



March 10, 2023

Martin Proulx
Director General, Engineering, Planning and Standards Branch
Innovation, Science and Economic Development Canada
235 Queen Street, 6th Floor
Ottawa, ON, K1A 0H5
(Submitted by email)

Subject: Consultation on SRSP-520, Issue 3 and RSS-192, Issue 5

Dear Martin Proulx,

In December 2022, the Department posted a consultation on proposed changes to SRSP-520, Issue 3, *Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the Band 3450 - 3900 MHz*; and RSS-192, Issue 5, *Flexible Use Broadband Equipment Operating in the Band 3450-3900 MHz* (“the consultation”). In addition to the material posted related to the consultation, the Department provided RABC with the new proposed drafts of the SRSP and RSS.

RABC divided the development of a response to the consultation between two working groups: the standing Advanced Wireless Services (AWS) subcommittee of the Mobile & Personal Communications Committee; and the ad hoc 5G Radio Altimeter Working Group (5GRAWG).

In its August 23, 2021, response to the Consultation on Amendments to SRSP-520, *Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the Band 3450-3650 MHz*, the Board stated:

The RABC intends to initiate a working group to focus on this coexistence issue between 5G 3.5/3.8 GHz and Aeronautical Radio Altimeters. RABC members would like to actively participate in any future studies and have full access to any of the reports/studies in progress as soon as they are available in order to be able to carry out independent analysis on the temporary amendments proposed by ISED. As part of this process, it would be helpful for the Department to provide details regarding the type of supporting data, as well as a summary description of the studies used by the Department in developing the interim measures in SRSP-520. The timing of further study is urgent. There are significant linkages between the technical rules in SRSP-520 (for the 3500 MHz flexible use band) and the yet to be developed technical rules for the 3800 MHz flexible use band. The RABC and industry need to fully understand any potential interference between 5G systems, operating in either the 3500 MHz or the 3800 MHz band, and radio altimeters as well as other services such as FSS.

The RABC believes it is important to have a transparent and predictable process so that standards can be written accordingly to protect the seamless operation of all services. The RABC looks forward to participation in all future studies and consultations on this issue as well as the upcoming consultation processes associated with the transition of the 3800 MHz band.

In September 2021 the Department indicated it would support the RABC's intention to initiate a working group to focus on the co-existence issue between 5G operation in the 3500/3800 MHz band and radio altimeters. The Board subsequently established the 5GRAWG. While RABC's membership does include organizations with interests in aviation, the Department requested RABC invite additional aviation stakeholders so as to have a balanced representation within the working group to obtain technical input from all impacted industries. The Board was pleased to accept the Department's request and included participation from approximately fifteen aviation stakeholders in addition to the Board's own members. The 5GRAWG also had broad participation by officials from Innovation, Science and Economic Development Canada and Transport Canada.

Prior to the publication of the consultation, the 5GRAWG advised Transport Canada and ISED regarding the Departments' 5G Radio Altimeter series of studies (including laboratory testing of several radio altimeter models, qualitative and quantitative over-the-air (OTA) testing with the use of various radio altimeters, and a computational analysis) performed to guide the update of Radio Altimeter protections.

The AWS subcommittee is a long-standing working group of RABC members that reviews technical standards related to mobile and flexible use services. Participation at the AWS subcommittee includes RABC members from a number of sectors including mobile operators, telecom vendors, public safety and fixed satellite services.

RABC identified proposed changes to the standards and a subset of the questions in the consultation that would be of high interest to the aviation sector and assigned the review of them to the 5GRAWG. Proposed changes to the standards that were primarily of interest to the flexible use services (e.g., mobile), and fixed satellite services sectors, were assigned to the AWS subcommittee.

The responses developed by the 5GRAWG and the AWS subcommittee form the basis of the overall RABC response to this consultation. Please note the response developed by the AWS subcommittee makes recommendations regarding the draft standards themselves, rather than responding to the questions posed in the consultation.

The RABC response has been approved by the Board's Executive Committee and it was sent to RABC Sponsor Members for a vote as part of the Board's approval process. The ballot results follow.

Of the Board's 21 Sponsor Members, 8 voted to approve (Canadian Association of Chiefs of Police, Canadian Association of Wireless Internet Service Providers, Canadian Electronics and Communications Association, Canadian Satellite and Space Industry Forum, Department of National Defence, Model Aeronautics Association of Canada, Rogers Communications and TELUS); 5 voted to abstain (Canadian Association of Broadcasters, Canadian Association of Broadcast Consultants, Electricity Canada, Railway Association of Canada and the RCMP); and 2 voted to approve with comment (Bell Canada and NAV CANADA). The Sponsor Members' comments (which form an integral part of the RABC response), are as follow.

Bell Canada

With respect to the Board's response in Question 2 regarding maintaining the antenna down-tilt requirement outside of LPC to protect low altitude military operations, search and rescue operations and medical evacuations and whether MPCs should also be excluded from the antenna down-tilt requirement, Bell does not believe that these restrictions are necessary.

Bell fully supports and endorses the Telecom stakeholder's view that down-tilt restrictions within LPCs and MPCs are not required. With respect to those areas outside of LPCs and MPCs, we support the removal of any down-tilt restrictions nationally on or before the sunset date when all susceptible radio altimeters will be replaced or upgraded. Entities operating outside of LPCs and MPCs concerned with the impact of up-tilted antennas may wish to fast track their radio altimeter upgrades earlier than the sunset date.

NAV CANADA

The following statement in the response to question two must be verified and confirmed by Transport Canada: "Further, telecom stakeholders note that Transport Canada appeared to suggest during the Feb 28 5GRAWG meeting that they viewed the heliport protections as sufficient for its specific use cases of concern, implying that a down-tilt restriction is unnecessary in MPCs."

The Board has now completed its review. We appreciate having had the opportunity to provide comments.

Sincerely,



J. David Farnes
General Manager

Attachments (2)

AWS subcommittee Response to ISED Consultation on SRSP-520, Issue 3 and RSS-192, Issue 5

SRSP-520, Issue 3 (DRAFT)

Section 10.2 (on WBS coexistence)

The text here accurately describes the policy for both the 3500 MHz band (3450-3650 MHz) and 3800 MHz band (3650-3900 MHz). It correctly states that 3500 MHz flexible use licensees must continue to coordinate with WBS systems prior to deployment, and that 3800 MHz flexible use licensees must protect WBS operations until the March 31, 2025 (urban) / March 31, 2027 (rural) displacement deadlines.

However, the draft SRSP fails to address an important operational consideration – what happens if flexible use (fixed or base) stations have been deployed in an area where no WBS is operating, and a WBS licensee decides to deploy afterwards (but prior to the displacement deadline).

The RABC proposes the adoption of similar text to that found in Section 10.4.3 on precedence, modified here to appropriately address the operational considerations of WBS protection. Draft new text follows (to be inserted following paragraph 57):

[57.5] Section 10.2 provides protection to WBS stations whose initial on-air date precedes the establishment of a fixed or base station in the 3650-3900 MHz band. In the case of interference with such stations, it is the responsibility of the flexible use licensee to mitigate the interference (e.g., reduce power, adjust antennas, etc.) to the existing WBS stations. WBS stations deployed after a fixed or base station has been deployed cannot claim protection from the fixed or mobile station in the 3650-3900 MHz band.

Section 10.4.1 (on notification from flexible use systems operating in 3450-3700 MHz to site approved non-transitioned FSS earth stations authorized to operate in 3700-4200 MHz)

In paragraph 69 of this section, the draft SRSP outlines an “either/or” criteria to trigger notification to FSS earth stations when flexible use licensees deploy new fixed or base stations in spectrum adjacent to the 3700-4200 MHz FSS band used by non-transitioned FSS earth stations.

These criteria are triggers for notification, and not protection limits. As such, the RABC recommends that the term “pfd trigger level” be used in paragraph 69b, rather than the current term “pfd limit” as follows:

The RABC further proposes that ISED allow the parties to agree to a notification period of less than one year.

69. After March 31, 2025, licensees planning to establish a fixed or base station in the 3450-3700 MHz band (this does not include fixed or base stations with an authorized bandwidth that extends into the frequency range 3700-3900 MHz for which section 10.4.3

would apply) must notify the FSS operator of site-approved non-transitioned earth station at least a year in advance (unless the parties agree to a shorter notice period), if the fixed or base station:

- a. is within 25 km of a non-transitioned site-approved earth station; or
- b. exceeds a pfd ~~limit~~ trigger level of $-87.72 \text{ dBW/m}^2/\text{MHz}$ at a site-approved non-transitioned earth station antenna, regardless of proximity to such earth station. This pfd ~~limit~~ trigger level applies to all emissions within the fixed or base station's authorized bandwidth.

5G equipment makers recommend the removal of Paragraph 70 and express concerns regarding the ability for equipment to meet the -13 dBm/MHz TRP or total conducted power limit. They note that this limit is more stringent than the in-band unwanted emissions limit (Table 2 in the draft RSS-192, Issue 5) that will be met for equipment designed to operate across the 3450-3900 MHz band.

DND and Telesat support paragraph 70 remaining in place as is to avoid any interference to non-transitioned earth stations coming from 5G spurious emissions in 3450-3700 MHz band.

ISED noted that paragraph 70 is not an equipment certification specification but an operator deployment specification. Flexible use operators noted that they had limited options to meet this requirement and supported its removal.

Section 10.4.3 (on coexistence between flexible use systems operating in 3700-3900 MHz with transitioned FSS earth stations operating in 4000-4200 MHz)

Bell, Rogers and TELUS have expressed concerns with the proposed coordination trigger of 25 km as it would require flexible use operators to provide tens of thousands of notifications and reach associated coordination agreements with FSS operators to deploy flexible use (5G) systems falling within a 25 km radius of transitioned FSS earth stations. Instead, Bell, Rogers and TELUS recommend the use of a pfd limit on unwanted emissions.

Telesat and DND also support the use of a pfd limit on unwanted emissions to minimize unnecessary coordination activity. However, Telesat and DND only support this approach if the pfd limit is sufficient to limit the likelihood of remedial mitigation that would be required in the event of interference from flexible use deployments whose unwanted emissions fall below this pfd limit.

Both flexible use and FSS ES operators agree that the design of a pfd limit on unwanted emissions must account for the aggregate impact of received signals from multiple base stations. However, in order for such an approach to be workable, the pfd limit must be specified in terms of the pfd originating from a single base station. For example, in the US, a pfd limit on unwanted emissions has been set at a value 4 dB lower than the aggregate allowable interference.

While fundamentally aligned on the principle that a pfd-based approach would be preferable, telecom and FSS stakeholders were not able to converge on an agreed value for a pfd limit on unwanted emissions. As such, FSS stakeholders revert to supporting the proposed 25 km

coordination trigger. However, FSS stakeholders have agreed to continue working towards an agreement with flexible use stakeholders while the consultation remains open.

Should ISED determine it will adopt a pfd limit on unwanted emissions, the RABC recommends ISED replace its proposed 25 km coordination trigger distance as follows (track changes used to distinguish proposed text from ISED's draft SRSP-520 Issue 3):

74. In line with the above, licensees planning to establish a fixed or base station in the 3700-3900 MHz band must coordinate with existing site-approved or generic FSS earth station operators in the 4000-4200 MHz band, if the planned fixed or base station:

- *~~is within 25 km of~~ exceeds a pfd limit of [see following two paragraphs] at an existing site-approved or generic FSS earth station antenna, regardless of proximity to such earth station. This pfd limit applies to unwanted emissions falling within the earth station's authorized bandwidth (4000-4200 MHz); or*
- *exceeds a pfd limit of -6.2 dBW/m²/MHz at an existing site-approved or generic FSS earth station antenna, regardless of proximity to such earth station. This pfd limit applies to all emissions within the fixed or base station's authorized bandwidth.*

Bell, Rogers and TELUS recommend adopting a formula-based approach which would define a pfd limit as $[-XXX] + 25 \cdot \log_{10}(\Theta)$ dBW/m²/MHz, where Θ is the elevation angle of the earth station antenna. The baseline value of $[-XXX]$ would be determined by the selection of I/N.

Telesat recommends that ISED adopt a similar approach to that of Section 10.4.2 of the draft SRSP which defines a lookup table for pfd limits that would apply within certain ranges of elevation angles.

Should ISED determine it will adopt a pfd limit on unwanted emissions, the RABC also recommends Paragraph 75 be updated to reflect that approach:

75. Unless agreed to by the affected earth station operator, these above pfd limits cannot be exceeded ~~and~~ by any planned fixed or base stations ~~cannot be deployed within 25 km of the earth station~~. When coordination is sought to exceed these pfd limits, and in the case of any interference concerns under these pfd limits, both parties are expected to cooperate and jointly resolve any issue in a timely manner to ensure equitable access and use of the spectrum.

The RABC further notes that Paragraph 65 of the draft SRSP describes a process for coordination with FSS earth stations whose details (including latitude, longitude and elevation angle) are not published in the SMS database. The RABC recommends that in order to support coexistence between these "unlisted" FSS earth stations and flexible use deployments (within the scope of Section 10.4.3), Paragraph 65 should be expanded to address transitioned earth stations operated by Government of Canada. An additional Table indicating Tier 4 service areas containing such earth stations should be included in the final SRSP-520 Issue 5 so that licensees deploying in 3700-3900 MHz are aware to contact the Government of Canada to obtain operator contact information. This would allow flexible use licensees to obtain the relevant parameters to pursue further coordination as needed.

Section 11.2 (on international coordination with US FSS earth stations)

The RABC understands that Section 11 of the draft SRSP is subject to ongoing negotiations between ISED and the FCC, and may be subject to change pending the establishment of border arrangements for the 3450-3550 MHz, 3550-3700 MHz and 3700-3900 MHz bands. With that in mind, the RABC offers several recommendations for ISED's consideration in those discussions with the FCC as follows.

In paragraph 95 of this section, the draft SRSP proposes a -16 dBW/m²/MHz “pfd limit” to determine whether coordination is required for flexible use fixed or base stations within the sharing zone (to be defined as within distance [X] km the border). The term “pfd trigger level” should be used, as above; paragraph 96 should then state “these pfd levels can only be exceeded upon successful coordination between licensees.”

Since the FCC's minimum filter performance specification is identical to that presented in Annex G (Table G1) of the draft SRSP, it stands to reason that the same protection level would be required for US FSS earth stations as for Canadian transitioned earth stations. The RABC recommends ISED consider the use of the PFD trigger level of -6.2 dBW/m²/MHz accordingly (in line with Section 10.4.3 paragraph 74).

These two proposals are summarized in the revised text below:

95. Pending the arrangements, coordination of a new fixed or base station within the sharing zone is required if:

- a. The station exceeds a pfd ~~limit~~ trigger level of -124 dBW/m²/MHz as measured at the earth station antenna. This pfd ~~limit~~ trigger level applies to all emissions within the earth station's authorized band of operation, 4000-4200 MHz.*
- b. the station exceeds a pfd ~~limit~~ trigger level of -16 -6.2 dBW/m²/MHz applied across the 3700-3900 MHz band at the earth station antenna. The pfd ~~limit~~ trigger level applies to all emissions within the fixed or base station's authorized bandwidth.*

96. These ~~maximum~~ pfd ~~limits~~ levels in paragraph 95 can only be exceeded upon successful coordination between licensees.

RSS-192, Issue 5 (DRAFT)

Section 5.6.2 (on unwanted emission limits for indoor base station equipment)

In the RSS-192, Issue 5 draft, ISED proposes “a limit of -30 dBm/MHz for all frequencies below 3440 MHz and above 3910 MHz”. The proposed limit falls outside the Canadian operation band, but within the U.S./FCC operation band 3700-3980 MHz (and also within the to-be-defined Canadian 3900 MHz band from 3900-3980 MHz).

ISED's proposed rule simply substitutes 3910 MHz (10 MHz above the new band edge) for 3660 MHz (10 MHz above the old band edge); however, it seems likely that coexistence with the to-

be-defined Canadian 3900 MHz band will be best supported by rules which follow the in-band emissions mask (i.e., in Table 5), since 3900 MHz systems are likely to benefit from the use of radios and handsets from the U.S. ecosystem. In the absence of a specific requirement for protecting an adjacent service using more stringent unwanted emissions limits than are defined for in-band emissions, and in order to make available to the Canadian Service Providers a broad indoor base station ecosystem, including the U.S. ecosystem, ISED should apply the unwanted emissions limit of -30 dBm/MHz for indoor base station to all frequencies above 3980 MHz, instead of to all frequencies above 3910 MHz. With such a change, within the 3910-3980 MHz range, the unwanted emissions requirement of -27 dBm/MHz would apply, as per the limit proposed in the current RSS-192 issue 5, Section 5.6.2 for more than 5 MHz offset frequency from the edge of the frequency block.

Indoor base station equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding:

- a. *The limits in table 5*
- b. *A limit of -30 dBm/MHz for all frequencies below 3440 MHz and above ~~3910~~ 3980 MHz*

5GRAWG Response to ISED Consultation on SRSP-520, issue 3 and RSS-192, issue 5

Q1: ISED is seeking comments on the proposed exclusion and protection zones to protect category 1 aircraft landing at the 26 airports and 43 runways where automated landing is authorized, identified in ISED's Map of Exclusion Zones and Protection Zones.

Aviation and telecom stakeholders have identified several technical aspects of ISED's models that they wish to clarify.

Aviation stakeholders seek clarification regarding parameters driving the proposed approach volumes and/or surfaces. Specifically, aviation stakeholders are seeking further details from TCCA on the criteria used to determine the choice of glide path angles that were considered for the aircraft approaches/departures and confirmation that the normative TERPS/PANS OPS 1:34 surfaces were reflected in determining the volumes for protection and exclusion zones (per input provided in table A.9 in Annex A of the consultation).

Aviation stakeholders seek clarification that ISED has accounted for adequate safety margins. Per Annex A (paragraph preceding Table A.11), the baseline simulator overestimation of 6.2 dB appears to be the rationale for not including an additional safety margin. This overestimation appears to be a median value and not an upper bound thus implying that the safety margin may not account for a level of protection that is reflective of the criticality of function. Telecom stakeholders note that ISED has accounted for additional safety margins in the model. For example, per Annex A (paragraph preceding Table A.10), in developing interference tolerance masks, when ISED had numerous data points for radio altimeters, they selected the "worst-performing unit of a particular model" and for radio altimeters with few data points, they included 6 dB of additional testing margin.

Telecom stakeholders suggest that if ISED has not accounted for the effect of the single polarization of radio altimeters in its analysis (a 3 dB reduction when compared to the transmitted power from cross-polarized 5G base stations), ISED should increase the permitted power (during the temporary EIRP restriction period) from 77.5 to 80.5 dBm EIRP.

It is not clear from Annex A of the consultation whether this per carrier EIRP limit plays a role in the definition of any mitigation measures other than the determination of the size of the airport protection and exclusion zones. If this is the case, telecom stakeholders recommend that the temporary per carrier EIRP restriction should only be applied within the airport exclusion and protection zones, and not on a national basis.

Q2: ISED is seeking comments on the proposal to maintain the antenna down-tilt requirement outside of LPCs to protect low altitude military operations, search and rescue operations and medical evacuations. ISED is also seeking comments on whether MPCs should also be excluded from the antenna down-tilt requirement.

Aviation stakeholders recommend that an antenna down-tilt restriction be maintained nationally in order that search and rescue operations and medical evacuations (which could take place anywhere a helicopter could land) would not be subject to potential interference.

DND recommends that ISED maintain the antenna down-tilt restriction outside LPCs for protecting low altitude military operations, search and rescue operations and medical evacuations. Those operations could take place anywhere a helicopter could land (not necessarily in a heliport) throughout the country and more likely outside LPCs (at least for DND operations).

Telecom stakeholders are not opposed to temporarily maintaining the antenna down-tilt restriction outside of LPCs and MPCs (99.9% of Canada's landmass), but oppose maintaining the antenna down-tilt restriction within LPCs and MPCs. ISED introduces specific protection/exclusion zones at heliports to create the required protection for helicopter operations within those areas. It is presumably unlikely that low altitude military operations, search and rescue operations and medical evacuations would occur within an MPC or LPC (covering 0.1% of Canada). Further, telecom stakeholders note that Transport Canada appeared to suggest during the Feb 28 5GRAWG meeting that they viewed the heliport protections as sufficient for its specific use cases of concern, implying that a down-tilt restriction is unnecessary in MPCs.

Q3: ISED is seeking comments on the proposed exclusion and protection zones around 58 H1 classified heliports, as listed in annex D, to protect helicopters.

Aviation and telecom stakeholders (i.e., the 5GRAWG) support ISED's proposal to define exclusion zones of 80m radius centred at the heliport FATO.

Q4: For protection zones around the 58 H1 classified heliports, as ISED continues its analysis of zone sizes and given that that heliport heights and clutter can differ from one heliport to the next, ISED is seeking comments on whether the same protection zone sizes should be applied across Canada or whether different sizes should be applied at each heliport, despite potential operational complexity for 5G operators.

Aviation and telecom stakeholders (i.e., the 5GRAWG) support the use of different protection zone sizes that would be defined, taking into account heliport parameters and the surrounding environment (i.e., clutter and shadowing). Telecom stakeholders are willing to deal with the operational requirement to apply different zone sizes for each heliport.

Q5: ISED is seeking comments on whether additional mitigation measures should be imposed on 5G operations in the 3500 MHz and 3800 MHz bands.

The RABC 5G RAWG makes no consensus comments or recommendations, based on technical analysis, that propose any additional technical measures that should be imposed on 5G operations in the 3500 MHz and 3800 MHz bands.

Q7: ISED is seeking comments on the proposed changes to RSS-192, as outlined above and specified in annex C***RSS 5.6.1.e:***

5G equipment makers recommend that -33dBm/MHz be replaced with -30dBm/MHz (i.e., -33dB/MHz/polarization). Firstly, the -30dBm/MHz limit is standardized in 3GPP TS 38.104 and used as a reference for spurious emissions in developing FR1 BS transmitters. Secondly, the radio altimeter antenna can detect only one polarization (single polarized), while a BS transmitter antenna is dual polarized. From this perspective, the -30dBm/MHz is equivalent to -33dBm/MHz/polarization.

Aviation stakeholders recommend that the -33dBm/MHz be replaced with -48dBm/MHz if that is what is decided in the US. Aviation stakeholders indicate that support for their recommendation can be found in the draft RTCA/DO-399 (Guidance Document on Radar Altimeter RF Interference Rejection and Tolerance) document, which is anticipated to be published in the coming months.

5G equipment makers indicate that they cannot support a -48 dBm/MHz requirement, and note that the wide-band radios capable of supporting Canada's 3500 MHz and 3800 MHz bands have been developed for the EU market to satisfy a -30 dBm/MHz spurious emissions requirement. Telecom stakeholders note that the -48 dBm/MHz level sought by the aviation proposal is addressed within an FAA NPRM (Notice of Proposed Rule Making) process and in ongoing discussions on voluntary agreements with US operators. Furthermore, telecom stakeholders are not aware of an FCC process contemplating changes to the spurious emissions requirements for C-band radios in the US from the current limit of -13 dBm/MHz (47 CFR 27.53 (l)(1)).