

SaskTel Comments:

Gazette Notice SMSE-018-17

Consultation on the Technical and
Policy Framework for White Space Devices

February 15, 2018

EXECUTIVE SUMMARY

1. The following represents a summary of SaskTel's Comments in response to SMSE-018-17, *Consultation on the Technical and Policy Framework for White Space Devices* ("the Consultation").
2. In the Consultation, the Department makes several proposals for operation of white space devices in vacant television broadcasting spectrum. The proposals will allow enhanced operation of white space devices in spectrum below 608 MHz, specifically television channels 3 and 4 (60-72 MHz) and channels 14-20 (470-512 MHz), in alignment with US FCC technical rules. SaskTel agrees with these proposals.
3. The Department has also proposed to limit operation of white space devices below 608 MHz, which would preclude operation of these devices in the 600 MHz mobile service bands, as well as the 600 MHz guard band and duplex spectrum blocks.
4. SaskTel strongly recommends that white space devices be limited to operation in spectrum below 608 MHz, as per the Department's proposal in the Consultation.
5. SaskTel agrees with the Department in their assessment that the 614-698 MHz band will be the focus of churn and a number of very large-scale transitions as television broadcasters are migrated to other channels, and new mobile services are auctioned, licensed and deployed. Because of the high degree of churn and instability expected in the 600 MHz band in the near future, SaskTel agrees with the Department in their proposal to limit white space devices to operate below 608 MHz.
6. Second, and more importantly, SaskTel has also serious concerns with the FCC analysis and technical rules regarding minimum separation distances between 600 MHz mobile service areas and white space devices for both co-channel and adjacent channel operations. The intent of these minimum separation distances in the FCC technical rules is to protect licensed mobile services.
7. The 600 MHz minimum separation distances in the FCC rules are based on an assumed tower height of 30 metres, or less, for the 600 MHz mobile base station. The model being used by the FCC seems to be based on an American urban deployment model of 600 MHz mobile services. SaskTel however foresees a

substantial deployment of 600 MHz low band spectrum in rural areas to alleviate forecasted capacity shortfalls. In rural areas SaskTel typically uses far higher tower heights, over 100 metres on average, to attain the highest possible coverage area from each rural tower. This is far greater than the 30 metres (or less) assumed in the FCC technical rules, and one of the key assumptions in the FCC analysis. This calls into question all of the resulting minimum separation distances established from this analysis. If the FCC technical rules are followed for the 600 MHz band, then all of the separation distances for white space devices found in the FCC technical rules will have to be re-calculated using assumptions appropriate for rural Canadian deployments, rather than being based on an American urban deployment model.

8. Another flawed assumption in the FCC technical rules was the assumption of receive signal level thresholds for both uplink and downlink calculations. SaskTel designs and operates our LTE networks at much lower receive signal thresholds for both uplinks and downlinks. In rural areas, in order to extend coverage as much as possible, the receive thresholds are set even lower than in urban areas. This allows user equipment in rural areas, with few cell sites and base stations for handovers, to operate at lower thresholds, and maintain a connection and service.
9. There is a considerable margin between the FCC assumptions and SaskTel's design and operating receiver thresholds, meaning that there is a substantial risk of interference to SaskTel's licensed mobile services, both in the uplink and downlink directions, if white space devices were allowed to operate in the 600 MHz band in accordance with the FCC technical rules, either on a co-channel or in the adjacent channels.
10. For all of these reasons, SaskTel therefore strongly recommends that white space devices be limited to operation in spectrum below 608 MHz, and that the Department's proposed moratorium on operation in the 600 MHz band be implemented as per the Department's proposal in paragraph 31 of the Consultation.
11. SaskTel also agrees with the Department's proposal to continue to preclude the use of channel 37 (608-614 MHz) by white space devices.

INTRODUCTION

12. The following represent Saskatchewan Telecommunications' (SaskTel's, or "the Company's") Comments in response to SMSE-018-17, *Consultation on the Technical and Policy Framework for White Space Devices* ("the Consultation").
13. SaskTel has participated in the creation of the Radio Advisory Board of Canada (RABC) response to the Consultation, and supports the RABC submission.
14. The section numbering of the remainder of this document corresponds to the numbering of the consultation paper released by the Department. Failure to address any particular issue or item, or the Comments made by any other party, should not be construed as agreement with those Comments where such agreement is not in the interests of SaskTel.

SASKTEL RESPONSE TO THE CONSULTATION

6. Additional White Space Spectrum/Channel Availability

6.1 TV channels 3 and 4 (60-72 MHz)

Q1. ISED is seeking comments on its proposal to harmonize with the U.S. framework regarding the operation of fixed white space devices in channels 3 and 4 (60-72 MHz).

In providing comments, respondents are requested to include supporting arguments and rationale.

15. SaskTel agrees with the Department's proposal to harmonize with the US FCC framework and permit the use of television channels 3 and 4 (60-72 MHz) by fixed white space devices. With advancing technology, the chances of interference with consumer equipment will continue to be reduced.

6.2 TV channels 14 to 20 (470-512 MHz)

Q2. ISED is seeking comments on its proposal to harmonize with the U.S. framework regarding the operation of personal/portable white space devices in channels 14 to 20 (470-512 MHz).

In providing comments, respondents are requested to include supporting arguments and rationale.

16. SaskTel agrees with the Department's proposal to harmonize with the US FCC framework and permit the operation of personal/portable white space devices in television channels 14 to 20 (470-512 MHz). It is understood that fixed white space devices will also continue to be allowed to operate in this spectrum.

7. White Space Devices in the 600 MHz range repurposed band

Q3. ISED is seeking comments regarding its proposal to limit the use of white space devices to spectrum below 608 MHz at this time.

In providing comments, respondents are requested to include supporting arguments and rationale.

17. SaskTel **strongly recommends that white space devices be limited to operation in spectrum below 608 MHz**, as per the Department's proposal in the Consultation.

18. SaskTel agrees with the Department in their assessment that the 614-698 MHz band will be the focus of a number of very large-scale transitions as television broadcasters are migrated to other channels, and new mobile services are auctioned, licensed and deployed. Should SaskTel be successful in acquiring 600 MHz spectrum in the auction, our initial plans are to deploy 600 MHz spectrum as soon as possible in rural areas as we foresee capacity issues in our rural areas which can only be mitigated with low band spectrum.

19. Because of the high degree of churn and instability expected in the 600 MHz band in the near future, SaskTel agrees with the Department in their proposal to limit white space devices to operate below 608 MHz.

20. Furthermore, and more importantly, SaskTel has also serious concerns with the FCC analysis and technical rules regarding minimum separation distances between 600 MHz mobile service areas and white space devices for both co-channel and adjacent

channel operations.¹ The intent of these minimum separation distances in the FCC technical rules is to protect licensed mobile services.

21. The 600 MHz minimum separation distances in the FCC rules are based on an assumed tower height of 30 metres, or less, for the 600 MHz mobile base station.² The model being used by the FCC seems to be based on an American deployment model of 600 MHz mobile services in urban areas. Although SaskTel will be planning urban deployments of 600 MHz equipment, we foresee a far greater demand for the 600 MHz low band spectrum in rural areas to alleviate forecasted capacity shortfalls. In rural areas SaskTel typically uses far higher tower heights, over 100 metres on average, to attain the highest possible coverage area from each rural tower. This is far greater than the 30 metres (or less) assumed in the FCC technical rules, and one of the key assumptions in the FCC analysis. This calls into question all of the resulting minimum separation distances established from this analysis. If the FCC technical rules are followed for the 600 MHz band, then all of the separation distances for white space devices found in the FCC technical rules will have to be re-calculated using assumptions appropriate for rural Canadian deployments, rather than being based on an American urban deployment model.
22. Another flawed assumption in the FCC technical rules was in the assumption of LTE receive signal level thresholds for both uplink and downlink protection margin calculations. For uplink signal protection, an LTE receive signal threshold of -101.5 dBm was assumed³, and for downlink signals an LTE receive signal threshold of -97 dBm was assumed.⁴
23. SaskTel designs and operates our LTE networks at much lower receive signal thresholds for both uplinks and downlinks. In rural areas, in order to extend coverage as much as possible, the design receive thresholds are set even lower than in urban areas. This allows user equipment in rural areas, with few cell sites and base stations for handovers, to operate at lower thresholds, and maintain a connection and service.

¹ These technical rules are discussed in paragraph 26 of the Consultation, and the rules and underlying assumptions are found in FCC Report and Order 15-99, paragraphs 170-186. This document can be found at: https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-99A1.pdf

² FCC Report and Order 15-99, para 170

³ Ibid.

⁴ Ibid. para 182

24. There is a considerable margin between the FCC assumptions and SaskTel's design and operating receiver thresholds, meaning that there is a substantial risk of interference to SaskTel's licensed mobile services, both in the uplink and downlink directions, if white space devices were allowed to operate in the 600 MHz band in accordance with the FCC technical rules, either on a co-channel or in the adjacent channels.
25. For these reasons, SaskTel **strongly recommends that white space devices be limited to operation in spectrum below 608 MHz**, as per the Department's proposal in the Consultation.
26. Should the Department choose not to implement the limit on white space device operation above 608 MHz as proposed in the Consultation, then SaskTel cannot agree to the use of the FCC technical rules as currently written to regulate operation of white space devices in the 600 MHz band. As discussed above, the underlying assumptions made in the FCC technical rules are based on an American urban deployment model, not on a Canadian rural deployment, and any implementation of these rules will risk serious interference to licensed 600 MHz mobile services. This risk would apply both to white space device operation in the mobile service bands, as well as operation in the adjacent guard band and duplex blocks.
27. As a minimum, in order to protect licensed mobile services, rather than adopting the FCC technical rules the Department will have to create effective co-existence rules and minimum white space device separation distances based on more realistic assumptions for mobile networks operating in rural Canada, before any consideration can be given to allowing any operation of white space devices above 608 MHz.
28. SaskTel agrees with the Department's decision to place a moratorium on the use of white space devices in the 614-698 MHz bands.⁵
29. Furthermore, the moratorium limiting operation of white space devices below 608 MHz can easily be implemented through the white spaces database, as described in paragraph 31 of the Consultation. By using the white space databases to impose the moratorium, this allows the opportunity for white space devices harmonized with US

⁵ The Consultation, paragraph 31

FCC equipment standards to be certified and used in the smaller Canadian market. There would not be a need for white space device manufacturers to provide a customized product solely for the smaller Canadian marketplace.

8. Consideration of white space devices in channel 37 (608-614 MHz)

Q4. ISED is seeking comments on its proposal to continue to preclude the use of channel 37 (608-614 MHz) by white space devices.

In providing comments, respondents are requested to include supporting arguments and rationale.

30. SaskTel agrees with the Department's proposal to continue to preclude the use of channel 37 (608-614 MHz) by white space devices. SaskTel believes that the benefits of white space devices using channel 37 do not outweigh the risks and challenges of coordinating with radio astronomy and wireless medical telemetry system users to minimize potential interference.

CONCLUSION

31. The intention when operating white space devices in vacant television spectrum is to protect licensed services. SaskTel agrees with the proposal by the Department to limit operation of white space devices to spectrum bands below 608 MHz.

32. The 600 MHz spectrum band will be subject to a high amount of churn in the near future as television broadcasters transition to lower spectrum bands, and mobile service spectrum is auctioned, licensed, and deployed. SaskTel agrees that imposing a moratorium on white space devices in the 600 MHz band will reduce the amount of disruption in the band.

33. In addition, and more importantly, SaskTel has very serious concerns with the assumptions made by the FCC in their analysis to create their technical rules for operation of white space devices in the 600 MHz band. Specifically, the assumptions made by the FCC of very low base station tower heights (30 metres or less) are much lower than the average tower heights of more than 100 metres anticipated by SaskTel as being essential for rural deployments. The tower height assumptions are key assumptions in the determination of minimum separation distances for white space devices in the FCC analysis. The large discrepancy in tower heights would mean that

separation distances far greater than those determined from the FCC technical rules would be required to adequately protect licensed 600 MHz mobile services.

34. Another inappropriate assumption in the FCC analysis involves assumptions on operating receiver signal thresholds for LTE networks. The assumed receiver signal thresholds in the FCC analysis are far higher than the design and operating receiver thresholds used in the SaskTel LTE networks. Furthermore, even lower thresholds are utilized in rural areas to ensure user devices remain connected and receive service in areas where there are few or no neighboring cell sites for handovers. If the separation distances from the FCC technical rules are utilized, then there is a substantial risk of interference to the licensed 600 MHz mobile services because of the inappropriate receiver threshold assumptions in the FCC technical rules.
35. For both of these reasons, the FCC technical rules for white space devices as written are clearly not appropriate to protect 600 MHz licensed mobile systems in rural Canada because they are based on an American urban deployment model. SaskTel cannot accept the current FCC technical rules for white space device operation in the 600 MHz band.
36. Therefore, SaskTel strongly recommends that white space devices be limited to operation below 608 MHz, as per the Department's proposal.
37. SaskTel also agrees with the Department's proposals to allow enhanced operation of white space devices in bands below 608 MHz as per the Consultation, as well as continuing to preclude the use of television channel 37 by white space devices.
38. SaskTel thanks the Department for the opportunity to provide input into these crucial matters. It is our hope that our comments will assist in providing a fuller view of the required rules for white space device operation in vacant television spectrum, and the need to protect licensed mobile services, to the maximum benefit of Canadians in all regions of Canada, particularly those in rural areas.