Technologies Canada Co. Ltd.

January 19, 2021

Innovation, Science and Economic Development Canada,
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Re: Comments from Huawei Technologies Canada Co., Ltd.
Canada Gazette Part 1
Consultation on the Technical and Policy Framework for Licence Exempt Use in the 6 GHz band SMSE-014-20 – November, 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 Licence Exempt Use in the 6 GHz band SMSE-014-20 – November, 2020.

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 license-exempt 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. ISED is commended for driving 3.5 GHz auctions this year, work on 3.8 GHz, and now 6 GHz.

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.

With respect to the 6 GHz band Huawei Canada supports:

1. license-exempt in 5925 – 6425 MHz,
2. licensed mobile designation in 5925 – 7125 MHz,
3. technology neutrality in the 6 GHz band (Wi-Fi, NR-U etc. in 5925 – 6425 MHz, IMT technologies in 6425 – 7125 MHz),
4. protection of incumbent users and a measured transition period as required,
5. a balanced (license-exempt / licensed) approach for the band 5925 – 7125 MHz considering:
    a. global developments for license-exemption in the 5925 – 7125 MHz band, and in particular, 5925 – 6425 MHz,
    b. WRC-23 Agenda Item 1.2: IMT in the 6425 – 7025 MHz band in ITU Region 1,
    c. 7025 – 7125 MHz mobile band globally, noting that the primary allocation for the entire band 5925 – 7125 MHz is mobile,
    d. benefits associated with the propagation characteristics of 6 GHz (i.e. balanced coverage and capacity with 3.5 / 3.8 GHz making it an ideal band for IMT,
    e. in addition to the 3.3 – 4.2 GHz band, 6 GHz is one of the few remaining opportunities for critical mid-band spectrum to support ever-growing capacity requirements – enabling large, contiguous channels best suited for 5G technologies and beyond.

That said it is recommended that ISED delay the decision for the upper portion 6425 – 7125 MHz until post – WRC-23 when the global spectrum allocation and ecosystem is well defined. More specifically, Canada could align with U.S. to enable unlicensed exempt in the lower 6 GHz 5925 – 6425 MHz while deferring decisions for the upper 6 GHz 6425 – 7125 MHz until after WRC-23.

It is also recommended that ISED carefully monitor and assess the implementation of AFC in the U.S. and other international markets with respect to the protection of incumbent services. This information will help to define AFC requirements, standards, and certification process for the Canadian market.

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.

Submission of Huawei Technologies Canada Co., Ltd.
in response to SMSE-014-20
Consultation on the Technical and Policy Framework for Licence-Exempt Use in the 6 GHz Band

Q1
ISED is seeking comments on the timelines for the availability of:
a. low-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U,
b. standard-power equipment ecosystems, both Wi-Fi 6E and 5G NR-U, under the control of an AFC,
c. AFC.

In IEEE 802, IEEE 802.11ax is an amendment that allows devices to operate at 2.4, 5 and 6 GHz. WiFi Alliance has introduced a terminology called Wi-Fi 6E for the IEEE 802.11ax – related interoperability certification program at 6 GHz. IEEE 802.11ax is in the final stages of completion with an expected publication date of Feb. 2021. In addition to the IEEE standard, Europe's ETSI BRAN EN 303 687 has reached a "stable draft", providing further support for standards-based deployments.

3GPP-based unlicensed technologies are also in standards development. 5G NR-U equipment ecosystems for low-power and standard power will be leveraged by 3GPP band n96 covering the 5925 – 7125 MHz spectrum range for the US market. 3GPP has agreed to discuss in early 2021 the need for a new 3GPP band for NR-U operation in the 5925 – 6425 GHz band, according to European regulations for unlicensed operation in this band. Another alternative for the 5925 – 6425 GHz band is updating the existing 3GPP band n96 with appropriate network signaling. This work should be completed in 3GPP Rel-17 time frame. 5G NR-U equipment is expected to be available by second half of 2021 or 2022.

3GPP has approved the creation of a Work Item placeholder for 5G NR licensed operation in the 6 GHz band. This Work Item is planning to address the upper part of the 6 GHz band (6425 – 7125 MHz) for Europe and Russia, and the whole 6 GHz band (5925 – 7125 MHz) for China.

Q2
ISED is seeking comments on its proposals to allow licence-exempt RLAN use in the 5925 – 7125 MHz band.

Regulators in the U.S. (FCC) and S. Korea (MSIT) have made decisions to allow unlicensed devices in the 5925-7125 MHz band. Similarly, the Electronic Communications Commission (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT) issued ECC Decision (20)01 in November 2020 allowing unlicensed devices into the 5925 – 6425 MHz portion of the band. However, each country has adopted somewhat different technical and deployment constraints based on device class, which is summarized below.

The FCC is the first regulatory authority to proceed to adopt test procedures for the Low Power Indoor device class and the first to see equipment authorized for market. Europe or S. Korea are likely to be first to authorize the Very Low Power devices into the market.

Introduction of licence-exempt RLAN use in the 5925-7125 MHz band must protect incumbent operations from unacceptable interference.

Although the consultation is considering the use of 6 GHz for unlicensed services, ISED may wish to consider the following:

- 6 GHz could be an important component of mid-band spectrum for IMT due to its unique balance of capacity and coverage (please refer to the Appendix – simulation analysis showing similar coverage characteristics between 3.5, 3.8 & 6 GHz deployment models).
- Some administrations are considering 6 GHz for licensed IMT services, mainly above 6425 MHz. In addition, the Chinese Regulator supported potential IMT identification for the whole 6 GHz band (5925 – 7125 MHz) at WRC-19 and in recent ITU-R meetings.
- The agenda item 1.2 for WRC-23 includes studying the possibility of allocating IMT-based licensed spectrum in 6426 – 7025 MHz in ITU-R Region 1, and globally within 7025 – 7125 MHz; as well as the investigation of co-existence of IMT with incumbent operations.
- Europe plans to continue to review use of the upper 6 GHz band to determine what the optimal use may be.
- Allowing unlicensed operation throughout the 6 GHz band could make it difficult to reverse part of the band for licensed operation later, as devices proliferate.

Therefore, it is recommended that ISED adopt a balanced approach between licence exempt and licenced operation in making 5925 – 7125 MHz band decisions, considering the diverse interest in the band across global ecosystems.

Huawei supports allowing licence-exempt operations in the lower part of the 6 GHz band (5925 – 6425 MHz), but deferring decisions on the upper portion 6425 – 7125 MHz until post WRC-23.

Q3
ISED is seeking comments on the proposed footnote Cxx and the changes to the CTFA as shown in table 2.

Huawei supports RABC's position on this.

> **CXX** The frequency band 5925 – 7125 MHz is designated for use by licence-exempt wireless local area networks and devices in accordance with the established spectrum policy and technical framework and based upon not interfering with, nor claiming protection from, licensed services.

In terms of footnotes, it is suggested to add the following to the Table: **DXX**: In Canada, the band 5925 – 7125 MHz is also allocated to mobile service on a primary basis.

Q4
ISED is seeking comments on the proposed rules for standard-power RLANs:
a. indoor and outdoor operation would be permitted,
b. RLAN access points would only be permitted to operate under the control of an AFC

system in the 5925-6875 MHz frequency range,
c. maximum permitted e.i.r.p. would be 36 dBm,
d. maximum permitted power spectral density would be limited to 23 dBm/MHz,
e. use of a vertical elevation mask, with a maximum e.i.r.p. of 125 mW at elevation angles above 30 degrees over the horizon, would be required.

Standard power operations are desired from an RLAN industry perspective, because such power levels will best ensure that a consumer has a consistent experience relative to 5 GHz RLAN networks.

License-exempt devices create interference challenges – particularly if deployed outdoors. For that reason, ISED should require that Standard Power devices be subject to certain mechanisms to control interference. For example, an AFC system enables operation vis-à-vis fixed services. This requires the Standard Power devices to know where they are, which could be accomplished with a GPS-type technology or, if indoors, or by an external source.

Once the device knows where it is, it can consult the AFC with its coordinates – as well as other pertinent technical details about its operation – and the AFC will determine a list of permissible frequencies, using an accurate and secure regulatory database to avoid fixed link operations. In this way, the AFC creates a frequency-based "exclusion zone" around the link, preventing the RLAN and its clients from causing unacceptable interference.

Canada could benefit by aligning the rules for standard-power RLAN access point maximum permitted e.i.r.p. and maximum permitted power spectral density with U.S. rules. It is noted that FCC has received petitions for reconsideration of the maximum permitted e.i.r.p. for standard-power RLAN access points under the control of the AFC, i.e. increase from 36 dBm to 42 dBm, while keeping the maximum permitted power spectral density unchanged at 23 dBm/MHz.

The goal is to enable reasonable coverage when using wider channels in outdoor deployments while protecting incumbent services from harmful interference. It is, therefore, advisable that ISED closely monitors the FCC's decision concerning the maximum permitted e.i.r.p. for standard-power RLAN access points.

Q5
ISED is seeking comments on allowing access to the additional 100 MHz of spectrum in the 6425-6525 MHz sub-band for standard-power operation.

As mentioned in Q2, Huawei believes it would be advantageous to defer decisions on the upper portion (6425 – 7125 MHz) of the 6 GHz band until after WRC-23.

Q6
ISED is seeking comments on the equipment availability of standard-power RLANs in the 6425-6525 MHz band and the impact on the development of AFC systems for Canada due to a potential lack of international harmonization for that sub-band.

No technical delay is foreseen in making Standard Power RLAN available in the 6425 – 6525 MHz band in addition to 5925 – 6425 MHz.

However, as mentioned in Q2, Huawei believes it would be advantageous to defer decisions on the upper portion (6425 – 7125 MHz) of the 6 GHz band until after WRC-23.

Q7
ISED is seeking comments on the proposed rules for low-power indoor-only RLANs:
a. operation would be permitted indoor only across the 5925-7125 MHz band
b. the use of a contention-based protocol (e.g. listen-before-talk) would be required
c. maximum permitted e.i.r.p. would be 30 dBm
d. maximum permitted power spectral density would be limited to 5 dBm/MHz

The Department's proposal for Low Power Indoor operation aligns with the US rules for low-power indoor access point devices. For client devices connected to such access points, the FCC imposed e.i.r.p. and e.i.r.p. density limits of 24 dBm and -1 dBm/MHz respectively. It is recommended that the Department adopts both the access point and client power limits adopted by the FCC so as to harmonize products, while protecting primary services in the band.

Q8
ISED is seeking comments on the proposed rules to allow very low-power RLAN devices:
a. operation would be permitted indoors and outdoors across the frequency range 5925-7125 MHz band
b. the use of a contention-based protocol (e.g. listen-before-talk) would be required
c. maximum permitted e.i.r.p. would be 14 dBm
d. maximum permitted power spectral density would be limited to -8 dBm/MHz

For very low power systems, the proposed text currently aligns with US proposals with respect to the Further Notice of Proposed Rulemaking. These rules are also consistent with final regulations announced in S. Korea, as well ECC Decision (20)01. ISED could refer to ECC Report 316 to review the justification for the very low power device class.

European and S. Korea have announced rules for Very Low Power devices that cap e.i.r.p. at 14 dBm. This is tied to the technical studies produced in ECC Report 316.

It is recommended that ISED carefully monitor and assess the implementation of AFC in the U.S. and other international markets with respect to the protection of incumbent services. This information will help to define AFC requirements, standards, and certification process for the Canadian market.

Q9
ISED is seeking comments on potential business models for AFC administrators to operate their AFC systems in Canada.

Huawei has no comment on potential AFC business models.

Q10

ISED is seeking comments on its proposal to permit the approval of multiple, third party AFC systems, taking into account the potential for the development of a sustainable market for AFC systems in Canada.

Huawei has no comment on AFC industry structure.

Q12
ISED is seeking comments on adopting an AFC system model that is harmonized to the maximum extent possible with the AFC system model being implemented in the U.S. and other international markets.

Huawei has no comment / familiarity with AFC systems being implemented in the U.S.

Q13
ISED is seeking comments on the implementation considerations for the operation of an AFC system, specifically:
a. information required from licensed users,
b. interference protection criteria for computation of exclusion zones,
c. information required from standard-power Aps,
d. frequency of AFC update of licensee information,
e. security and privacy requirements

Huawei has no comment / familiarity with AFC systems being implemented in the U.S. or Canada.

Q14
ISED is seeking comments on any additional considerations, limits or general concerns that should be taken into account in setting detailed standards and procedures for AFC operation.

Huawei has no comment / familiarity with AFC systems being implemented in the U.S. or Canada.

Q15
ISED is seeking comments on its proposal to require AFC systems to protect the following types of licensed stations from standard-power APs:
fixed microwave stations,
fixed point-to-point television auxiliary stations,
radio astronomy stations,

Huawei has no comment / familiarity with AFC systems being implemented in the U.S. or Canada.

Q17
ISED is seeking comments on the proposed approach to incremental implementation of an AFC system in Canada.

Huawei has no comment / familiarity with AFC systems being implemented in Canada.

Q18
ISED is seeking comments on the objective to maximize the potential for synergies, where possible, in defining the technical and administrative requirements for the respective databases addressing different bands under different technical regimes.

Huawei has no comment / familiarity with AFC systems being implemented in the U.S. or Canada.

Appendix

Huawei simulations at 6 GHz versus 3.5 GHz frequency ranges indicate there is a small gap in coverage between the two frequency ranges.

This gap can be compensated with new base station architectures, RF algorithms, and UE capability enhancements.