

**Comments from Global mobile Suppliers Association (GSA)¹ to ISED Consultation
on Releasing Millimetre Wave Spectrum to Support 5G**

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General Comments:

The Global mobile Suppliers Association (GSA) represents the leading suppliers in the mobile industry and is progressively supporting mobile broadband development based on a harmonized and standards-based approaches. GSA promotes the 3GPP technology roadmap (3G; 4G; 5G including NB-IoT, VoLTE, LTE-V, LTE-U, LTE Broadcast), mobile device availability and features, etc. and represents companies across the worldwide mobile ecosystem engaged in the supply of infrastructure, semiconductors, test equipment, devices, applications and mobile support services. The GSA Executive Board members are Ericsson, Huawei, Intel, Nokia, Qualcomm Incorporated and Samsung, covering close to 100% of all mobile network infrastructure deployments.

Global standards are under development for frequency bands that are the subject of this consultation. Base stations and user devices are available to support trial networks already ongoing in these frequency bands, and commercial products will soon be on the market for planned networks. Details are provided in the answers to the questions below.

Base stations and user devices developed by GSA member companies can be supported by radios which cover an entire frequency range. The radio tuning range, combined with an unpaired band plan in the frequency range, provides incredible flexibility for economies of scale and global roaming of user devices with reduced complexity. Even if countries decide to assign licenses for different bands within a radio tuning range, the same user devices could be utilized in all countries. It should be noted that although the radio has the capability to cover the entire range, the user devices would not operate outside the bands permitted in each respective country.

GSA welcomes this consultation and strongly supports the proposals to develop a flexible use licensing model for mobile services in the 28 GHz and 37-40 GHz frequency bands. GSA concurs with ISED that this “presents a key opportunity to support competition and the provision of high quality and innovative wireless services to Canadians”.

¹ GSA: Global mobile Suppliers Association. Website <http://www.gsacom.com>

Specific comments:

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 license-exempt use of the 64-71 GHz frequency band ahead of WRC-19 and before 5G technology standards are finalized.

GSA Response

GSA strongly supports ISED's proposal to make the 28 GHz and 37-40 GHz frequency bands available for mobile services. These frequencies are some of the most promising bands for high band 5G services due to the ability to support wide channel bandwidths, which will be needed to provide the significant performance gains that are expected relative to 4G services.

GSA also agrees with ISED's proposal to develop a flexible use licensing model for fixed and mobile services in these bands. This proposal would provide new, flexible rights to operate in their site or area of license and provide the fastest transition to provide the benefits to Canadians from expanded use of the bands.

GSA believes that ISED should permit flexible use of these bands as soon as possible in order for Canada to take a leading role in developing the 5G ecosystem. Several countries such as USA, Korea, and Japan already announced their 5G spectrum strategies and roadmaps. As ISED is already aware, the US FCC decided to provide 28 GHz and 37-40 GHz as licensed bands for 5G market development by adopting their policy and technical regulations on July 14th, 2016². It is expected that the first pre-standard 5G commercial trials will be provided by operators in the US beginning in 2018, using 28 GHz band. On January 21st 2017, Korea MSIP announced the K-ICT Spectrum Plan³ in order to use the 28 GHz (26.5-29.5 GHz) band for 5G commercial service. In particular, the Republic of Korea is planning to use the 28 GHz band not only for 5G trial services during the 2018 Winter Olympic Games but also 5G commercial services around 2020. Japan MIC published the final report on the 2020 Japan Radio Policy⁴ on July 15th, 2016 with regard to their 5G candidate spectrum bands including 28 GHz band, in order to realize 5G in 2020.

² Federal Communications Commission, "Report and Order and Further Notice of Proposed Rulemaking" (Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al – Jul. 14, 2016), FCC-16-89, available at https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A1.pdf.

³ <http://www.businesskorea.co.kr/english/news/ict/16837-strategic-securement-south-korean-government-secure-40-ghz-frequency-width-10-years>

⁴ https://www.gsma.com/spectrum/wp-content/uploads/2016/08/MIC_Spectrum-for-5G-MIC-Kuniko-OGAWA.pdf

In terms of standards development, this work is already well underway. It should be noted that 3GPP has recently approved a common band plan that includes the entire frequency range from 24.25 to 29.5 GHz⁵. There are expectations that the radio tuning ranges of future equipment will be able to operate in both the 26 GHz (at least part of it if not all) and the 28 GHz bands (up to 29.5 GHz). Work in 3GPP on development of technical specifications of “5G” systems in 24.25 to 29.5 GHz and 37-40 GHz is ongoing, with standards expected by the 2nd half of 2018.

Based upon the decisions by regulators in other leading 5G markets to move forward with these bands, the status of work within 3GPP, the expected rapid deployments of 5G in leading markets, and potential to harmonize the regulations of these frequency bands with the United States, GSA strongly supports ISED moving forward expeditiously to allow flexible use of 28 GHz and 37-40 GHz frequency bands in advance of WRC-19. This will allow ISED to quickly facilitate the benefits of 5G to Canadian consumers and businesses and allow Canada to be on the leading edge of innovation.

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.

GSA Response

GSA supports the changes to the CTFA including the prioritization of fixed and mobile services over Fixed Satellite Services. The soft partitioning of the band will allow Fixed-satellite service implementations which will pose minimal constraints upon the deployment of fixed service systems and mobile service systems, such as a small number of large antennas for feeder links

GSA also supports ISED’s proposal to permit airborne and sea ESIMs only on a case-by-case basis on conditions of no interference, no-protection. We note that land-based ESIM is particularly problematic due to the high-likelihood of terminals of both services operating in close proximity. It should also be noted that co-channel operation is problematic, even for some sea and airborne ESIM operations. GSA provided the FCC with analysis of interference from land, sea, and air ESIMs into Mobile stations. This can be found at:

<https://ecfsapi.fcc.gov/file/10830940623166/Compatibility%20between%20ESIM%20and%20MS%202017-08-30.pdf>.⁶

⁵ 3GPP TSG-RAN WG4, “Proposed NR frequency range and band combination”, Meeting #83 (May 2017), available at http://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_83/Docs/R4-1706325.zip.

⁶ GSA reply comment submission into FCC IB Docket No, 17-95 on August 30, 2017.

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

GSA Response

GSA supports the moratorium suggested by ISED on the 28 GHz band and agrees with the conclusion of ISED that no negative impacts are foreseen in the short to medium term, due to the lack of licenses issued under the current framework.

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

GSA Response

GSA concurs with the ISED proposal to adopt the same band plan as the U.S., which will facilitate equipment harmonization and simplify coordination between terrestrial services along the Canada-U.S. border.

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.

GSA Response

GSA believes a site by site coordination process is reasonable given the limitations proposed on FSS earth station use in the band. The PFD limit of 77.6 dBm/MHz measured at a height of 10 meters adopted by the FCC seems appropriate. We note that this level is even somewhat conservative given the system characteristics of 5G systems (e.g. antenna gain) compared to cellular. GSA would provide its views on specific technical rules if any are proposed.

Q6-5:

- 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.**

GSA Response

The GSA strongly supports the view that flexible use terrestrial stations should have priority over FSS earth stations in the 28 GHz band as provided in the proposed footnotes C47A and C47C (of the Canadian Table of Frequency Allocations). Gateway stations for the FSS can be located in areas sufficiently remote from high population centers, yet not so far away that connectivity cannot be provided economically; this would create the geographic separation required for co-existence.

GSA believes there is a need to prescribe specific rules to limit the growth of FSS earth stations in core urban areas and near major infrastructure where the deployment of flexible use systems would be most desirable. GSA also believes that the adoption of a PFD limit of -77.6 dBm/MHz at a height of 10m above the ground would be a desirable coordination trigger; thereby giving rise to studies that could determine the appropriate protection levels (such as the separation distance required).

If there are other proposals for FSS earth station deployments in core urban areas or near major infrastructure, GSA would evaluate the proposals to provide its views.

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.

GSA Response

GSA shares the views of the FCC and ISED that harmful interference to FSS space stations due to aggregate interference from terrestrial 5G stations is unlikely. GSA supports the proposal from ISED to not impose any limits on the aggregate power levels produced by flexible use systems. GSA believes this ISED proposal is supported by the extensive FCC record on this matter, which led to the conclusion the FCC reached in its Report and Order, stating that, “specific technical limits on UMFUS stations are not necessary at this time to address aggregate interference.”⁷ There is no need to consider placing any additional restrictions on the flexible use systems at this time.

⁷ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, FCC Report and Order and Further Notice of Proposed Rulemaking, GN Docket No. 14-177, released July 14, 2016, at ¶294.

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 CFTA footnote C51, while continuing to allow for fixed-satellite service (space-to-Earth) in the band.

GSA Response

GSA supports the ISED proposal regarding flexible use licensing in the 37-40 GHz band. GSA also supports the associated changes to the CFTA which would provide priority of fixed and mobile stations over the fixed satellite service in this band.

Q7-3: ISED is seeking comments on the proposal to adopt the band plan as shown in figure 7 for the frequency band 37-40 GHz.

GSA Response

GSA supports ISED's proposal to adopt the band plan as shown in Figure 7, with 200 MHz channels for the frequency band 37.6-40 GHz, and "to be determined" for the 37-37.6 GHz portion. GSA is providing more details on the considerations for the 37-37.6 GHz sub-band in response to Q9-1.

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

GSA Response

GSA is of the view that should ISED adopt a site by site coordination process, an appropriate coordination trigger that reduces the burden on deployment of flexible use stations should be considered. This suggests the adoption of minimal and flexible criteria. We note the lack of fixed satellite service use in these bands. The coordination criteria and procedure should consider the complexity and the difficulty of the introduction of terrestrial mobile communications into these band, with its many unknowns. The uncertainty counsels against complicating the terrestrial deployment process by introducing onerous impediments.

Question 9-1: ISED is seeking comments on:

A. Whether flexible use access in these bands should be exclusively licenced or licence-exempt.

B. If a licencing 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.

GSA Response

Regarding question 9-1a, as noted earlier, GSA supports exclusive licensing in the 28 and 37-40 GHz bands. Regarding question 9-1b, spectrum licenses with geographic service areas have historically been the preferred and successful approach, especially in bands with few incumbents. We see no reason to deviate from that approach in order to support a variety of 5G technologies, applications, and business cases.

Regarding question 9-1c, GSA does not support the use of dynamic, license-exempt access in any of these bands, including the 37-37.6 GHz band. Such techniques are still under development in lower frequency bands, and may not be suitable in mmW bands. They would add unnecessary complexity and would delay the introduction of the primary licensed services as a sharing framework is developed. Further, if ISED adopts the same 64-71 GHz license-exempt approach as the FCC, it would be redundant to consider dynamic sharing in these other mmW bands.

Regarding the 37-37.6 GHz band, as with the other millimeter wave bands, harmonization with the U.S. is desired in order to develop common equipment that can serve both the Canadian and U.S. markets. However, many issues remain unresolved in this band in the U.S., and certain differences between the U.S. and Canada may justify a different approach for Canada. In particular, if the U.S. decides to opt for a dynamic sharing framework, which GSA does not support for the reasons stated above, ISED should consider providing the 37-37.6 GHz band as exclusive licensed instead. Note, however, the larger size of the U.S. market will likely necessitate that any functional differences between the two markets can be implemented at low cost and can still benefit from equipment design commonality.

In the U.S., the 37-37.6 GHz band has certain rules that have already been approved, and other rules that are pending, subject to an ongoing Further Notice of Proposed Rulemaking. In addition, proposed changes to certain already-approved rules are the subject of pending Petitions for Reconsideration. Collectively, these factors temporarily cloud the direction for U.S./Canada harmonization in 37-37.6 GHz.

The existing FCC rules created the 37-37.6 GHz band as a shared band, consisting of two co-equal, non-exclusive partitions of sharing: commercial-to-commercial sharing (C2C); and commercial-to-federal sharing (C2F).

The C2C sharing is under license-by-rule and site-license restrictions. That aspect of the rules is already in place, but as noted, is being disputed via petitions (e.g. petitioners are asking that the band instead be made exclusively licensed). Reconsideration petitions are seldom granted, especially when they address issues the FCC has already considered and rejected. Still, this issue cannot yet be considered closed.

The FCC intends for the C2C sharing to serve as a proving ground for a wide variety of entities, to support innovative uses of the band, and to facilitate lower-cost access to the mmW bands.⁸ If this sharing framework is successful, it may enable new markets that would be beneficial in Canada as well.

However, the sharing framework itself has not yet been decided, nor has the channel size. Another gating factor is that the full 37-40 GHz range in the U.S. is subject to a band-wide operability requirement under the FCC's July 2016 rules. Petitioners' are challenging that requirement, asking that the operability not be applied to the 37-37.6 GHz range, since its implementation remains ambiguous.

The second sharing partition, C2F, would not be applicable in Canada since there are no government users. In the U.S., this spectrum is intended to support future but ill-defined growth for federal users. There are minimal existing federal incumbents in the U.S., and those sites could be handled via exclusion zones regardless of the sharing framework. Thus, while C2F sharing on 37-37.6 GHz is not applicable in Canada, it is feasible that the equipment design elements for supporting federal C2F users in the U.S. could simply be disabled or not used in Canadian deployments—preserving the equipment harmonization goal.

In light of the multiple dimensions of uncertainty in the U.S. rules for this band, as discussed above, and that the final FCC decisions will impact equipment design decisions for the larger U.S. market, the GSA recommends that Canada wait for further clarifications from the FCC before making a decision. The clarifications from the FCC will come via an "Order on Reconsideration" to address the Petitions for Reconsideration, and from a "Second Report and Order" to address the Further Notice of Proposed Rulemaking. These may be issued simultaneously, and are currently expected to be resolved by the end of this year. At that point, it should be clear whether Canada should proceed with the 37-37.6 GHz band as an exclusive licensed band, or as a shared band for commercial-to-commercial sharing.

Respectfully Submitted,

Global mobile Suppliers Association (GSA)

⁸ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, FCC Report and Order and Further Notice of Proposed Rulemaking, GN Docket No. 14-177, released July 14, 2016, at ¶¶ 112, 113.

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