

**Canada Gazette Notice DGTP-003-08**  
**Consultation Paper on the Possible Use of the Extended-Ku Spectrum**  
**Bands for Direct-to-Home (DTH) Satellite Broadcasting Services**

**Fixed Services Response**

**Introduction**

Bell Canada, Harris Stratex Networks LLC, TELUS Communications Company, and Rogers Communications Inc. (collectively, “the Fixed Service Providers”) are pleased to respond to Canada Gazette Notice DGTP-003-08, Consultation Paper on the Possible Use of the Extended-KU spectrum Bands for Direct-to-Home (DTH) Satellite Broadcasting Services (the Consultation Paper).

The Fixed Service Providers actively participated in the development of the Radio Advisory Board of Canada’s (RABC’s) response to the Consultation Paper: specifically, the comments of the Fixed Service Providers that are incorporated in the RABC’s response.

The above named companies are firmly opposed to the prospect of re-designating the extended Ku band for exclusive use by the fixed satellite service (FSS), especially given the very recent issuance of the Department’s spectrum utilization policy for this band (SP3-30). We have committed our resources and planning to the availability of this spectrum for the immediate and long term future as it was our expectation that the satellite service providers would utilize the spectrum designated for their use. Manufacturers base the efficient design of their radio equipment on the specific characteristics of the spectrum allocated and commit developmental resources on the basis of the regulatory certainty provided by Industry Canada’s spectrum policies.

**General**

The Consultation Paper notes that certain fixed service providers are currently licensed in the 11 GHz band to operate digital microwave backhaul facilities for their commercial mobile networks. The Fixed Service Providers are concerned with the Department’s proposal to limit their continued use of this band. Added to this concern is the fact that the Department has proposed in a separate consultation paper to similarly limit the Fixed Service Providers from operating in the 15 GHz band. While the options available to the Fixed Service Providers are under threat of diminishing, it is important to note that demand for suitable additional microwave backhaul spectrum is dramatically

increasing as these Providers expand the capacity of their networks to support new and innovative mobile broadband data services and applications.

There are currently over 21 million mobile subscribers in Canada. While the vast majority of the traffic generated by these subscribers has traditionally been related to voice services, this is rapidly changing as more and more Canadians adopt broadband mobile data services. The explosive growth in broadband mobile data usage is driven by the rollout of advanced 3.5G networks to over 75% of the Canadian population and the introduction of a variety of smartphone devices that support the use of mobile broadband services and applications, including high speed video, TV and web browsing. One mobile service provider recently publicly disclosed that smartphone devices comprised 50% of mobile device upgrades in the fourth quarter of 2008. As well, a recent and widely reported study<sup>1</sup> regarding mobile data trends noted that the popular iPhone smartphone device typically generates 30 times the mobile data traffic compared to a basic-feature mobile phone and that lap-tops equipped with a 3.5G modem will generate 450 times the traffic of a basic mobile phone. It is not surprising, therefore, that mobile data traffic is currently forecast to double every year between 2009 and 2013. Clearly, mobile broadband data services are dramatically growing and mobile service providers must expand their backhaul facilities to support these services. The evolution to 4G technologies like WiMax and LTE will significantly add to the requirements for backhaul facilities.

As a general matter, adequate suitable spectrum for microwave backhaul capacity is required wherever mobile networks have been built. Backhaul spectrum is required in major urban centers and sub-urban areas to allow for the rapid enhancement of coverage or for additional capacity. Mobile radio base stations are not necessarily situated near existing fibre systems, which means that microwave backhaul is the preferred option in these circumstances. Backhaul spectrum is also important in rural and remote areas where fibre and leased facilities are not economic. The expansion of microwave backhaul systems in these areas has already begun and will continue as 3.5G and 4G services are extended to the approximately 95% of the Canadian population that are already served by 2.5G and 3G networks.

It is important to note that the ongoing rollout of new and advanced mobile services has been imposed on certain mobile service providers as a condition of their spectrum licenses. The use of microwave backhaul facilities to support the provision of new and advanced mobile services is also consistent with Canadian Telecommunications Policy objectives which are intended, among other things, “to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada”. Further, given that, in the 2009 budget, the federal

---

<sup>1</sup> Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, January 29, 2009

government has allocated \$225 million to develop and implement a strategy for extending broadband coverage to un-served communities, it is essential that the Department take steps to ensure that adequate spectrum is available for microwave backhaul systems used to provide mobile broadband services.

Additional spectrum is required for microwave wireless backhaul, not less, and the 11 GHz band is a key backhaul alternative that is available to mobile service providers, when expanding the capacity of their networks to keep up with the surging demand for broadband mobile services. Like the 15 GHz band, the 11 GHz band is an ideal choice for short and mid-range link distances and for medium and high capacity links. A number of high frequency bands are available for shorter links and a number of low frequencies are available for longer links. Restricting the use of the 11 GHz and 15 GHz bands by fixed services will create a void in the options that are available to mobile service providers as they build and enhance their networks.

As noted in section 2.1 of the Consultation Paper, a major spectrum sharing review was conducted in the 3-30 GHz range. At that time, it was concluded that sharing of the 11 GHz band between the fixed service and FSS was possible on a co-coordinated basis. The Department's spectrum utilization policy for the 11 GHz band currently requires earth stations to be individually coordinated and authorized and they are limited to non-ubiquitous deployments. The policy also requires that, in implementing FSS earth terminals, practicable measures must be taken to facilitate the continued introduction of fixed service systems in the band, particularly near urban centres. The Fixed Service Providers fully support this policy and we respectfully request that the Department continue to manage the band on this basis. We do not support the proposal to displace fixed service systems from the extended-Ku bands or to designate these bands for the exclusive use of FSS for DTH services.

From our perspective, there has not been any additional formal review that would lead us to a different conclusion. We note that this proceeding is to seek comments on a "request to use the extended Ku spectrum bands for DTH broadcasting services" and hence does not constitute a formal review. Thus, procedurally, since the original premise of the allocation was that sharing was possible for the services envisaged at the time, it is necessary to review the viability of the new services to operate in the current allocations before considering major changes of the significance being contemplated here. Furthermore, the review "was intended as a long-term planning exercise, taking into account the requirements of both Satellite and terrestrial services" and this purpose is undermined by frequent reviews of the policy. In the present instance, clearly the review made provisions for future FS growth in the extended Ku bands and for future FSS and broadcast satellite service (BSS) growth in the exclusive Ku band and the Ka bands, 17/24, 18/28 and 19/30 GHz bands. We believe that current policy should not be changed

merely because one party failed to plan accordingly. This is especially so since the technology for the 17/24 and 18/28 GHz is available.

Not all direct-to-home service providers agree with the position that extended-Ku is the only option available. ExpressVu, believes that BSS properly belongs in the Ka-band for purposes of global development, and Ka options should be exhausted first. Furthermore, the design and installation of new residential antennas is common practice in the DTH business as part of capacity expansion investments.

As outlined in greater detail below, there are other options available for satisfying the capacity requirements of FSS DTH. The Department should not permit the DTH proponents to shift the economic burden associated with their capacity requirements onto the backs of the Fixed Service Providers by requiring the displacement of fixed service systems from the extended-Ku bands.

### **Responses to Specific Questions**

**1.(a) The Department seeks comments as to whether the spectrum utilization policy of the Ku frequency band 10.7-11.7 GHz should be changed to accommodate the provisioning of DTH services and, if so, what the designated use for each of the sub-bands should be.**

As noted above, The Department's spectrum utilization policy for the 11 GHz band (SP 3-30 GHz) currently requires earth stations to be individually coordinated and authorized and they are limited to non-ubiquitous deployments. The policy also requires that practicable measures must be taken to facilitate the continued introduction of fixed service systems in the band, particularly near urban centres, when implementing FSS earth terminals. Non-broadcasting FSS services are already permitted on a first-come, first-served (FCFS) basis. The Fixed Service Providers are opposed to the modification of this policy to accommodate DTH services since coordinating with these services would be impractical.

Prior to the last consultation on SP 3-30 GHz, the satellite services were essentially precluded by footnote C16A from operating in the 10.95-11.2 and 11.45-11.7 GHz bands in urban areas. A second provision of the footnote required the use of large antennas. The last consultation on SP 3-30 GHz removed this footnote in favour of coordination, but at the time it was understood that earth stations would not become ubiquitous, and would not unduly constrain fixed service usage. In our view, the proposed change is a major policy change, without the benefit of a full policy review.

We strongly believe that any change in the spectrum utilization policy to accommodate the provision of DTH broadcasting services in this band, would by nature, initiate a fundamental change in the way the satellite earth stations are deployed. Rather than having a defined set of locations, these stations would pop up and disappear randomly in a ubiquitous fashion as consumers start or terminate their subscription for DTH services. For this reason, coordination between FSS DTH services and fixed services would be impractical, and thus these services would not be compatible in the band.

We emphasize that our need for the 11 GHz band is real and immediate. We require spectrum in the 11 GHz band in order to support our extensive advanced mobile networks, and to support the introduction and proliferation of broadband mobile data services. Certain fixed service operators are also required by the CRTC to expand broadband services to rural and remote communities throughout Canada and this requires that these operators continue to have access to sufficient spectrum to accommodate their backhaul requirements.<sup>2</sup>

These backhaul requirements are not satisfied by individual links, but by an extensive web of microwave systems interconnected between cell sites. It is not a simple matter of retuning an individual link to vacate a certain band, as each link has an effect on adjacent links, as well as links within radio reach. As noted above and further described under question 4, backhaul network designers require the use of a variety of frequency bands in order to maximize network and spectrum efficiency.

It is important to note that maintaining the existing spectrum utilization policy for the 11 GHz band would maintain the harmonized use of the band with the U.S. The importance of harmonization cannot be overstated. By using standardized frequency bands, the Fixed Service Providers have access to leading edge technology developed for larger markets, which means that the Fixed Service Providers are able to benefit from equipment availability and economies of scale. This in turn translates into services that are affordable and of high quality. Harmonizing with the US will also provide for more efficient use of the spectrum near border areas, since coordination between US and Canadian fixed services will be far simpler than coordination between US fixed services and Canadian DTH services.

On the FSS side, there are alternatives to the Ku band for DTH broadcasting services, namely the use of Ka bands 17.3-17.8 GHz and 18.3-19.3 GHz for which satellite technology is available as evidenced by the number of FSS applicants for licenses in the US.,

---

<sup>2</sup> Telecom Decision CRTC 2008-1, *Use of deferral account funds to improve access to telecommunications services for persons with disabilities and to expand broadband services to rural and remote communities*, 17 January 2008.

Furthermore in 2006 a Ka-FSS license was awarded to Telesat at 118.7 WL, and Ciel was recently awarded 6 new Approvals in Principle by Industry Canada to develop spectrum at the orbital locations listed below:

91°W 17/24 GHz BSS Band

91°W Ka FSS Band

103°W 17/24 GHz BSS Band

107.3°W 17/24 GHz BSS Band

109.2°W Ka FSS Band

138°W 12 GHz BSS Band.

It is clear therefore that Canada has ample resources for broadcasting satellite services, including 500 MHz of spectrum, both polarizations, at each of six orbital locations which can be used in combinations to cover all Canada or create regional beams. Each of the beams can support 32 broadcasting FM TV channels. We submit that these allocations should be exhausted before other spectrum is designated for FSS DTH.

It is important for the Department to remember that fixed service operators were required to vacate the 18 GHz band several years ago so that it could be used by BSS. It is ironic that some satellite operators are unwilling to utilize the 18 GHz band to satisfy their BSS requirements.

Significantly, at least one DTH service provider agrees with the views of the Fixed Service Providers and believes that 18 GHz is the proper place to develop a global ecosystem for BSS, and that economic investment in 18 GHz should be viewed as a normal cost of business for DTH providers.

In summary, the Fixed Service Providers oppose the change to the spectrum utilization policy to accommodate DTH services. We believe that there is a substantial difference between DTH broadcasting services and other satellite services which are already accommodated under the existing policy. While the fixed service and FSS are compatible, sharing with DTH broadcasting services is not practical. Changing the policy to accommodate DTH would unnecessarily constrain the continued use of the band by fixed services and would unreasonably shift the economic burden associated with the capacity requirements of DTH services onto the backs of the Fixed Service Providers without any benefit to the Fixed Service Providers.

**1 (b) More specifically, should the designation be as requested in section 3.1 above, namely that the extended-Ku bands 10.95-11.2 GHz and 11.45-11.7 GHz be designated only to the fixed-satellite service, and the bands 10.7-10.95 GHz and 11.2-11.45 GHz continue to be designated to the fixed-satellite and fixed services under the current policy stipulations?**

The Fixed Service Providers are opposed to the designation of the extended-Ku bands for the exclusive use of FSS. The existing allocations, designations and spectrum utilization policy should be maintained such that fixed services can continue to operate and expand within the band.

Considering the balance of needs as outlined in 1(a) above, the designation as requested in section 3.1 of the Notice would not be sound policy. The entire 10.7-11.7 GHz band is an important backhaul alternative in the provisioning of fixed service backhaul links with its combination of low attenuation due to rain and small-antenna directivity. Exclusion of the 10.95-11.2 and 11.45-11.7 GHz band from the available Fixed Service spectrum would handicap the development of services that are dependent upon the favourable propagation and antenna gain advantages provided by this spectrum. Sharing with non-broadcasting FSS applications is feasible in this band through the use of judicious and cooperative coordination made on a good faith basis. Very often a simple replacement of antenna locations would permit both parties to operate and to maximize the efficient use of the spectrum.

A proposal similar to the proposal under consideration in the Consultation Paper, was recently considered in the US in connection with the 2 foot antenna proceeding<sup>3</sup>. While the proposal was rejected as not being germane to the issue at hand, the Federal Communications Commission (FCC) commented further that the proposal to exclude the fixed service from the 10.95-11.2 and 11.45-11.7 GHz bands was inappropriate because:

“the domestic use of the 11 GHz band by the FSS has been limited, to date, because the Commission has sought to protect the use and expansion of terrestrial microwave services within the band. The Commission has also designated the 11 GHz band as one of the relocation bands for emerging technologies. The Commission emphasized in the NPRM that the Commission’s Rules explicitly limit satellite use of the 11 GHz band to international systems. Moreover, the Commission reiterated that the intent and effect in adopting footnote NG104 was to limit the expansion of FSS in the 11 GHz band and protect the future use of the band for FS.”

---

<sup>3</sup> See FCC WT Docket No. 07-54 RM-11043

Clearly, the US FCC has determined that the 11 GHz band is an important band for microwave backhaul systems and has taken steps to maintain the ongoing use of this band by fixed services. The Fixed Service Providers respectfully urge the Department to maintain the current spectrum utilization policy and harmonize the use of the 11 GHz band with the US.

**2. Should they (a) be for a limited duration, and (b) be made conditional on the bringing into use the extended-Ku bands for DTH services within a specified period of time?**

The Fixed Service Providers do not support a change in the designation of the extended-Ku bands, irrespective of whether any such changes would be temporary or permanent. In either case, such a change would be disruptive and costly for the Fixed Service Providers since it would result in the displacement of their fixed service backhaul systems from these bands and it would require that limited engineering and technical resources would be focused on replacing existing microwave backhaul links rather than implementing new technologies and services.

As stated in response to (1), there is a need for regulatory stability so that Fixed Service operators and manufacturers can continue to plan for the orderly development and efficient operation of their networks, consistent with Section 5(1) of the *Radiocommunication Act*. It is important to note that the 11 GHz band was identified in previous proceedings as the future home for fixed service microwave backhaul systems that would be displaced from the 2 GHz band. The Department should deny the request of DTH proponents that fixed service systems be displaced yet again.

While a temporary re-allocation for a limited duration may be viewed by the Department as a practical means of addressing the DTH proponents' request, such action will significantly impact incumbent fixed service operators and manufacturers. At this time there is clearly a need for continued access by the fixed service to this spectrum for backhaul applications used to support broadband mobile data services that, as noted above, are growing dramatically and will continue to grow as Canadians increasingly adopt new and innovative 3.5G and 4G services and smartphone devices to increase their productivity.

**3. Comments are sought as to the disposition of the current fixed service licensees in the extended-Ku bands. Should they be permitted to continue operating in these bands and, if so, under what conditions?**

Existing fixed services should be permitted to continue to operate in these bands on the basis of the current allocations, designations and spectrum utilization policy. If incumbent fixed service systems will be displaced from the extended-Ku bands, alternative spectrum for the migration of these existing

fixed links would need to be identified. Retuning these systems will not be possible due to limitations of the existing equipment. Therefore, any frequency change would require wholesale changes of radio apparatus which could include antennas as well as tower reinforcement. Any such changes to existing infrastructure would result in added substantial costs to be borne by the Fixed Service Providers without any corresponding benefit for these parties.

It is important to note that these costs would not be limited to capital costs but would also include network planning and engineering costs. Further, these changes would divert scarce resources from other business opportunities, such as the provision of new and innovative services.

As noted above, fixed services in this band are primarily used for backhaul for mobile base station sites. The cellular grid (and cell site locations) associated with mobile networks are narrowly defined by radio access capacity and coverage requirements. The network topology naturally makes use of existing cell sites as anchor points for the backhaul network. The link distances are therefore fixed. It is also worth pointing out that link direction may also be determined by requirements for route diversity, which is tied to network reliability. The other variable in this situation is capacity, and in simple terms, this determines a link budget.

Efficient network design encourages link design which just meets link budget. While it is obvious that a higher frequency may introduce too much path loss, a lower frequency may introduce too little, thus creating microwave overreach and a potential interference situation. Each link has to be examined on its own requirements to determine if one could use the next higher or lower Fixed Service band. This means that in some cases, 11 GHz is the only solution.

While it may be possible to retune some links within the 11 GHz band, retuning will not be possible for other links in the band. Many components only have a tuning range of 30-40 MHz and would then have to be replaced if still available.

In some cases, the make of equipment simply prevents retuning. In these cases, the equipment will need to be replaced.

In other cases, the network topology prevents retuning. It must be remembered that these links are not stand-alone, but part of a large webbed network. Industry Canada advises on which microwave frequencies to use and has, as a matter of longstanding practice, limited cellular applicants to specific preferred channel assignments. The operators continue to use these frequencies until network topology prevents it. Generally this occurs where a cell site is a hub, and the arrival angle of two links can not be discriminated by antenna patterns. In this case, a second channel is assigned.

**4. Comments are sought as to whether the future capacity requirements of the fixed service can be accommodated in other fixed service allocations at 6, 15, 18 GHz and the remaining portions of the 11 GHz Ku band. Are these bands suitable and is there sufficient spectrum to accommodate any potentially displaced fixed service systems from the extended-Ku bands?**

We expect significant growth in requirements for backhaul services due to the continued growth of mobile services and the expected exponential growth due to the advent of 3G and 4G broadband mobile data services. As noted already, the 11 GHz band is an important option that is available for fixed service backhaul systems.

Fixed Service operators select the frequency band that will yield the most efficient use of the spectrum, given the path distance and link capacity requirements. Since the 11GHz band is much less susceptible to rain attenuation than the 15 GHz and 18 GHz bands, it is an ideal alternative for mid-range backhaul links. In any event, as noted already, the Department is considering whether to limit the use of the 15 GHz band by fixed services. Since half of the available spectrum in the 15 GHz band may not be available for fixed services, this band would be an unlikely future home for fixed systems that would be displaced from the 11 GHz band if DTH services were to be accommodated.

In addition, the current SRSP for the 11 GHz band allows the use of antennas as small as 4-feet in diameter, which are ideal for urban and sub-urban applications where the support structures are usually roof-tops. The use of smaller antennas in this manner also minimizes the aesthetic concerns that would arise with the use of larger size antennas, which are required, for example, for backhaul links in the 6 GHz band.

With the 2004 policy changes and the placement of a moratorium on the fixed services in the 18 GHz band, some of these existing fixed services may need to transition to either the 15 GHz or 11 GHz bands after the sunset period which will end in 2014. Again, this would make the 18 GHz band an unlikely future home for fixed service systems displaced from the 11 GHz band. On the hand, since a soft moratorium has been placed on 2x160 MHz in the 15 GHz band, the 11 GHz band will be the most likely candidate to accommodate the fixed systems that will be displaced from the 18 GHz band. With this cascading effect of band selections and the exponential growth rate as mentioned in the response (2), the remaining portion of the 11 GHz band that is available for the Fixed Services will likely become congested in the short term.

As noted above, reducing the available spectrum in the 11 GHz band will create a void between the higher frequency bands at 15 and 18 GHz and

lower frequency bands at 6 GHz. This would complicate network design, as described above.

It should also be noted, that this type of re-allocation over the years has eroded the frequency options available to carriers. We are currently faced with the exponential growth of broadband mobile data services, and all projections predict a continuing trend with 3G and 4G services. Backhaul spectrum availability will continue to be a major issue for many operators.

## **5. Comments are sought on the coordination requirements with fixed systems in the U.S. and coordination with other FSS systems.**

In the US, the 10.7 -11.7 GHz band was identified for the future home of fixed service systems that were to be transitioned out of the 2 GHz band a number of years ago and this was noted by the Department when it established the existing spectrum utilization policy. Also, in a recent proceeding<sup>4</sup>, the FCC granted fixed service operators the authority to use smaller antennas in this band. Because of this decision, the number of 11 GHz fixed service stations along the US border is expected to proliferate in the near future.

The proposed introduction of DTH broadcasting services in the 11 GHz band will increase the burden of frequency co-ordination for the incumbent fixed service systems in the US. In some cases, it may be difficult to co-ordinate DTH and fixed services along the border. Since the use of the band would not be harmonized with the US, the extended-Ku bands would not be as fully utilized as they would be if fixed service systems were to continue using the extended-Ku bands in Canada.

Experience in the US has demonstrated that DTH services are not compatible with fixed backhaul services. As indicated in the Consultation Paper, the DTH company Echostar was able to obtain a waiver to operate on the basis of no protection from interference from the fixed service. However, this waiver was ultimately withdrawn due to non-viability of the sharing situation. Unless agreements are reached with the FCC, extensive fixed service use in the border areas would prevent the use of DTH in major Canadian border communities, and therefore nullify any advantage of relocating the existing fixed services out of the band.

---

<sup>4</sup> See WT Docket No. 07-54; RM-11043

**6. Should consideration be given to authorizing the use of the extended-Ku bands to provide DTH services on a non-standard basis (i.e. receive-only earth stations shall not claim protection from harmful interference from any current and future authorized fixed service stations)?**

The Fixed Service Providers do not support the proposal to accommodate DTH services in the 11 GHz band. If the Department considers that DTH services should be permitted in the band, they should only be accommodated on a non-standard basis and must not be permitted to claim protection from interference from any fixed service systems. DTH providers should be explicitly advised that there will be no protection from new fixed service stations and any adjustments required to accommodate DTH will be at the expense of the satellite service provider.

This approach would be consistent with the approach taken by the US FCC. It is important to note that Echostar was unable to promote its service and eventually returned its authorization.

**7. Comments are sought on how the near-term DTH capacity requirements can be met.**

First, the Fixed Service Providers note that “near term” is not immediate. The DTH proponents have indicated that they require additional capacity no sooner than 3 years from now. Extensive analyses show that the Extended Ku-bands will not be the only viable option for the delivery of new DTH broadcasting services within that timeframe. Use of the extended-Ku bands would merely be the least cost option for DTH proponents. While the DTH proponents’ proposal may be an efficient way to upgrade their residential DTH equipment, it would do so simply by shifting the economic burden onto the backs of the Fixed Service Providers and would provide no corresponding benefit to the Fixed Service Providers. This would be entirely unjustified and unreasonable.

As noted in greater detail in 1(a) above, the Department has already made provisions for the orderly growth of DTH broadcasting services by allocating additional spectrum in higher frequency bands. The maturity of higher band technology in the near term is demonstrated by the fact that there are six applications for 17/24 GHz satellites for direct broadcasting services in the U.S., as well as a submission by Northrup Grumman for a GSO/non-GSO system of satellites utilizing technology in this band and other Ka/V bands. This technology can be employed in Canadian satellites to satisfy the capacity requirements of the DTH proponents.

It is incumbent upon the Department to require a rigorous demonstration of an immediate and urgent demand by Canadians that was not anticipated at the time of the policy review.

Furthermore, the DTH proponents have not demonstrated that all technology options have been exhausted in an effort to expand capacity on some or all of their existing conventional Ku-band frequencies. Technologies such as MPEG4 compression, or improved modulation with 8PSK will increase capacity.

BSS providers globally, including an existing Canadian DTH service provider, have recognized the need to develop a global ecosystem of cost effective technologies at 18 GHz. The Department should take steps to promote this development.