

The need for affordable WiMAX in the 1.4 GHz SRS Band for improving broadband availability in rural Canada

Summary

Xittel telecommunications inc. is a competitive local exchange carrier and Internet Service Provider with a corporate mission of providing telecommunications services in underserved communities in Quebec, Ontario and PEI.

As part of a market trial, Xittel has sought and obtained SRS licenses from the Department. However, the pricing of such licenses has never been specific to the band itself and has followed the general rules prescribed by the Radiocommunications Act. Unfortunately, based upon a desired speed of 4 mbps and the default pricing rules, the costs of licenses are in excess of \$10 per month per user and thus make the provision of services using this band uneconomic.

In the present consultation, the department is considering, amongst other things abolishing the possibility that the SRS band may be further utilized for the purpose of providing broadband services in Rural Canada. Xittel says otherwise and has a proposal. Allow for the SRS band to be licensed at terms and conditions similar to the WBS (3.65 to 3.7 GHz) band, and Xittel will make use of the band. In fact, Xittel will also make use of the entirety of the spectrum for band L. And finally, Xittel is also able to tell the Department that it has partnered with Airspan Networks and deployed WiMAX equipment compatible with the frequencies in band L. Thus Xittel considers it as an important opportunity that this consultation may pave the way for an important opportunity to improve the availability of broadband services in rural Canada.

There are few other options without compromises

Xittel has the largest Canopy 900 MHz footprint of any service provider in Quebec. Making good use of the 900 MHz band is plagued with difficulties arising of the significant presence of interferences from other unlicensed services, and the shortage of spectrum in this band makes it very hard to provide services at modern speeds. Xittel has tried Rural and Remote Broadband Spectrum and the licensing experiment resulted in a failure. Xittel has sought to make use of the TV spectrum, but it will likely that there is a strong chance that there will be little to no opportunity for small carriers to get a portion of the 700 MHz spectrum in the upcoming public consultation and auctions. Xittel is currently now deploying WiMAX in the WBS (3.65 to 3.7 GHz) band and has committed in its application to Industry Canada for the stimulus funding program of \$225M, to make increased use of WiMAX in order to provide services at speeds comparable to wireline (DSL, Cable) alternatives.

We can see that the better performance of a lower frequency, i.e. the lower free space attenuation that a lower frequency has over a higher frequency, remains linear over any distance. In the case of 1.4 GHz versus 3.65 GHz, there is a linear sub 10 dB better performance of 1.4 GHz over 3.65 GHz which remains linear over any distance.

Should different technologies be compared, such as 802.16e WiMAX which features an 12 dB gain over 802.16D in 3.65 GHz versus 802.16D in 1.4 GHz, then, in **line of sight conditions**, it is the technology utilized, and not the frequency which would make one better over the other.

However, it is penetration through foliage that concerns the provision of broadband services in rural areas, and this is where the 1.4 GHz band has a significant edge over 3.65 GHz. The frequency itself makes a big difference. The lower the frequency, the lower the loss, as can be observed in this table.

Frequency in Ghz	Loss per meter due to foliage
0.90 GHz	.19 dB/m
1.40 GHz	.22 dB/m
2.40 GHz	.26 dB/m
3.65 GHz	.29 dB/m
5.70 GHz	.34 dB/m

It is easily observed that at 5.7 GHz, the signal fades almost twice as fast than at 900 Mhz, which explains the popularity of this band for the application of providing broadband services in rural areas. However, the 900 Mhz band is very congested and does not offer sufficient capacity to meet the performance objectives set by Industry Canada in its latest broadband program.

When the 1.4 GHz band is compared to the most recently made available band of 3.65 GHz, we can see that the performance of 1.4 GHz over 3.65 GHz fades at a pace that remains always better by about 0.7 dB per meter of foliage depth. Considering that ITU-T Recommendation P.883-2 "Attenuation in Vegetation" shows that attenuation in excess of 30 dBs is attained as soon as foliage depth exceeds 15 meters. Given that the 1.4 GHz band is always better by 0.7 dB per meter of foliage, than 3.65 GHz, we can see that a signal that would not cross that last wall of 15 meters of vegetation at 3.65 GHz, would more than probably do so at 1.4 GHz. The technological advantage of 802.16e with MIMO Matrix A over 802.16D without antennae diversity of 12 dBs is rendered ineffective by $12/0.7=$ as little as 17 meters of foliage depth.

Conclusion

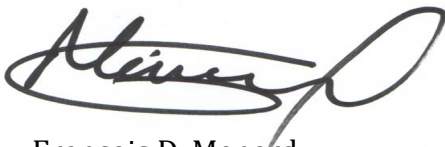
Xittel telecommunications has assessed that there will unfortunately be no real commercial available alternative to 1.4 GHz band on a 3 to 5 years horizon, as;

- 1) The RRBS band is not commercially viable due to limited and dissimilar channels being awarded and the fact that there is no WiMAX profile for RRBS
- 2) WBS (3.65 to 3.7 GHz) band WiMAX systems do not perform as well as they should under heavy foliage attenuation compared to 1.4 GHz WiMAX systems
- 3) The public consultation on 700 MHz spectrum is not yet released and that it is a fair expectation that none of this spectrum could be utilized for the application of providing affordable broadband services in rural Canada
- 4) The public consultation for broadband in the interstitial space between television channels has not yet been announced
- 5) Public consultation for broadband in the lower portion of the UHF band has not yet been announced

Achieving good coverage in heavy foliage environments is a principal objective of any WiMAX deployment in rural areas. Unless the 1.4 GHz band is made available on the same terms and conditions than the 3.65 GHz band, Xittel will have no choice but to continue to mix and match multiple technologies (such as feeding sub tree canopy 900 MHz systems from above tree canopy 3.65 GHz systems) in order to achieve ubiquitous broadband coverage. Xittel submits that use of the 1.4 GHz band at terms and conditions similar to the WBS band, would avoid having to use of several technologies, and would go a long way towards making deployments in rural Canada more economically viable.

Xittel would like to thank the Department for the opportunity to share these comments and commits to participate in any further effort required to arrive at a consensus on the possibility of making use of the L band for the purpose of providing broadband services to rural Canadians.

Best regards,



Francois D. Menard
Director of technology
Xittel telecommunications inc.
1350 Royale #800
Trois-Rivieres, QC, G9A 4J4
Canada
Tel: +1 819 601-6633
Fax: +1 819 374-0395
francois.menard@xittel.com