Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Procedures to Govern the Use of	)	
Satellite Earth Stations on Board Vessels	)	IB Docket No. 02-10
In the 5925-6425 MHz/3700-4200 MHz	)	
Band and 14.0-14.5 GHz/11.7-12.2 GHz	)	
Bands	)	

COMMENTS OF TELENOR SATELLITE SERVICES, INC.

Telenor Satellite Services, Inc., on behalf of itself and its affiliate Telenor Satellite Services AS (together, "Telenor") hereby files its comments in response to the Notice of Proposed Rulemaking in the above-referenced proceeding.[1] Telenor Satellite Services, Inc. is a U.S. company based in Rockville, Maryland, that, together with its Norway-based sister company Telenor Satellite Services AS, provides satellite communications solutions to customers throughout the world.

I. Introduction

Among its many service offerings, Telenor is a provider throughout the world of wideband mobile services to customers utilizing earth stations aboard vessels ("ESVs"). Telenor provides C- and Ku-band ESV services -- under the brand "Sealink" -- to a wide range of maritime customers, including cruise ships, ferries, oil platforms, and cargo vessels. While Telenor sells its Sealink service throughout the world, it has a particularly

[1] *In the Matter of Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands,* Notice of Proposed Rulemaking, IB Docket No. 02-10, FCC 03-286 (released Nov. 24, 2003) ("Notice").

significant level of experience providing this service in Scandinavia, especially to the many seagoing ferry fleets serving the intercoastal passenger market in this region. Telenor currently uses space segment supplied by New Skies Satellites N.V. (C-band), Satmex (Ku-band), and Intelsat (C- and Ku-band). Telenor believes that its experience in this market, as well as its understanding of and experience with the relatively well-developed ESV regulatory scheme throughout the Nordic countries, will allow Telenor to assist the Commission in evaluating the necessity and cost-effectiveness of a number of its proposals.

Telenor generally favors the regulatory framework proposed by the Commission. ESV communications services such as Telenor's Sealink product are a vital communications link for ships at sea, making available wideband data capabilities that are unavailable from any other source.[2] These services also maximize the value of scarce spectrum resources by ensuring that full use is made of these prime frequency bands. The adoption by the Commission of a stable and predictable regulatory scheme governing ESV use in the United States will go a long way toward encouraging the development of and investment in new ESV services and technologies that will benefit end users and allow for more efficient use of the spectrum.

In particular, Telenor wholeheartedly supports the Commission's proposal for a blanket licensing regime for ESV systems.[3] With respect to the C-band proposals,

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[2] The data throughput and availability of the current generation of conventional mobile satellite systems such as Inmarsat and Iridium and not sufficient for many customers' needs, including applications such as real-time high-volume data access such as required for logistics and other uses.

[3] *See* Notice at ¶ 24.

Telenor endorses the approach that would provide a two-year license for C-band operations on a non-coordinated basis, although we believe, as discussed in detail below, that the Commission's proposals regarding real-time tracking of ESVs are neither practical nor workable.

While Telenor does favor the overall framework, it does, however, believe that a number of the proposals outlined by the Commission are misguided and are not supported by the experiences of the ESV industry. In particular, Telenor believes that several of the key concerns and assumptions expressed by the Commission, which underlie many of the proposed rules, are unfounded or incorrect, and we encourage the Commission to rethink these matters in light of actual ESV industry experiences.

II. Discussion

A. The Commission Should Not Favor Use of the Ku-band for ESV Use

One of the overriding themes in the Notice is the Commission's clear preference for the use of the Ku-band for ESV services instead of the C-band. For example, the Commission states that it " . . . strongly favor[s] rules that would encourage ESV use of the Ku-band over the C-band."[4] Telenor strongly disagrees with the assumption by the Commission that ESV use is preferable in the Ku-band. While the Ku-band is certainly an important element in providing ESV services, we submit that the Commission has not fully considered the considerable difficulties and expense involved with using the Ku-band while it has overstated the problems inherent to the C-band. Telenor believes that, considering the relative costs and benefits of C-band versus Ku-band, the Commission should not adopt any policy that favors use of the Ku-band over the C-band.

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[4] Notice at ¶ 29.

First, Ku-band satellites offer only regional coverage, and their primary focus is, of course, land. Ku-band coverage of oceans and seas is spotty at best, and many ocean areas are not covered by Ku-band satellite beams at all.[5] Because ESV-equipped ships often operate over large areas, those utilizing Ku-band must often utilize capacity on two or three Ku-band beams, occupying two to three times the necessary bandwidth that can be found on a single C-band hemisphere or global beam. The cost of operating the service can increase dramatically in this situation, as changing between Ku-band beams requires having trained personnel aboard the vessel as well as additional equipment such as filters and LNBs. Even in areas where continuous coverage may be available, such as for vessels operating along the immediate Western U.S. coastline,[6] there still may not be sufficient available bandwidth.[7] C-band service, on the other hand, is available at any position on the Earth visible to the satellite.

Second, the Ku-band is much more susceptible than C-band to attenuation caused by precipitation. This is especially pronounced in areas such as the Gulf of Mexico and the Caribbean, where C-band communications may work reliably but Ku-band services

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[5] Because Ku-band systems are focused toward serving land-based users, satellite coverage on Ku-band systems drops off rapidly away from the coastline.

[6] Even where Ku-band coverage may be available along the immediate coastline, it should be noted that such coverage rarely extends very far out into the ocean, making it very difficult for customers such as the fishing industry to get reliable Ku-band coverage in instances when the ships are not hugging the shoreline.

[7] In many parts of the world it is also difficult to secure adequate Ku-band coverage due to the intensive use of these frequencies. In Europe, for example, Ku-band has historically been a more economical and space-efficient alternative to C-band for Direct-To-Home applications and large land-based VSAT networks, making it much more difficult for ESV operators to secure adequate Ku-band resources at a reasonable price.

suffer frequent outages. Vessels operating in such areas where rain squalls are frequent find it much more difficult to rely on Ku-band systems for critical communications.

On the whole, ESV communications using the C-band are considerably more robust and reliable, and are accessible in more places, than those using the Ku-band. Nonetheless, the Commission has proposed to discourage C-band use in favor of Ku-band use solely because of concerns about interference to land-based Fixed Service ("FS") systems, concerns that are, in the experience of Telenor and other ESV operators, greatly exaggerated.[8] Telenor has been providing its Sealink ESV service around the world for thirteen years. In all this time, there has only been one documented case where an ESV has interfered with a FS licensee, and this interference was due not to ordinary ESV operation but to an anomalous hardware failure that was quickly resolved. In Telenor's experience, in fact, it is ESVs that are interfered with by FS operators, not the other way around. Interference from FS operations is so bad that even fully-licensed Ku-band ESV operations are difficult or impossible in a number of European harbors.

The Commission's proposed coordination distance of 300 kilometers from shore is a particular example of how overprotective of FS operators the Commission's proposals are. For most satellites operating in U.S. waters (with the possible exception of Alaska), the elevation angle of an ESV antenna is typically about 15 degrees. At a 13.3 degree elevation, the 3 dB beam width of most current ESVs is at 1000 meters above sea

[8] In particular, the opposition to ESV licensing stated by the Fixed Wireless Communications Coalition ("FWCC") is unnecessarily alarmist and completely unsupported by any evidence. *See* Notice at ¶¶19-20.

level when the vessel is only 5 kilometers from shore.[9] This plainly shows that a 300 kilometer limit is wholly unnecessary to protect shore-based FS operators.

Further, the Commission is not taking into adequate consideration the huge investment that ESV operators have already made in C-band equipment. The Commission in the Notice seeks comment as to whether it is feasible to switch all C-band operations to Ku-band and whether C-band operations should be "phased out."[10] Telenor currently serves approximately 60 C-band ESVs, and hundreds of others are served by other companies. Even without considering the difficulties inherent in Ku-band operations that are discussed above, the cost of converting these C-band vessels to Ku-band, even if practicable, would be enormous, and "phasing out" C-band operations would make worthless the millions of dollars invested in C-band equipment.[11]

B. Several of The Commission's Proposed Technical Restrictions Are Not Feasible

The Commission in the Notice requests comment on its proposal to require that all ESV antennas be 4.5 meters or larger in diameter.[12] Telenor believes that is proposal is not realistic and is wholly inconsistent with regulatory requirements in the rest of the

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[9] Even at only 4.9 degrees of elevation, the beam will be 1,000 meters above sea level only 20 kilometers from shore. At 7.75 degrees of elevation, the distance is 10 kilometers.

[10] Notice at ¶ 62.

[11] Similarly, any plan by the Commission to require ESVs to switch from C-band to Ku-band only when approaching the U.S. coastline would be impractical. Switching from C-band to Ku-band in mid-voyage would require additional hardware (at a cost of approximately $50,000 per ship) plus the manpower required to actually effect the switch-over (including the need to fly in an engineer if one were not already aboard). This would also result in significant downtime for the ship's communications.

[12] Notice at ¶91.

world. 4.5 meters is not a practical antenna size for routine use aboard ships, as the sheer weight and dimensions of such an antenna make it almost impossible to install and very unattractive for customers, most of whom for which deck space is at a premium.

Telenor has significant experience with the use of 2.4 meter antennas in C-band and has never experienced issues with respect to co-satellite interference due to antenna performance. The Commission's concerns about interference can be alleviated by imposing limitations on up-link E.I.R.P. density rather than on antenna size alone. For example, Intelsat has certain requirements for operation under Standard Gx approval. The Intelsat Standard Gx Earth Station ON-AXIS Up-Link E.I.R.P. density limit is 37.7 dBW/4 kHz for C-band and 36.9 dBW/4 kHz for Ku-band. Over the past ten years this has proven to be a viable and realistic standard, which obviates the need to impose unrealistic antenna size limits as the Commission has proposed. This is particularly important given the cost that ESV owners would have to bear if existing antennas had to be replaced. Virtually all ESV antennas in use today are smaller than 4.5 meters, with 2.4 meters being the current industry norm. The cost to replace these antennas, particularly with much larger models requiring additional space and stronger and larger support structures, would be tremendous, and these costs would most likely be borne by end-user customers.[13]

The Commission also seeks comment on whether "to adopt the U.S. proposal regarding the 2.4 megahertz bandwidth limitation . . . ."[14] Telenor believes that imposing

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[13] It is also worth noting that the antenna size restrictions proposed by the Commission are not consistent with the rules governing ESVs throughout the rest of the world. The ITU recognizes ESVs as small as 0.6 meters.

[14] Notice at ¶ 16.

a 2.4 MHz bandwidth limitation would significantly limit the data rate for C-band operation. Using 5/16 BPSK Turbo coding, the occupied bandwidth of a 512 kbit/s carrier is 2.4 MHz. This is a coding that will utilize the power and the bandwidth in the most efficient way possible (assuming that the outbound carrier is balanced with the inbound carrier(s)).

With respect to the Commission's proposed limits of access for ESV operators to 36 MHz of spectrum for uplink and 36 MHz for downlink for a maximum of two satellites in a particular location, Telenor does not object so long as this is the limitation that would be imposed with respect to a particular vessel and not to all ESVs in total operated by a particular service provider. Otherwise this proposal is wholly unrealistic, as Telenor, like other ESV providers, occupies a full transponder on certain satellites.

D. Proposals For Real-Time Tracking Must Take Confidentiality and Security Concerns Into Account.

The Commission in the Notice solicits comment on the practicality and necessity of having tracking capability for ESVs that would allow specified parties to detect a particular vessel's location on a real-time basis.[15] Telenor is extremely concerned about the issue of real-time tracking, as it is our belief that most ESV customers would object very strenuously to such a requirement. For many customers, such as those in the oil and gas industry, the location of their vessels is highly confidential commercial information.

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[15] Notice at ¶¶ 47, 95-97.

The availability of positional information regarding cruise ships and ferries would also seem to raise significant homeland security concerns.[16]

Telenor believes such issues can be alleviated through use of a type of system that would assist FS users in identifying purported instances of interference without the need for vessel tracking. This solution would utilize two on-line databases that could be automatically updated. The first would contain the different FS frequencies in use at particular sites. This database could be accessed by ESV operators planning to operate along a particular route who could use this information to implement a frequency plan that would minimize any chances of interference. The second database, which could also be updated automatically, would contain the different ESV frequencies in use for ships operating in a particular region (without being linked to a particular position). This database could be accessed by FS operators who believe they are being interfered with to allow them to determine whether a particular ESV could be interfering on their frequencies.[17]

In any case, Telenor believes that all complaints of interference made by FS operators should be made through a designated FS point person, as suggested by the

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[16] Telenor is not able to comment on the exact costs that would be incurred in making available a real-time tracking system, but they are likely to be substantial. The ESV operator would have to invest in new hardware and software as well as bear the recurring costs of updating and maintaining a database. Additional man-hours would also have to be expended to maintain and repair the system.

[17] Telenor is not able to comment on the cost and benefits of placing "identification tags" into ESV transmissions that would identify the ESV operator and the vessel, as we have no knowledge of how such a system would be implemented. *See* Notice at ¶ 98. However, if such a system does not introduce extra costs or impose limitations on the service, it would likely be a solution that Telenor would support.

Commission.[18] All interference claims should be brought to a designated ESV point of contact and attempts made to resolve claims informally before recourse could be had to the Commission's complaint process. We believe that this approach is necessary in order to avoid a flood of frivolous complaints being made directly to the Commission.

III. Conclusion

Telenor applauds the Commission's efforts in establishing a predictable and stable regulatory regime to govern the provision of ESV services in the United States. We do urge the Commission, however, to heed the experiences of the ESV service providers throughout the world and not fall victim to certain incorrect assumptions, particularly that there ought to be a government policy in favor of the use of Ku-band instead of C-band. The evidence clearly shows that ESV operations in the C-band can coexist quite easily with FS operations, and the Commission should adopt sensible rules that allow such use.

Respectfully submitted,

TELENOR SATELLITE SERVICES, INC.

By: _____

Bruce A. Henoch
Assistant General Counsel
Telenor Satellite Services, Inc.
1101 Wootton Parkway, 10th Floor
Rockville, MD 20852
(301) 838-7739

Its attorney

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[18] *See* Notice at ¶ 67.