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(Submitted by email)

**Subject: General Technical Requirements for Fixed Point-to-Point Radio Systems  
Operating in Frequency Bands above 960 MHz (SRSP-300-GEN)**

Dear Josette Gallant,

This is further to my letter of October 31, 2022, which provided recommended changes to draft Issue 1 of *General Technical Requirements for Fixed Point-to-Point Radio Systems Operating in Frequency Bands above 960 MHz (SRSP-300-GEN)*. As indicated in that letter, the Board anticipated submitting additional comments regarding Table 1 in SRSP-300-GEN.

The RABC Fixed Wireless Communications Committee has completed its analysis of Table 1 as proposed by the Department. The Board recommends the table proposed by the Department be replaced with the table below. A full explanation of the recommendation is attached.

Table 1

<b>Frequency range (MHz)</b>	<b>Minimum hop length for single polarization (km)</b>	<b>Minimum hop length with CCDP operation (km)</b>
960-6930	30	25
6930-8500	19	17
8500-11700	12	11
11700-13250	11	9
13250-15350	9	6
15350-19700	5	4
19700-23600	3	2
23600 and above	-	-

We certainly appreciate the Department considering this additional recommendation.

Sincerely,



J. David Farnes  
General Manager

Attachment

Attachment

Regarding section 6.3 “Minimum hop length”, RABC is offering an update to Table 1 by proposing values for the “Minimum hop length (km)” column and adding a column for minimum hop length for the use of CCDP (Co-Channel Dual Polarization).

Table 1

<b>Frequency range (MHz)</b>	<b>Minimum hop length for single polarization (km)</b>	<b>Minimum hop length with CCDP operation (km)</b>
960-6930	30	25
6930-8500	19	17
8500-11700	12	11
11700-13250	11	9
13250-15350	9	6
15350-19700	5	4
19700-23600	3	2
23600 and above	-	-

Note: For 8 GHz and 11 GHz, it should be noted that the small difference in the median values between single polarization and CCDP lengths and between the bands needs to take into account that for single polarization considers low and medium capacity links, while CCDP links most cover high capacity links.

The above proposed values for the minimum hop length are based on best available information at this time (refer to Table 2 below). ISED is welcomed to have further discussion with operators who provided the information, as well as with other operators, to further refine the values.

RABC proposal is based on the following justifications:

- It is RABC understanding that the values in draft SRSP-300-GEN are based on data gathered about 5 years ago
- RABC is of the view it is important to take into account the trend on hop lengths of licensed point-to-point systems put into service in the last 5 years, as it would be beneficial providing the most appropriate up to date values going forward
- In that regard, RABC is providing in Table 2 below statistics gathered on point-to-point links' median hop length, including the number of links on which the median value is base:
  - For both single polarization and dual polarization (CCDP) categories, it was possible to gather the number of in-service links from two operators for all bands, except for 13 GHz and 8 GHz with CCDP that are based on a single operator
  - The proposed hop length values is based on hundreds of links and is considered as significantly representative by RABC in all but the 13 GHz case
- Although understanding the intent to limit the number of frequency ranges, it is felt appropriate to provide enough granularity, as too wide frequency ranges may lead to minimum hop length that would prevent optimal use of spectrum.

Table 2

<b>Frequency range (MHz)</b>	<b>Number of links for single polarization</b>	<b>Median hop length for single polarization (km)</b>	<b>Number of links for CCDP operation</b>	<b>Median hop length for CCDP operation(km)</b>
6 GHz	1046	33.14	491	25.42
8 GHz	313	18.49	182	17.39
11 GHz	620	11.79	1109	11.32
13 GHz	0	0.00	73	9.05
15GHz	576	8.12	606	6.00
18 GHz	517	4.06	648	4.00
23 GHz	311	2.33	718	2.24
>23 GHz	-	-	-	-

Note 1: Above data came from two operators, except for 13 GHz and for 8 GHz with CCDP that are based on a single operator

Note 2: For single polarization, median was rounded up to higher integer. For CCDP, due to the important of supporting higher capacity, median value is rounded up to the lower integer

For RABC's update to the "Minimum hop length (km)" column:

- First, it is proposed to update the column's title to distinguish between single polarisation and dual polarization operation by adding single polarization to the title
- It is proposed to split the frequency range 960-8500 MHz into two ranges: 960-6930 MHz and 6930-8500 MHz.
  - The value 6930 MHz is proposed as this is the upper limit for SRSP-306.4 *"Technical Requirements for Fixed Line-of-Sight Radio Systems Operating in the Band 6425-6930 MHz"*
  - Although SRSP-306-5 *"Technical Requirements for Line-of-sight Radio Systems Operating in the Fixed Service and Providing Television Auxiliary Services in the Bands 6590-6770 and 6930-7125 MHz"* upper limit extends beyond 6930 MHz, it is proposed not to use 7125 MHz as the value for the split, since SRSP-306.5 is a specialized fixed service band for providing "one-way line-of-sight radio systems in the fixed service to provide television auxiliary services" and not intended for two-way point-to-point links
- This split is proposed based on propagation characteristics such that, although 30 km can be reached for 6 GHz, it is recognized being more difficult to achieve the same hop length with similar transmitter output and antennas size in 8 GHz bands (no data is available for 7 GHz band from the two operators who provided information)
  - This is shown in Table 2 where the median hop length for 6 GHz complies with the proposed value of 30 km (1046 links), but the median hop length for 8 GHz bands cannot meet it (18.5 km for 313 links). The reason for the much lower median hop length in 8 GHz, as mentioned in note below Table 1, is that this band has a lesser use for corridor links and more for distribution and spur links, which supports low and mid capacity, leading to shorter hop length.
  - It should also be noted that in Table A2-2B of Recommendation ITU-R F.2086-0, Canadian median hop length for 8 GHz is 22 km. Although understanding this value may have been a subset of ISSED licensing database at that time, it nevertheless shows to be a significant lower value than 30 km.
  - Therefore, to account for both explanations above, it is proposed to use 19 km (based on median of 18.49 for 313 links) as a representative value for minimum hop length for the range 6930-8500 MHz
- For the frequency range 8500-11700 MHz, basically covering the 10 and 11 GHz bands, it is proposed to use minimum hop length of 12 km instead of 15 km, based on median value of 11.79 km for 620 links already deployed.
- It is also proposed to split the frequency range 11700-15350 into two ranges: 11700-13250 MHz and 13250-15350 MHz for two reasons
  - First, this will allow addressing the band 13 GHz which was not opened 5 years ago
  - Secondly, although too recent to have a significant number of links deployed, the 13 GHz band is about at midpoint between 11 GHz and 15 GHz bands, and it would make sense that median minimum hop length reflects this to ensure efficient and optimal use of this new band
- Therefore, considering the above, it is proposed to:

- use a median of 11 km for the frequency range 11700-13250 MHz
- for the frequency range 13250-15350 MHz, it is proposed to use a median value of 9 km instead of 10 km to reflect the use of 576 links having a median hop length of 8.12 km. Similarly to 8 GHz band, the proposed lower median value needs to take into account deployment of low and medium capacity links. In addition, due to decrease in overall bandwidth in 15 GHz, and unavailability of 13 GHz before 2020, use of 11 GHz band was the only alternative when not possible to use the 15 GHz band, which contributes to lowering the median hop length for deployed point-to-point links.

For RABC's proposed new column "Minimum hop length with CCDP operation (km)":

The use of CCDP allows to significantly increase transport capacity without requiring additional spectrum (in fact doubling it). However, it comes at the expense of reducing achievable hop length. This is because use of dual polarization causes threshold degradation due to rain attenuation and multipath propagation, as reported in section 4 of Recommendation ITU-R P.530-18.

In order to recognize this constraint, it is proposed to add a column in Table 1 titled "Minimum hop length with CCDP operation (km)" with recommended values based in the median value coming from two operators.