as location, PFD, antenna gain/directionality and assisting with shielding or other coordination measures if appropriate.

[10] E.g. a common band plan enables roaming by Canadian users with their mobile devices on both sides of the southern border.

Question 7-4:

A. ISED seeks comments on the proposal to require site-by-site coordination between proposed flexible use terrestrial stations and FSS earth stations in the frequency band 37.5-40 GHz when a pre-determined trigger threshold is exceeded.

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

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

A Huawei Canada views it to be premature at this time to require a site-by-site coordination process between flexible use terrestrial stations and FSS earth stations in the 37.5-40 GHz bands, considering that currently there are no FSS ground stations to coordinate with. As discussed in response to the earlier question on coordination for the 28 GHz band, when such coordination becomes necessary, the use of a relevant trigger to initiate coordination is appropriate to ensure an optimal use of all services in this frequency band.

B As discussed previously in response to question 6-4, Huawei Canada agrees that the use of a suitable trigger may initiate site-by-site coordination for this band. This trigger permits identifying the flexible use terrestrial stations for which detailed coordination would be required, without extensive detailed calculations for every station.

C Practically, perhaps it is possible to define a distance function[11] beyond which detailed coordination is not required. The distance for example may be a function of latitude and the azimuth angle and elevation of the antenna boresight and its beam size. Within the distance more detailed examination of antennas and terrain is warranted. Reflection by local structures and elevation geography may also have effect. Also, as the footnote (C51) limits FSS implementation to "applications that will pose minimal constraints upon deployment of fixed service systems, such as a small number of large antennas for feeder links", coordination is expected to be limited to a manageable number of known cases. In some cases site shielding may be appropriate to reduce the signal strength of flexible use stations into the FSS station.

As noted earlier, Huawei Canada also cautions that the parameters for the flexible use user devices form an integral part of the coordination process as these devices must operate with a receiver front end that spans the whole band.

Question 7-5:

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 frequency band 37.5-40 GHz.

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?

[11] E.g. that is beyond the local horizon

As Huawei Canada has noted elsewhere[12], the new FSS stations should be coordinated carefully to maximum advantage of both parties and with consideration of growth in both systems and changes in available technology. For example, improved antenna gain isolation or increased EIRP may permit locations closer than was possible before.

As Huawei Canada has noted elsewhere[13], the coordination of FSS ESIMs is technically very difficult and we recommend that in this band they be generally not permitted and restricted to geographic areas well separated from FS or flexible use systems.

Question 7-6: It is proposed that, should SRS and/or MSS systems be deployed, flexible use licensees in the band 37.6-40 GHz may be subject to technical provisions to facilitate co-existence. Comments are sought. ISED notes that any such technical provisions would be established through a future consultation process.

Huawei Canada recognises that licenses could be subject to technical change at the discretion of ISED and that such changes might occur in the event of a future consultation and deployment of SRS or MSS in the 37-40 GHz band.

Question 8-1: ISED is seeking comments on its proposal to designate the band 64-71 GHz for licence-exempt operations on a no-protection, no-interference basis.

Huawei Canada agrees with the ISED proposal to designate the 64-71 GHz band for license-exempt operations on a no-protection, no interference basis. This designation will bring the Canadian usage into line with neighbouring jurisdictions and enable deployment of equipment based on the recently developed standards from the IEEE 802.11. The availability of such low-cost broadband services will be of considerable benefit to Canadians and Canadian industry.

The limited propagation characteristics of this band[14] are ideal for such local area services. The global harmonisation of this band is also of significance to enable Canadian individuals and industry to take advantage of the global ecosystem of equipment for this band. Huawei Canada notes in particular the unlicensed designation for this band in the US. Such harmonious designation also in Canada will assure interoperability and usage patterns along Canada's southern border.

Huawei Canada views the opening of this band, in Canada and on an international scale, to be very significant. In many locals, the majority of user traffic originates or terminates on WiFi (802.11/unlicensed) links. This proportion is expected

[12] See response to question 6-5
[13] See response to question 6-1
[14] E.g. due to absorption by oxygen molecules in the atmosphere.

to continue or increase and thus the availability of new spectrum for license-exempt operation is of significant importance to accommodating the expanding future communications and the workings of commerce in Canada.

Question 9-1: ISED is seeking comments on:
A. Whether flexible use access in these bands should be exclusively licensed or licence-exempt.
B. If a licensing approach is proposed, which types of licences (radio licences, spectrum licences with user-defined licence areas, spectrum licences with service areas for competitive licensing, or others) are expected to best lend themselves to licensing flexible use in the 28 GHz and 37-40 GHz frequency bands in order to support a variety of 5G technologies, applications and business cases?
C. Whether a licence-exempt dynamic access using data base should be implemented in all, or portions of the 28 GHz, 37-40 GHz, particularly in the band 37-37.6 GHz.

A. In general, Huawei Canada recognises that licensed spectrum is an environment that permits the licensees to deliver the best quality of service they can offer to their clients. In addition, licensed spectrum facilitates coordination among users and incumbents with differing services. The proposed flexible use licences in the 28 and 37-40 GHz bands will enable licensees to deliver a variety of services including fixed, mobile or a dynamic configuration for their clients.

B. In general for mobile services, Huawei Canada recognises that spectrum licences with defined geographic service areas are more practical than licensing each individual transmitter site.

C. In the 28 GHz and 37 – 40 GHz bands, Huawei Canada views that license exempt dynamic access using a data base is generally not appropriate. Coordination among incumbents may be efficiently accomplished within the flexible licensing-coordination process. This planned arrangement also ensures that services can be reliably delivered to users. However, Huawei Canada recognises that the administration of licensing and coordination operations[15] may be assisted through the use of a database among the group of spectrum licensees.

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[15] For example, ISED utilises a database for its administration and coordination services.