



Telecom Decision CRTC 2022-102

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Updates to national wireless carriers' GSM-based wholesale mobile wireless roaming tariffs to incorporate seamless hand-off and 5G roaming

The Commission issues a number of determinations related to the implementation of seamless roaming to ensure that this functionality is available to regional wireless carriers and their customers in a timely fashion. Seamless hand-off prevents calls and data sessions from dropping when customers move from one serving area to another.

The Commission also makes determinations to facilitate roaming on 5G stand-alone networks as they are deployed, to ensure that regional wireless carriers are not disadvantaged relative to the national wireless carriers.

The Commission **directs** Bell Mobility Inc., Rogers Communications Canada Inc., and TELUS Communications Inc. to make changes, for Commission approval, to the proposed terms and conditions in their wholesale mobile wireless roaming service tariffs to enable seamless hand-off according to these determinations.

Background

1. In Telecom Regulatory Policy 2015-177, the Commission determined that it was necessary to mandate the provision of Global System for Mobile communications (GSM)-based wholesale roaming services by Bell Mobility Inc. (Bell Mobility), Rogers Communications Canada Inc. (RCCI), and TELUS Communications Inc. (TCI)¹ [collectively, the national wireless carriers] to other Canadian wireless carriers and to regulate the rates, terms, and conditions for such services. Prior to that decision, wholesale roaming had been forborne from regulation.
2. The Commission finalized the terms and conditions of wholesale roaming in Telecom Decision 2017-56,² and finalized the rates in Telecom Order 2018-99.

¹ At the time of Telecom Regulatory Policy 2015-177, the Commission referred to TELUS Communications Company (TCC). However, effective 1 October 2017, TCC's assets were legally transferred to TCI and TCC ceased to exist. For ease of reference, "TCI" is used in this decision.

² In Telecom Order 2017-433, the Commission approved the final tariffs which incorporated the policies and decisions set out in Telecom Decision 2017-56.

3. In Telecom Regulatory Policy 2021-130 the Commission, among other things, mandated the national wireless carriers to enable seamless roaming between their networks and those of regional wireless carriers. This determination highlighted that seamless roaming benefits consumers by helping to prevent dropped calls and data sessions when consumers move between carriers' networks, and that it benefits competition by enabling wireless competitors to offer a higher quality of service. The Commission also confirmed that its wholesale roaming policy applies to fifth-generation (5G) networks. The Commission directed the national wireless carriers to file, for approval, amended wholesale mobile wireless roaming tariffs within 90 days of the date of that decision with amended terms and conditions reflecting the Commission's determinations, and to begin offering seamless roaming by 15 April 2022. The Commission indicated that any required changes to the rates for the mandated roaming service resulting from seamless roaming could be considered once the service is implemented.
4. The national wireless carriers filed amended tariffs in July 2021. The following parties filed interventions regarding seamless roaming and 5G roaming: Cogeco Communications Inc. (Cogeco); Bragg Communications Incorporated, carrying on business as Eastlink (Eastlink); Iristel Inc. (Iristel); the Independent Telecommunications Providers Association (ITPA); Sogetel inc. (Sogetel); TerreStar Solutions Inc.; Videotron Ltd. (Videotron); and Xplornet Communications Inc. (Xplornet), and on 7 October 2021, the national wireless carriers filed replies to these interventions. The record for these tariff proceedings closed on 27 January 2022 with the filing of responses to requests for information.
5. In Telecom Regulatory Policy 2021-130, the Commission also directed Bell Mobility, RCCI, Saskatchewan Telecommunications, and TCI to make available a wholesale mobile virtual network operator (MVNO) access service and file proposed tariffs for that service 90 days from the date of the decision. The Commission notes that since the record of the tariff notice proceedings for wholesale roaming and the record of the tariff notice proceedings for wholesale MVNO access both arose from the policy determinations set out in Telecom Regulatory Policy 2021-130, and were filed at the same time, parties commented on both sets of tariff applications in the same interventions. As a result, in certain cases, parties' arguments applied to both wholesale roaming and wholesale MVNO access. The Commission has identified these instances at various points in this decision. The determinations herein do not relate to the wholesale MVNO access tariff notice proceedings.

Issues

6. The Commission has identified the following issues to be determined in this decision:
 - Is there a need for CRTC Interconnection Steering Committee (CISC) involvement to implement seamless roaming?

- Should the national wireless carriers have discretion to unilaterally deny the provision of seamless roaming to a regional wireless carrier based on a feasibility assessment?
- Should seamless roaming apply to coverage gaps when in-footprint roaming?
- Should seamless hand-off be implemented one-way or two-way?
- How frequently should wireless carriers exchange network and border information?
- On which technologies should seamless roaming be required to be offered?
- Should direct interconnection be mandated?
- Has 5G roaming been appropriately included in the proposed tariffs?
- Other matters

Is there a need for CISC involvement to implement seamless roaming?

7. CISC is an organization established by the CRTC with a mandate to undertake tasks related to technical, administrative, and operational issues on matters assigned by the Commission or originated by the public that fall within the Commission's jurisdiction.³
8. The record for these tariff proceedings indicates some disagreement over whether there is a need to engage CISC, either through an existing working group or by establishing a new one, to develop specific guidelines for the implementation of seamless roaming.

Positions of parties

9. RCCI and TCI both indicated that prior to the implementation of seamless roaming, CISC should be involved in the development of specific industry guidelines and other implementation details, since only general standards currently exist.
10. TCI argued that the Commission should not mandate additional technical or operational requirements related to seamless hand-off until parties can agree on a baseline approach to the seamless roaming solution. TCI submitted that seamless roaming is complex, requires considerable time and resources to properly design and implement, and that there is no one-size-fits-all solution for seamless roaming. TCI added that each incidence of seamless roaming will be a custom deployment. To that

³ The Commission established CISC in Telecom Public Notice 96-28 and the CISC Administrative Guidelines are posted on the Commission's website.

end, there will need to be a systemic approach in place to deal with multiple simultaneous requests for seamless roaming since each request is a one-off network solution engagement.

11. While Bell Mobility did not comment specifically about the need for CISC involvement, it argued that certain interveners have exaggerated the existence of seamless roaming standards and minimized the fact that seamless hand-off has seldom been operationalized until now.
12. The regional wireless carriers opposed the use of CISC for such a purpose.
13. Cogeco and Videotron argued that general standards for seamless hand-off have already been developed by the 3rd Generation Partnership Project (3GPP) and associated guidelines have already been produced by the GSM Association (GSMA) for 4G and 5G-non-standalone (NSA) technologies. The parties added that guidelines will soon be completed for 5G-standalone (SA) technologies, and that the purpose of the current tariff proceedings is to set a baseline approach to the implementation of seamless roaming.
14. Eastlink submitted that it did not see the need for a CISC working group and was unsure what the purpose of such a group would be, given that general standards for seamless hand-off already exist.
15. Eastlink and Xplornet argued that referring technical matters to CISC would only serve to delay the implementation of seamless hand-off.

Commission's analysis and determinations

16. CISC is normally engaged to assist the Commission and the industry with implementing the technical and administrative aspects of regulatory policies set by the Commission. As the CISC Administrative Guidelines note, the Commission can refer matters to CISC for review, or a party can make a written proposal to CISC to consider a matter. However, in the case of the implementation of seamless roaming, the Commission is not persuaded that it is necessary to engage CISC, for a number of reasons as set out below.
17. First, CISC normally produces a set of common standards, protocols, or guidelines for the industry to adopt. In the case of seamless roaming, each arrangement between a national wireless carrier and regional wireless carrier, beyond the general standards or technical specifications that already exist, will be unique and customized based on their equipment vendors' solutions. It is unclear from the parties what additional common technical standards they believe the Commission should task CISC with developing. This being the case, the Commission does not see the need to request that CISC create additional common standards or guidelines.
18. Second, many of the issues that parties proposed to have CISC address in these tariff proceedings are the subject of the determinations in this decision, and relate to how seamless roaming is to be configured and implemented. In the Commission's view,

the determinations in this decision are sufficient in setting out the parameters of the service and how it is to be provisioned, while enabling wireless carriers to ensure arrangements are appropriate for their individual circumstances.

19. Finally, the Commission is concerned that referring this matter to CISC without a demonstrated need or a specific task to accomplish would make it difficult for stakeholders to reach consensus, and would result in prolonged delays to the availability of seamless roaming. This would not be in the public interest.
20. Accordingly, the Commission determines that at this time it will not refer matters to CISC regarding the implementation of seamless roaming and thereby delay the introduction of seamless roaming as part of the mandated wholesale roaming service.

Should the national wireless carriers have the discretion to unilaterally deny the provision of seamless roaming to a regional wireless carrier based on a feasibility assessment?

21. In Bell Mobility's proposed tariff, a wholesale roaming customer seeking to implement seamless roaming must request a Seamless Handoff Potential Implementation Review and Bell Mobility will then determine whether it is "feasible" to implement seamless roaming with the wholesale customer (feasibility assessment). The details of this Seamless Handoff Potential Implementation Review are contained in Item 100.18. The definition of "Seamless Handoff" in Bell Mobility's tariff refers to seamless roaming as discussed in Telecom Regulatory Policy 2021-130.
22. This feasibility assessment was also referred to in the definition of Seamless Handoff Potential Implementation Review at Item 100.1(a)(27) of Bell Mobility's proposed tariff.
23. Through the introduction of a feasibility assessment, Bell Mobility in effect accords itself unilateral discretion to determine whether it will provide seamless roaming to a regional wireless carrier or if doing so is not feasible. The Commission must consider whether such a feasibility assessment is acceptable in light of the determinations made in Telecom Regulatory Policy 2021-130.

Positions of parties

24. Bell Mobility submitted that it is critical to assess and confirm the interoperability of its core network and radio access network (RAN) equipment with the core network and RAN equipment deployed by prospective wholesale seamless roaming customers to assess the overall technical feasibility of any request for seamless roaming. In its proposed tariff, Bell Mobility included a Seamless Handoff Potential Implementation Review, including lab and field testing, for this very reason.
25. RCCI agreed with Bell Mobility's proposed provision and indicated in reply that it would include a similar process with similar wording in its tariff.

26. A number of wireless competitors took issue with Bell Mobility's proposed provision.
27. Videotron argued that Bell Mobility's proposed provision would give Bell Mobility full discretion for determining whether a competitor's request for seamless roaming is feasible with no set timelines, a practice which has the potential for anticompetitive abuse.
28. Xplornet submitted that Bell Mobility should not be in a position to decide whether or not it is possible to implement seamless roaming and that any process adopted must solely serve to determine the specifics of implementing seamless roaming.
29. Eastlink submitted that the national wireless carriers were given a year from the date of Telecom Regulatory Policy 2021-130 to make any required technical modifications, and should not now be in a position to deny a wholesale roaming customer the ability to implement seamless roaming because they have not made the necessary modifications to their networks.

Commission's analysis and determinations

30. In the case of Bell Mobility's proposed tariff, references to the carrier's assessment of feasibility of seamless hand-off with a competitor carrier would effectively give Bell Mobility the discretion to deny offering seamless roaming to a regional wireless carrier if, in its own estimation, it is not feasible to implement. However, Bell Mobility provided little to no explanation in the tariff as to the criteria it would use to assess feasibility and either approve or deny a request.
31. In the Commission's view, unilateral feasibility assessments such as this are inappropriate and contrary to the determinations concerning seamless roaming set out in Telecom Regulatory Policy 2021-130. The national wireless carriers were directed to make seamless roaming a feature of their mandated wholesale mobile roaming service, and compliance with this regulatory requirement is not optional. No discretion was granted to subsequently decide whether or not to fulfill this obligation on the basis of wireless carriers' own feasibility assessments.
32. To the extent that there are technical impediments to implementing seamless roaming with a particular regional wireless carrier, the national wireless carrier and regional wireless carrier in question are expected to work together in good faith to overcome such impediments to ensure that seamless roaming is provided as mandated. If the parties are unable to reach an agreement together, they must seek to resolve the issue using other means, including the Commission's staff-assisted dispute resolution mechanisms, as set out in Broadcasting and Telecom Information Bulletin 2019-184.
33. The Commission considers that the wholesale roaming tariffs must set out the process and steps to operationalize seamless roaming following receipt of a request from a regional wireless carrier. In the case of Bell Mobility, notwithstanding the matter of it giving itself discretion to deny the provision of seamless roaming

through its proposed feasibility assessment, Bell Mobility's provisions in Item 100.18 do set out the process for operationalizing a seamless roaming arrangement between a national wireless carrier and a regional wireless carrier, as well as the procedure for making a request for the implementation of seamless roaming.

34. The Commission therefore **directs** national wireless carriers to revise their tariff proposals to remove any wording in their tariff pages that gives them the discretion to deny the provision of seamless roaming based on unilateral feasibility assessments, in keeping with the determinations above. The Commission also **directs** RCCI and TCI to revise their tariff pages as necessary to ensure that their tariffs set out the process for implementation of seamless roaming between themselves and any given regional wireless carrier, as well as the process for making a request for the implementation of seamless roaming. To that end, RCCI and TCI may adopt the same language in their tariff pages as the language in Bell Mobility's proposed tariff, as amended in this decision, or file proposed alternative wording with the Commission for approval.

Should seamless roaming apply to coverage gaps when in-footprint roaming?

35. Certain parties questioned whether seamless roaming should apply only to the outer edges of a regional wireless carrier's network or whether it should also apply within the entire serving territory of a regional wireless carrier where coverage gaps may necessitate in-footprint roaming.⁴
36. In Telecom Decision 2017-56, the Commission determined that in-footprint roaming was appropriate and directed the national wireless carriers to remove any restrictions on in-footprint roaming from their tariffs.
37. However, the Commission also directed the national wireless carriers to add a clause to their tariffs that states that the wholesale roaming customer must take all reasonable steps to ensure that its end-users configure their devices to register on the wholesale roaming customer's network in priority over all other available networks where roaming is permitted, to minimize in-footprint roaming.

Positions of parties

38. Bell Mobility indicated that its tariff provides for seamless roaming to be implemented along the outer boundary of a wholesale roaming customer's home network. It submitted that throughout the proceeding leading up to Telecom Regulatory Policy 2021-130, seamless roaming was always discussed from the

⁴ In-footprint roaming occurs when a wireless carrier's retail customers roam on another carrier's network while they are within their home carrier's network footprint.

perspective that it applied only at the outer borders of a network and no party explicitly sought seamless roaming throughout Bell Mobility's network footprint.

39. TCI argued that seamless roaming should not be available for the purpose of filling coverage gaps within a regional wireless carrier's own network. TCI added that it would not make seamless roaming available where a regional wireless carrier's network overlaps with its own. If a roaming customer's network has a weak signal or spotty coverage, it is not the purpose of incidental or seamless roaming to compensate for poor network deployment. Instead, the wholesale roaming customer should invest in improving the quality of its network.
40. Videotron argued that proposals to restrict seamless roaming to the outer boundaries of a competitor's network disregard the conclusions reached by the Commission in Telecom Decision 2017-56. By adopting a rigid network border with no internal variations that changes only once or twice a year, the incumbents are creating the conditions for seamless roaming to fail. If boundaries are rigidly preassigned and then moved, the inevitable result is a failed hand-off. If too many hand-offs fail because too many boundaries have moved, the result is a failed seamless roaming service.
41. Eastlink argued that seamless roaming should be enabled within a regional wireless carrier's network perimeter, not just at the perimeter, which includes areas where wholesale roaming is required to fill network coverage gaps. Eastlink added that the Commission clearly outlined the benefits of mandating seamless roaming in Telecom Regulatory Policy 2021-130, specifically the benefits to end-users experiencing fewer dropped calls and regional wireless carriers being able to provide end-users with a higher quality of service, thereby increasing competition. The reality of the competitor networks is that coverage gaps exist, and will continue to exist, until regional wireless carriers are able to expand their networks.

Commission's analysis and determinations

42. The Commission notes that many of the arguments made by parties concerning in-footprint roaming applied to both wholesale roaming and wholesale MVNO access. The Commission's decisions herein apply to wholesale roaming. Matters relating to wholesale MVNO access will be addressed in a separate decision.
43. When the Commission required the national wireless carriers to provide in-footprint wholesale roaming in Telecom Decision 2017-56, it reasoned that there is no solid and stable boundary to a wireless network, coverage gaps are inherent to the nature of mobile wireless services, and significant time is required for smaller wireless carriers to expand their facilities and fill coverage gaps. Therefore, given the overlapping nature of public mobile networks, in-footprint roaming and occasional traffic offloading are important to the quality of roaming services.

44. This reasoning is also pertinent to in-footprint roaming in the context of seamless roaming. In particular, it is important to enable regional wireless carriers' end-users to roam in the coverage gaps that are inherent to mobile wireless networks. It is also important that the regional wireless carriers build out their networks to fill in those coverage gaps. In-footprint coverage gaps create a border between the regional and national wireless carriers' mobile wireless networks, and there is a need to provide seamless roaming along that border.
45. The Commission's primary motivation for mandating seamless roaming was to minimize dropped calls and data sessions, since doing so would benefit both consumers and competition. In the Commission's view, restricting seamless roaming to the outer perimeter of regional wireless carriers' networks would work against the objective of minimizing dropped calls and data sessions, since customers who unknowingly enter a coverage gap would have their calls and data sessions dropped.
46. In light of the above, the Commission finds that it would not be appropriate to limit the provision of seamless roaming to the outer edges of a regional wireless carrier's network.
47. The Commission therefore **directs** the national wireless carriers to revise their tariffs to clarify that seamless roaming should be available for use by regional wireless carriers where they have in-footprint coverage gaps, consistent with its determinations on in-footprint roaming in Telecom Decision 2017-56.

Should seamless hand-off be implemented one-way or two-way?

48. One-way seamless hand-off and two-way seamless hand-off are two of the proposed methods for the implementation of seamless roaming. Each method is described below.
49. One-way seamless hand-off refers to the seamless hand-off or transfer (without dropping) of an in-progress call or data session of an end-user who leaves a regional wireless carrier's network and begins to roam on the network of the wholesale roaming provider. When the end-user moves back to the regional wireless carrier's serving area, there is no call hand-off back to the regional wireless carrier's network. Instead, the wholesale roaming provider maintains the call or data session on its own network until completion of the call or data session. While there is no seamless hand-off from the wholesale roaming provider's network back to the regional wireless carrier's network, the call or data session is not dropped in progress.
50. Two-way seamless hand-off refers to the seamless hand-off of in-progress calls or data sessions between networks when a regional wireless carrier's end-user moves from the national wireless carrier's network to an area served by the regional wireless carrier's network and vice versa.
51. The question of whether seamless hand-off should be one-way or two-way has arisen in the record of these tariff proceedings.

Positions of parties

52. Bell Mobility indicated that under its proposed tariff, the seamless hand-off functionality would apply to a voice call or data session initiated by an end-user on the home network of the regional wireless carrier when that end-user moves across the relevant boundary from their home network to roam on Bell Mobility's network. The seamless hand-off functionality would not apply to a voice call or data session initiated on Bell Mobility's network. Bell Mobility indicated that it would implement one-way seamless hand-off because dropped calls only occur when moving from a regional wireless carrier's network to a national wireless carrier's network. Bell Mobility indicated that a call initiated on its network will continue uninterrupted as a user moves back into a territory covered by a regional wireless carrier's network. For this reason, end-users would not be disadvantaged by the implementation of one-way seamless hand-off instead of two-way seamless hand-off. When the call is completed, the end-user's device would disconnect from Bell Mobility's network and re-register on that of the regional wireless carrier.
53. Bell Mobility explained that the difficulty in implementing two-way seamless hand-off has to do with identifying diminishing signal strength, which is the trigger for a hand-off. With one-way seamless hand-off, as an end-user moves toward the edge of the coverage of the regional wireless carrier's network, the signal strength between the end-user's device and the regional wireless carrier's network diminishes, and the network can be engineered to hand the call over to Bell Mobility's network where the signal strength is greater. Bell Mobility submitted that the fundamental problem with attempting to hand a call back in the opposite direction is that, on Bell Mobility's network, there would be no loss of signal strength at the edge of the regional wireless carrier's network, therefore no hand-off would be triggered. The company argued that it would have to inefficiently engineer its network to create an artificial loss of signal strength to accomplish this hand-off.
54. RCCI also proposed a one-way seamless hand-off solution in its proposed tariff, arguing that one-way seamless hand-off would accomplish the objective of preventing dropped calls and data sessions in a cost effective, timely, and simple way. It submitted that this specification would remove numerous complexities related to technical coordination and implementation, and the need for constant updates of network border topology and settings between the wireless carriers. One-way seamless hand-off would also remove the possibility of end-users bouncing between the network of a regional wireless carrier and RCCI's network.
55. TCI's proposed tariff did not specify whether its seamless roaming service would use one-way or two-way seamless hand-off. TCI submitted that seamless hand-off is complicated and would take years of coordination and custom implementation with each wholesale roaming customer.
56. Cogeco and Videotron supported a two-phased approach to implementing seamless roaming, beginning with one-way seamless hand-off.

57. Videotron submitted that the first phase of implementing seamless roaming would involve the seamless hand-off of calls and data sessions from the competitor network to the incumbent network, which is the direction in which most calls are dropped. It also indicated that with one-way seamless hand-off the vast majority of the implementation burden falls on the competitor since the incumbent need only act as a recipient of cell site decisions made by a competitor. Videotron noted that it has experience implementing seamless hand-off in this direction, having already done so with one incumbent.
58. Videotron acknowledged that the implementation of seamless hand-off from an incumbent network to a competitor network would be a more complex and time-consuming process for the incumbents, and Videotron would accept two-way hand-off being delayed to a second implementation phase if such a delay would facilitate implementation of one-way seamless hand-off by the Commission's deadline.
59. Eastlink and Sogetel were of the view that Bell Mobility and RCCI should be directed to update their definitions of seamless roaming to two-way seamless hand-off.
60. Eastlink argued that if the seamless roaming service does not also include two-way seamless hand-off, end-users who go from the roaming partner's network to the home network will experience prolonged roaming sessions which will result in additional costs to the regional wireless carriers. Eastlink added that there is a risk of poor customer experience if calls are dropped during the process, when end-users go back to their home network.
61. Xplornet submitted that while it recognizes that calls do not always drop as a customer returns from a roaming partner's network to their home network, two-way seamless roaming is especially important in areas where the roaming partner's network coverage is weaker than that of the home network.

Commission's analysis and determinations

62. In Telecom Regulatory Policy 2021-130, the Commission did not specify whether seamless hand-off must be implemented one-way or two-way when seamless roaming is deployed. The Commission's primary policy concern was minimizing dropped calls and data sessions because they are an irritant for consumers, and they create a perception of poor quality of service that negatively impacts competition. The Commission considers that the implementation of seamless roaming addresses these issues.
63. Both one-way and two-way seamless hand-off would achieve the goal of minimizing dropped calls, though in slightly different ways.
64. With one-way seamless hand-off, an end-user on a call or data session who crosses from a regional wireless carrier's network to a national wireless carrier's network would have that call or data session handed off seamlessly. Going the other way, from a national wireless carrier's network to a regional wireless carrier's network,

the end-user would simply remain on the national wireless carrier's network until the call or data session is completed, with no hand-off occurring. This latter scenario is what occurs with some mobile wireless carriers today. Two-way seamless hand-off would allow for traffic to be handed off seamlessly in both directions.

65. Of the two seamless roaming implementation methods, the Commission finds that one-way seamless hand-off can be operationalized faster and more efficiently than two-way seamless hand-off. This is because the network update that is necessary to facilitate one-way seamless hand-off largely only occurs on the side of the wholesale roaming customers, who have an apparent incentive to use the service as soon as possible. The national wireless carriers, as well as certain competitors, have indicated that two-way seamless roaming is much more complex to implement and that there are some technical challenges that would need to be overcome. Also, the national wireless carriers have had since 15 April 2021 to plan for the implementation of seamless roaming.
66. One-way seamless hand-off would achieve the Commission's objective of minimizing dropped calls and improving the quality of service of competitors, because the direction of seamless hand-off in this case would be from a regional wireless carrier to a national wireless carrier, and the record of these tariff proceedings indicates that most dropped calls are going in this direction. At this time, the Commission is not persuaded that the effort and resources involved with implementing two-way seamless hand-off, when compared with those involved with implementing one-way seamless hand-off, are proportionate to the problem it would be addressing.
67. Regarding arguments that without two-way seamless hand-off regional wireless carriers would incur additional roaming charges, these potential roaming charges are expected to be minimal since the end-user's device is handed back to the regional wireless carrier's network when a call is completed. Furthermore, the regional wireless carriers are expected to continue building out their mobile wireless networks' coverage to rely less on roaming, regardless of whether seamless hand-off is one-way or two-way.
68. In the Commission's view, one-way seamless hand-off can be operationalized relatively quickly for the reasons explained above. The implementation of two-way seamless hand-off could be revisited in the future if the circumstances allow for it, for example if it were to become easier to implement as technology progresses.
69. The Commission determines that the implementation of seamless roaming as mandated by the wholesale roaming requirement is to be provisioned using one-way seamless hand-off as defined above. The Commission **directs** the national wireless carriers to begin accepting written requests for seamless roaming from regional wireless carriers effective **immediately** and work in good faith to have the service operational for a requesting regional wireless carrier within **90 days** of receiving a request. The 90-day deadline may be extended upon mutual agreement between a national wireless carrier and a requesting regional wireless carrier.

How frequently should wireless carriers exchange network and border information?

70. In order for seamless hand-off to work effectively, a regional wireless carrier and a national wireless carrier must exchange information related to network border locations and topography. While parties recognize the need for exchange of information, there is disagreement as to how frequently it should occur.

Positions of parties

71. Bell Mobility and RCCI both proposed that regional wireless carriers should only be allowed to submit border changes to the national wireless carrier twice a year. TCI argued that the frequency of boundary updates is one of many issues that should be addressed by a CISC working group, but agreed that updates should occur no more than twice a year.
72. Bell Mobility submitted that the exchange of network cell site information in order to update boundaries should be required only when necessary. Bell Mobility argued that this approach appropriately balances the burden on the national wireless carriers, who will be required to develop and manage boundaries for an unknown number of regional wireless carriers, with the ability for regional wireless carriers to expand their networks.
73. Bell Mobility submitted that it does not have any technology capable of providing a daily or real-time exchange of detailed network configuration information between itself and a wholesale customer, and does not have any technology that would facilitate an automated process.
74. RCCI argued that its approach of allowing for two border changes per year, in combination with its tariff provision that end-users' devices are configured to preferentially register on the Wholesale Roaming Customer's public mobile network (PMN), balances operational costs to all parties and network impairment to end-users while allowing for additional border changes when it is in the interest of both parties.
75. TCI argued that cell site updates require a significant amount of effort on the part of the national wireless carriers. Regarding potential automated solutions, TCI indicated that manual involvement would still be required to filter out test sites and lab sites, to verify site removals and additions, and to reconcile information for each wholesale customer.
76. The national wireless carriers are of the view that daily updates, as some competitors are proposing, are impractical and unnecessary.
77. Wireless competitors generally favoured more frequent exchange of information. For example, Videotron and Xplornet rejected the limits on border updates, arguing that for efficient operation, cell site data must be exchanged and updated constantly, even daily, between the wireless carriers.

78. Videotron submitted that the robust exchange of cell site information is key to the success of seamless roaming. It provided a list of the specific cell site data elements that must be provided by the national wireless carriers to competitors in order to allow competitors to properly configure their detection and transfer algorithms for the effective implementation of phase one seamless hand-off. Videotron also argued that the Commission should direct each national wireless carrier to include a reference to this list in their seamless hand-off tariffs.
79. Eastlink submitted that there should not be an annual limit on network border updates to ensure that a regional wireless carrier who is in a period of expansion can rely on seamless roaming services as they expand, and that any network border updates should be provided daily as needed. Any limit on border updates would hinder the policy objective to incentivize regional wireless carriers to expand their networks.
80. Cogeco submitted that for one-way seamless roaming the only information a regional wireless carrier needs from a national wireless carrier is an up-to-date list of geo-referenced cell site information, a data set that should not be difficult for the national wireless carriers to produce since they already have it in hand as part of their network management procedures. Cogeco added that this information could be provided on a daily basis by using an automated process.
81. Xplornet submitted that in order for seamless roaming to be effective, boundary mappings must be constantly updated to reflect changes in network coverage. If this information is only updated once every six months, network expansion efforts can only be implemented by regional wireless carriers twice a year. Xplornet supported daily updates using an automated process since this would enable boundaries to be easily updated with minimal administrative burden on roaming customers or providers.
82. Sogetel argued that border updates should occur on a quarterly basis at least, with 60 days' notice upon implementation of seamless roaming and 30 days for ongoing updates to take effect.

Commission's analysis and determinations

83. In Telecom Regulatory Policy 2021-130, the Commission noted that regional wireless carriers have an incentive to expand their networks so as to minimize wholesale roaming charges. Timely border updates are needed to capture these changes. It is clear from the record that the exchange of cell site information to update network borders is also an important activity to ensure the effectiveness of seamless hand-off. While cell site information is typically tracked dynamically in software by regional wireless carriers and national wireless carriers, there is still an administrative burden associated with the exchange of such information since the national wireless carriers will have to manage boundaries with multiple regional wireless carriers.

84. However, the sharing of cell site information is only one step; the receiving party, (i.e., the national wireless carrier), must update the borders on its own cell site database to implement a change in borders. As such, it is reasonable to place a limit on the frequency of information exchange to manage the administrative burden.
85. In the Commission's view, daily information updates would place an undue administrative burden on the national wireless carriers, particularly if this information was received from numerous regional wireless carriers. Also, while certain parties have suggested automating this process, it is not clear from the record whether this could be achieved from a technological perspective.
86. On the other hand, limiting exchange of cell site information to twice a year like the national wireless carriers have suggested is not sufficient; as networks expand and boundaries shift, it is important to have up-to-date information to facilitate seamless hand-offs between networks.
87. To balance the concerns for the administrative burden on the national wireless carriers with the need to reflect expanding regional wireless carriers' networks, the Commission considers that, at most, monthly exchange of information is reasonable. It would be a balance between keeping cell site information up to date and managing the administrative impact on the national wireless carriers.
88. The Commission determines that regional wireless carriers are to provide updated cell site information to their wholesale roaming providers no more than once per month, in a standard format that is to be described in the tariffs. Upon receiving updated regional wireless carrier cell site information, the national wireless carrier is to make the necessary adjustments to its network within **30 days**. National wireless carriers are to provide their updated cell site information to a regional wireless carrier within **7 days** of receiving a request. The Commission **directs** the national wireless carriers to revise their tariff pages accordingly and to set out the standard format in the tariffs, for approval.
89. Notwithstanding the determinations above, the Commission notes that wireless carriers can mutually agree to share information more or less frequently.

On which technologies should seamless roaming be required to be offered?

90. There is debate in the record of these tariff proceedings as to whether the mandate to provide seamless roaming should apply to older legacy networks, namely 3G, and how it should apply to evolving 5G networks.

Positions of parties

91. Bell Mobility submitted that its roaming tariff does not specify the technology over which seamless roaming will be provided. However, it indicated that regarding its 3G network, its supporting equipment manufacturers have designated this technology as "manufacturer discontinued".

92. With respect to voice over new radio (VoNR),⁵ Bell Mobility submitted that it does not offer this service on its network today nor can it support roaming (whether seamless or otherwise) on this basis. Bell Mobility added that to the best of its knowledge, seamless hand-off of a VoNR call has not been operationalized on any network in the world at this time.
93. RCCI's proposed wholesale roaming tariffs propose seamless roaming which supports 4G, as well as 5G RANs with control signalling on a 4G core. It submitted that requiring seamless hand-off for legacy technology such as 2G and 3G services is not an efficient use of resources. It indicated that voice over long-term evolution (LTE) [VoLTE] represents the largest share of voice minutes while 4G/LTE also represents by far the largest share of data traffic. RCCI argued that mandating seamless roaming on legacy technologies, with minimal benefit to most end-users, is unnecessary and wasteful, and that these legacy technologies are being decommissioned across the national wireless carriers' networks.
94. TCI submitted that the Commission should disregard calls to force the provision of wholesale roaming on 3G or obsolete technologies. It argued that national wireless carriers must not be mandated to continue providing new services on technologies which they have either discontinued or soon plan to discontinue for their own retail customers, since doing so would negatively impact innovation and investment; the human and technical resources required to maintain obsolete network technologies mean fewer resources and investment dollars to focus on current and future-facing technologies.
95. Videotron submitted that in the interest of accelerating the implementation of seamless hand-off functionality for non-legacy (4G and 5G) technologies, it is prepared to forego the implementation of this functionality for legacy (2G and 3G) technologies. It noted the proposed definition of seamless roaming in TCI's tariff refers to the hand-off of "VoLTE calls and data sessions" which would appear to exclude 5G, which would be a violation of Telecom Regulatory Policy 2021-130. Videotron asked the Commission to direct the national wireless carriers to clarify in their tariffs that seamless roaming would apply to 4G/LTE (i.e., VoLTE) and 5G (i.e., VoNR) calls.
96. Eastlink indicated that it has completed the phase-out of its 3G network and is now fully operating a 4G VoLTE network.
97. Iristel and Sogetel both agreed that seamless roaming should not be required on 3G networks.

⁵ "Voice over New Radio" is a term used in the telecommunications industry that relates to the enabling of voice calls on 5G networks.

98. The ITPA argued that legacy networks are still operational and that the national wireless carriers should be required to support seamless roaming on 2G and 3G networks until their own networks are decommissioned, providing reasonable notice before those networks are turned down.
99. Xplornet submitted that seamless roaming on 2G and 3G networks is important for customers who are continuing to use older devices that are not 4G or 5G compatible. It added that although 3G devices remain relatively common today it expects that their prevalence will decline in the coming years.

Commission's analysis and determinations

100. The mandate set out in Telecom Regulatory Policy 2015-177 to provide wholesale roaming applies to all GSM-based networks. This includes network technology generations including 3G, 4G/LTE and, as of the publication of Telecom Regulatory Policy 2021-130, 5G networks. 2G, which is not GSM-based, is therefore already excluded from the seamless roaming framework set out in Telecom Regulatory Policy 2021-130. Excluding 3G technology from the seamless roaming framework was not considered in Telecom Regulatory Policy 2021-130.
101. The evidence on the record of this proceeding shows that the vast majority of calls and data sessions currently occur on 4G/LTE networks using VoLTE. The Commission considers then that the vast majority of dropped calls and data sessions occur on 4G/LTE networks and that the number of dropped calls and data sessions that occur on 2G and 3G networks would be comparatively much smaller.
102. 3G is a legacy technology that has been, or is in the process of being, decommissioned by mobile wireless carriers, and equipment vendors are unlikely to support major changes to installed equipment going forward. Therefore, 3G is widely expected to become obsolete in the near future as the industry moves to 4G/LTE, 5G, and beyond. The record suggests that 2G and 3G networks could continue to be used in some capacity for the Internet of Things and machine-to-machine applications; however, the Commission considers that seamless roaming is not necessary for those purposes.
103. The Commission is not persuaded that as a matter of policy the obligation to provide seamless roaming should apply to 3G networks. The Commission considers that it is far more important for wireless carriers to focus their efforts on ensuring that seamless roaming is implemented on predominant and emerging network technologies rather than legacy ones.
104. The Commission therefore determines that the obligation to provide seamless roaming applies to 4G/LTE (i.e., VoLTE calls) and 5G networks (i.e., VoNR calls) and not to 3G networks. The Commission **directs** the national wireless carriers to update their proposed tariff pages for approval.

105. Seamless roaming for 5G networks, which are currently being rolled out on a non-standalone (NSA) basis (i.e., a mix of 4G/LTE and 5G technology), will depend on 5G core interconnections, which the record indicates have not yet been deployed. The national wireless carriers are required to provide seamless roaming for 5G data sessions and VoNR, once wholesale roaming is available on their 5G-SA core networks. At such a time, the Commission **directs** the national wireless carriers to file updates to their tariffs reflecting this determination.

Should direct interconnection be mandated?

106. In Telecom Decision 2017-56, the Commission determined that indirect interconnection was the appropriate method of interconnection for mandated wholesale roaming services.

107. In these tariff proceedings, certain parties are calling for the Commission to require the national wireless carriers to offer a direct interconnection option to facilitate seamless roaming.

Positions of parties

108. Bell Mobility submitted that while it is prepared to implement direct interconnections with wholesale customers on a negotiated basis where traffic volumes would justify doing so, it is not appropriate to include this as an obligation in the tariff.

109. TCI submitted that the Commission should disregard calls to mandate direct interconnection as there are no latency performance issues caused by indirect interconnection. Parties who wish to interconnect directly with wholesale service providers can negotiate such an arrangement as part of an off-tariff agreement. TCI agreed with other parties who suggested that if there are issues with latency as a result of indirect interconnection, this matter can be subject to a follow-up CISC proceeding.

110. The national wireless carriers generally argued that direct interconnection would lead to higher ongoing transport costs than indirect (third-party) interconnection, and the national wireless carriers would require additional compensation.

111. A number of competitors argued that for seamless roaming and 5G roaming to be effective, direct interconnection will be necessary to mitigate latency issues, and that the national wireless carriers should be required to provide a direct interconnection option as part of the tariffed wholesale roaming service.

112. Videotron submitted that core-to-core interconnections are necessary for seamless roaming, and direct network-to-network interface (NNI) interconnections are necessary for both seamless roaming and 5G roaming. It argued that with the arrival of these new services, third-party interconnection becomes a performance liability. Seamless roaming and 5G services rely on purpose-built levels of latency. Third-party interconnections cause latency that negatively impacts competitors' quality of service, which directly affects the ability of competitors to compete successfully in the retail marketplace.

113. Iristel indicated that it is not proposing any modifications to the current methods of indirect interconnection that are found in the approved wholesale roaming tariffs at this time. However, Iristel submitted that one of the principal benefits of 5G is ultra-low latency, and it is concerned that the current indirect interconnection regime may result in situations where wholesale customers are not able to take advantage of this ultra-low latency with indirect interconnection. To the extent that latency with indirect interconnection becomes an issue that may need to be addressed, it could be subject to a follow-up CISC proceeding.

Commission's analysis and determinations

114. National wireless carriers currently only offer the wholesale roaming service with third-party indirect interconnections. In Telecom Decision 2017-56, the Commission considered whether to mandate direct interconnection. It chose not to and mandated indirect interconnection instead. However, the Commission noted that if national wireless carriers were directly interconnecting with each other but not with competitors of a similar scale, this practice could indicate preferential treatment. However, there was no evidence of such an occurrence in that proceeding so as to initiate any further inquiry into an instance of non-compliance with subsection 27(2) of the *Telecommunications Act* (the Act).

115. When the Commission determined that indirect interconnection would be appropriate for wholesale roaming in Telecom Decision 2017-56, most voice calls were on 3G networks. Since then, VoLTE calls over 4G/LTE networks have become predominant and indirect interconnection has remained the standard form of interconnection in Canada.

116. However, two important developments have occurred since that decision was made. First, the provision of seamless roaming is now an obligation, since the release of Telecom Regulatory Policy 2021-130. Second, wireless carriers in Canada have begun to deploy 5G networks.

117. The Commission considers that direct interconnection offers important benefits that indirect interconnection does not. A key feature of 5G networks is low latency, which is important for time-sensitive applications. Direct interconnections between carriers can reduce latency and improve the customer experience since network traffic has a shorter distance to travel. There is also the potential for a higher volume of regional traffic exchanged with regional wireless carriers as they deploy 5G equipment and expand their networks and customer bases.

118. There are costs associated with direct interconnection that must be considered, including up-front implementation costs as well as ongoing operational costs. However, the cost implications are not well developed in the record of these proceedings. Regional wireless carriers may require multiple direct connections, for example one or two per province in which they operate, to realize lower latency. Direct interconnection could result in higher transport costs because traffic from multiple wholesale customers can no longer be aggregated and transported to a common third-party interconnection point. These costs would typically be borne by the wireless carriers and passed along to retail customers.

119. Regarding arguments that direct interconnection is necessary for 5G applications, 5G network deployment is still in the early stages and, with the exception of RCCI, wireless carriers have not yet announced the launch of their 5G-SA core networks in Canada. Where 5G service is being offered, it is being done using a combination of 4G/LTE core networks and a 5G RAN (i.e., NSA). While direct interconnection may eventually be a preferred method of interconnection in an environment where 5G is the prevailing technological generation, most network traffic is still on 4G/LTE networks where direct interconnection is not vital. Therefore, direct interconnection is not an imminent need and the Commission determines that indirect interconnection remains the mandated form of interconnection for wholesale roaming.
120. Nevertheless, the Commission acknowledges that the evolution of wireless networks is happening quickly and that direct interconnection will be required for effective 5G-enabled time-sensitive applications, including seamless roaming.
121. The Commission is concerned that the national wireless carriers will have a head start over regional wireless carriers when it comes to 5G deployment, and denying direct interconnection between 5G core networks would harm competition. The Commission therefore takes a preliminary view that failure by the national wireless carriers to provide regional wireless carriers with direct interconnection between 5G-SA core networks, while the national wireless carriers are directly interconnecting among themselves, would raise concerns of undue preference/unreasonable disadvantage under subsection 27(2) of the Act.
122. The Commission **directs** the national wireless carriers to notify regional wireless carriers who are customers of their wholesale roaming services **six months prior** to the launch of a 5G-SA core network and begin working in good faith to implement direct connections upon request. If a national wireless carrier has already launched its 5G-SA core network, or plans to do so less than 6 months from the date of this decision, it must immediately notify regional wireless carriers who are customers of its wholesale roaming service. The Commission **directs** the national wireless carriers to file tariff updates reflecting the availability of direct interconnection as an option at the time of notification.
123. The Commission notes that under the current wholesale roaming policy framework, carriers are permitted to enter into off-tariff agreements and, as such, direct interconnection arrangements can be negotiated at present. Parties are reminded that they can avail themselves of the Commission's dispute resolution processes if they cannot agree on direct interconnection arrangements.

Has 5G roaming been appropriately included in the proposed tariffs?

124. Currently, wholesale roaming is available on universal terrestrial radio access networks (UTRAN, or 3G) and evolved universal terrestrial radio access networks (EUTRAN, or 4G/LTE).

125. In Telecom Regulatory Policy 2021-130, the Commission clarified that its wholesale roaming policy also applies to 5G networks, which are next generation radio access networks (NGRAN).
126. This section examines whether the national wireless carriers' proposed tariffs appropriately reflect the Commission's determinations with respect to applying the wholesale roaming policy to 5G networks.

Positions of parties

127. Bell Mobility's proposed tariffs include roaming on NGRAN in addition to roaming on UTRAN and EUTRAN.
128. RCCI submitted that it added 5G to its list of technologies applicable for the wholesale wireless roaming rates. It also added a provision clarifying that RCCI is only obligated to provide services for a functionality or technology for which standards and industry guidelines have been developed, namely 5G-NSA networks. RCCI argued that this was necessary to ensure that wholesale roaming customers cannot insist on a functionality and/or technologies before the industry has settled on standards and guidelines.
129. TCI indicated that it included reference to 5G-NSA networks in its GSM-based roaming service tariff.
130. Regarding calls for the Commission to mandate the national wireless carriers to include 5G-SA in their roaming tariffs, TCI submitted that it does not currently offer 5G-SA to its customers and it is not yet in a position to offer 5G-SA roaming because it is still determining its network architecture for this future mode of deployment. It argued that it is therefore premature to mandate the inclusion of 5G-SA in TCI's roaming tariff. As the industry progresses further towards the rollout of 5G-SA networks, it would be ideal to determine implications for the roaming tariffs within a CISC working group.
131. Certain competitors submitted that the national wireless carriers should be directed to use a consistent statement in their tariffs that clarifies that wholesale roaming applies to UTRAN (3G), EUTRAN (4G/LTE) and NGRAN (5G) technologies deployed in their footprint.
132. A number of regional wireless carriers argued that the wholesale roaming tariffs should support future technologies including 5G-SA core interconnection and the inclusion of VoNR, wherever available.

Commission's analysis and determinations

133. In Telecom Regulatory Policy 2021-130, the Commission confirmed that its wholesale roaming policy applied to 5G networks, which include both 5G-NSA and 5G-SA networks.

134. The Commission **directs** the national wireless carriers to specify in their tariffs that wholesale roaming will be available on their NGRANs (5G), and include VoNR calls and data sessions.
135. The national wireless carriers currently use 5G-NSA networks and, as of the date of this decision only RCCI has announced a 5G-SA network. The record also indicates that industry standards are still being worked on for 5G-SA roaming. Nevertheless, the Commission **directs** the national wireless carriers to make wholesale roaming on 5G-SA networks available to regional wireless carriers, once 5G cores are deployed in their networks and wherever 5G-SA networks are available.
136. The Commission **directs** the national wireless carriers to notify regional wireless carriers who are customers of their wholesale roaming services **six months prior** to the launch of a 5G-SA core network, or provide notification immediately for any national wireless carrier that has already announced a 5G-SA network as of the date of this decision, and update their tariffs at that time to enable roaming on the 5G-SA network.

Other matters

137. In Telecom Regulatory Policy 2021-130, the Commission required the national wireless carriers to file proposed tariff pages to reflect the determinations regarding seamless roaming and 5G. Some proposed tariff revisions went beyond the scope of the determinations in this decision, and were made in the context of the wholesale MVNO access tariff notice proceedings, which as of the date of this decision are still under consideration by the Commission. In particular, TCI proposed to revise Item 233.2 of its wholesale roaming tariff, to add a definition of permanent roaming. This proposal conflicts with the Commission's determinations in Telecom Decision 2017-56 regarding a definition of permanent roaming and is out of scope of the modifications to the mandated roaming service set out in Telecom Regulatory Policy 2021-130. As such, this proposed change is not approved as part of this decision.
138. Furthermore, as a general matter, in filing revised tariff pages for the Commission's approval, the national wireless carriers are to remove any proposed changes to their wholesale roaming tariffs that (i) do not relate to either the provisioning of seamless roaming or 5G roaming, or (ii) are not of a housekeeping nature.
139. In Telecom Regulatory Policy 2021-130, the Commission noted that the proper reflection of the underlying costs associated with the implementation of seamless roaming in the tariffed wholesale roaming rates may be appropriate upon implementation of seamless roaming. RCCI and TCI have proposed to include provisions relating to rates for the seamless roaming service, without specifying the rates (Items 800.15.1 and 233.4.2, respectively). The national wireless carriers are reminded that any changes to their tariffed wholesale roaming rates require prior Commission approval.

Final tariff approval process

140. The Commission **directs** the national wireless carriers to file updated tariffs that reflect the Commission's determinations in this decision within **15 days** of this decision. Once filed, the updated tariffs will follow the process for competitor tariff applications set out in Telecom Information Bulletin 2010-455-1. Submissions are to be limited to whether the revised tariff provisions reflect the determinations in this decision.

Conclusion

141. The Commission determines that at this time it will not refer matters to CISC regarding the implementation of seamless roaming.
142. The Commission **directs** national wireless carriers to revise their tariff proposals to remove any wording in their tariff pages that gives them the discretion to deny the provision of seamless roaming based on unilateral feasibility assessments.
143. The Commission also **directs** RCCI and TCI to revise their tariff pages as necessary to ensure that their tariffs set out the process for implementation of seamless roaming between themselves and any given regional wireless carrier, as well as the process for making a request for the implementation of seamless roaming.
144. Consistent with the Commission's determinations on in-footprint roaming in Telecom Decision 2017-56, the Commission **directs** the national wireless carriers to revise their tariffs to clarify that seamless roaming should be available for use by regional wireless carriers where they have in-footprint coverage gaps.
145. The Commission determines that the implementation of seamless roaming as mandated by the wholesale roaming requirement is to be provisioned using one-way seamless hand-off. The Commission **directs** the national wireless carriers to begin accepting written requests for seamless roaming from regional wireless carriers effective **immediately** and work in good faith to have the service operational for a requesting regional wireless carrier within **90 days** of receiving a request.
146. The Commission determines that the regional wireless carriers are to provide updated cell site information to their wholesale roaming providers no more than once per month, in a standard format that is to be described in the tariffs. Upon receiving updated regional wireless carrier cell site information, the national wireless carriers are to provide their updated cell site information to a regional wireless carrier within **7 days** of receiving a request. The Commission **directs** the national wireless carriers to revise their tariff pages accordingly and to set out the standard format in the tariffs, for approval.
147. 2G networks are excluded from the seamless roaming framework as set out in Telecom Regulatory Policy 2021-130. The Commission determines that the obligation to provide seamless roaming applies to 4G/LTE (i.e., VoLTE calls) and 5G networks (i.e., VoNR calls) and not to 3G networks. The Commission **directs** the national wireless carriers to update their proposed tariff pages for approval.

148. The national wireless carriers are required to provide seamless roaming for 5G data sessions and VoNR, once wholesale roaming is available on their 5G-SA core networks. At such a time, the Commission **directs** the national wireless carriers to file updates to their tariffs reflecting this determination.
149. The Commission determines that indirect interconnection remains the mandated form of interconnection for wholesale roaming. Nevertheless, the Commission **directs** the national wireless carriers to notify regional wireless carriers who are customers of their wholesale roaming services **six months prior** to the launch of a 5G-SA core network and begin working in good faith to implement direct connections upon request. The Commission **directs** the national wireless carriers to file tariff updates reflecting the availability of direct interconnection at that time.
150. The Commission **directs** the national wireless carriers to specify in their tariffs that wholesale roaming will be available on their NGRANs (5G), and include VoNR calls and data sessions. The Commission also **directs** the national wireless carriers to make wholesale roaming on 5G-SA networks available to regional wireless carriers, once 5G cores are deployed in their networks and wherever 5G-SA networks are available. The Commission **directs** the national wireless carriers to notify regional wireless carriers who are customers of their wholesale roaming services **six months prior** to the launch of a 5G-SA core network, or provide notification **immediately** for any national wireless carrier that has already announced a 5G-SA network as of the date of this decision, and update their tariffs at that time to enable roaming on the 5G-SA network.
151. Finally, the Commission **directs** the national wireless carriers to file updated tariffs that reflect the Commission's determinations in this decision within **15 days** of this decision.

Policy Direction

152. The Commission considers that its determinations in this decision are consistent with the 2006 Policy Direction⁶ and the 2019 Policy Direction,⁷ as well as with the policy objectives of the Act.
153. First, market forces cannot be relied upon to ensure the timely and efficient implementation of seamless roaming by the national wireless carriers. The regulatory measures the Commission is imposing in this decision are efficient and proportionate to their purpose, consistent with paragraph 1(a) of the 2006 Policy Direction.

⁶ *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives*, SOR/2006-355, 14 December 2006

⁷ *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives to Promote Competition, Affordability, Consumer Interests and Innovation*, SOR/2019-227, 17 June 2019

154. The Commission considers that its determinations in this decision, which seek to enable the implementation of seamless roaming to the benefit of regional wireless carriers, support the 2019 Policy Direction's call to, among other things, reduce barriers to entry into the market and to competition for telecommunications service providers that are new, regional, or smaller than the incumbent national service providers.
155. As the Commission found in Telecom Regulatory Policy 2021-130 with respect to the mandating of seamless roaming as a matter of policy, the Commission considers that its determinations in this decision, which seek to implement that policy expediently to the benefit of regional wireless carriers and consumers across the country, are consistent with paragraph 7(b) of the Act⁸, since they would help to ensure that affordable access to high-quality telecommunications services is available in all regions of Canada, including rural areas.
156. Furthermore, the adverse impact that the continued absence of seamless roaming has on the regional wireless carriers' retail customers serves to undermine the quality of service that is provided to them and further undermines the development throughout Canada of a telecommunications system that serves to safeguard, enrich, and strengthen the social and economic fabric of Canada and its regions, which is inconsistent with paragraph 7(a) of the Act⁹.
157. Finally, by adversely affecting the regional wireless carriers' ability to compete with the national wireless carriers and other wireless carriers that have seamless roaming, the continued absence of this functionality undermines the efficiency and competitiveness of Canadian telecommunications, which is further inconsistent with paragraph 7(c) of the Act.¹⁰

Secretary General

Related documents

- *Review of mobile wireless services*, Telecom Regulatory Policy CRTC 2021-130, 15 April 2021
- *Practices and procedures for dispute resolution*, Broadcasting and Telecom Information Bulletin CRTC 2019-184, 29 May 2019
- *Wholesale mobile wireless roaming service tariffs – Final rates*, Telecom Order CRTC 2018-99, 22 March 2018

⁸ The cited policy objective is: 7(b) to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada

⁹ The cited policy objective is: 7(a) to facilitate the orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions

¹⁰ The cited policy objective is: 7(c) to enhance the efficiency and competitiveness, at the national and international levels, of Canadian telecommunications

- *Wholesale mobile wireless roaming services – Final terms and conditions*, Telecom Decision CRTC 2017-56, 1 March 2017
- *Follow-up to Telecom Decision 2017-56: Wholesale mobile wireless roaming service tariffs – Final terms and conditions*, Telecom Order CRTC 2017-433, 6 December 2017
- *Approval processes for tariff applications and intercarrier agreements*, Telecom Information Bulletin CRTC 2010-455-1, 19 February 2016
- *Regulatory framework for wholesale mobile wireless services*, Telecom Regulatory Policy CRTC 2015-177, 5 May 2015
- Telecom Public Notice CRTC 96-28, 1 August 1996