Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 101 of the Commission's Rules to Modify Antenna Requirements for the 10.7 – 11.7 GHz Band	)	WT Docket No. 96-86 RM-11043

COMMENTS OF ERICSSON INC

I. Introduction

Ericsson Inc ("Ericsson") hereby submits comments in response to the Federal Communications Commission's *Noticed of Proposed Rulemaking* in the above referenced proceeding seeking comment on modifying the Commission's Part 101 Rules to permit the installation of smaller antennas by Fixed Service ("FS") Operators in the 10.7 – 11.7 GHZ ("11 GHz") band in response to a petition for rulemaking filed by FiberTower, Inc. ("FiberTower"), a wireless backhaul provider.[1] Ericsson supports the modification of Part 101.115 of its rules and recommends that the Commission refrain from establishing any new interference or coordination rules that are customized for FS and Fixed Satellite Services ("FSS"). Modifications to Part 101.115 are in the public interest for three reasons.

[1] *See Notice of Proposed Rulemaking In the Matter of Amendment of Part 101 of the Commission's Rules to Modify Antenna Requirements for the 10.7 – 11.7 GHz Band, WT Docket No. 07-5, RM 11043, FCC 07-38(rel. March 27, 2007).*

First, the modifications facilitate the efficient use of the 11GHz band. Second, the use of smaller antennas in the 11GHz band will not materially increase the risk of interference to other operators licensed in the band, particularly FSS Operators. Third, the Commission can improve the efficient use of spectrum through a narrow rule change. No other rule modifications are necessary. For these reasons, Ericsson urges the Commission to modify Part 101.115 of its rules.

II. Argument

A. Amending Part 101.115 Promotes More Efficient Use of the 11GHz Band and Broader Availability of 3G Mobile and Broadband Services.

The 11GHz band is currently underutilized both in terms of where 11GHz equipment is deployed and how the 11GHz band is put to use. The proposed modifications to Part 101.115 remedy this underutilization and encourage more efficient use of spectrum. This allows the Commission to maximize the value and utility of the 11Ghz band, which serves the public interest.

1. The 11GHz Band is Poorly Used in Metropolitan and Urban Areas.

Under the current rules, few 11GHz antennas are deployed in metropolitan and urban areas. This is directly due to their size. Typically, 11 GHz antennas do not comport with the stringent zoning requirements established for metropolitan and urban areas, which restrict the deployment of large antennas for aesthetic and space concerns. As a result, the availability of 11 GHz spectrum has been effectively limited to suburban and rural areas. By revising Part 101.115 to permit the use of smaller antennas, the Commission will promote fuller utilization of the 11 GHz band in metropolitan and urban areas.

2. The 11GHz Band is Prime Spectrum for High Capacity Transmission Networks.

Fostering 3G mobile services and increasing broadband service penetration are core Commission policy objectives. These services require a robust backhaul network to satisfy their considerable bandwidth needs, particularly in densely populated communities. However, these critical transmission networks are currently lacking, despite increasing demand for them, especially in metropolitan and urban areas. The 11 GHz band can help fill this void.

It is commonly recognized that current T1 capacity is insufficient to sustain increasing backhaul demands. Alternative transport means are needed. One immediate and easily implemented solution to this predicament is to modify Part 101.115, which would open up the 11GHz band in metropolitan and urban areas.

The propagation characteristics of the 11 GHz band make it very suitable for building high capacity, high availability transmission networks. There is low rain attenuation in this band compared with higher frequency bands. Although the propagation characteristics of the 10 GHz band are similar to those of the 11 GHz band, the bands are not interchangeable. The limited bandwidth in the 10GHz band does not allow for the high capacity transmission that is possible in the 11GHz band.

Moreover, microwave solutions offer a timely and cost effective way to address interim transport needs. They can be deployed rapidly to meet independent backhaul needs or as a compliment to other backhaul networks. Consequently, the availability of 3G mobile and broadband services is not delayed while carriers struggle to fund costly, longer-term fiber deployments to increase their backhaul capabilities.

Further, 11GHz can be used for backhaul either as a part of a fixed or a mobile network. Therefore, it can provide the means for both wireless and wireline operators to more rapidly deploy broadband services in addition to meeting the growing bandwidth requirements of rich 3G mobile services. Unless Part 101.115 is amended, however, 11GHz will not be an available resource in metropolitan and urban areas to facilitate the build-out of high capacity backhaul networks and inefficient use of the 11GHz band will continue unnecessarily. Therefore, modifying Part 101.115 serves the public interest.

B. Smaller Antennas Minimally Impact the Risk of Interference.

The use of smaller antennas in the 11 GHz band will not materially increase the risk of interference to other operators licensed in the band, particularly FSS operators. Due to the improved performance and technical characteristics of smaller antennas, the old belief that the smaller the antenna, the greater the risk of interference, is no longer true. Indeed, microwave antenna technology is significantly different today than when the Part 101 rules were adopted.

Since 1996, antenna technology has advanced and their performance has improved. Most notably, the radiated pattern envelope ("RPE") has improved. Now, the signal attenuation in other than the main direction is better suppressed than previously, which minimizes the interference impacts of smaller antennas. In addition, the way such antennas will be deployed will mitigate interference opportunities.

1. The Technical Performance of Smaller Antennas is Not Significantly Different than that of Larger Antennas.

The similar performance of smaller antennas to larger antennas is reflected when one compares the front to back ratios of larger and smaller antennas for angles 100^{o} to 180^{o} off the main beam.[2] For example, the front to back ratio for the proposed Class A antennas, which is the same for 0.61 m antennas, is actually equal to that of the current

[2] The front to back ratio gives the difference in effective isotropic radiated power ("EIRP") in the main beam direction compared to the back direction. It can also be described as the difference in gain between these directions.

Class A antennas. For the proposed Class B antennas there is a 9 dB improvement in suppression over current Class B antennas. As a result, one cannot categorically conclude that bigger antennas have better suppression capabilities than smaller antennas or, in other words, that the risk of interference is greater with smaller antennas. FiberTower's proposed modification of Part 101.115 takes this technical advancement into account.

2. As Deployed, Smaller Antennas Will Not Substantially Increase the Risk of Interference.

Although it is true that smaller antennas have larger beam widths than larger antennas - which theoretically increases the risk of interference - as they will be deployed, smaller antennas will pose only a negligible increased risk of interference, if at all. There are several reasons for this. First, interference levels depend on the effective isotropic radiated power ("EIRP"), which is a combination of the gain of an antenna and the transmitter power, irrespective of main lobe gain or side lobe gain. At the same transmitter power, larger antennas have higher gain than smaller antennas, which means larger antennas pose a higher risk for interference.[3]

Second, when smaller antennas are used, the hop distance traditionally used for 1.2 m antennas deployed in 11 GHz is shortened for two reasons. Even when operated at the same transmit power as larger antennas, the lower gain of smaller antennas means that signals from smaller antennas do not travel as far. Moreover, with larger antennas, it is possible to increase the EIRP to create longer hop links. However, it is not possible to

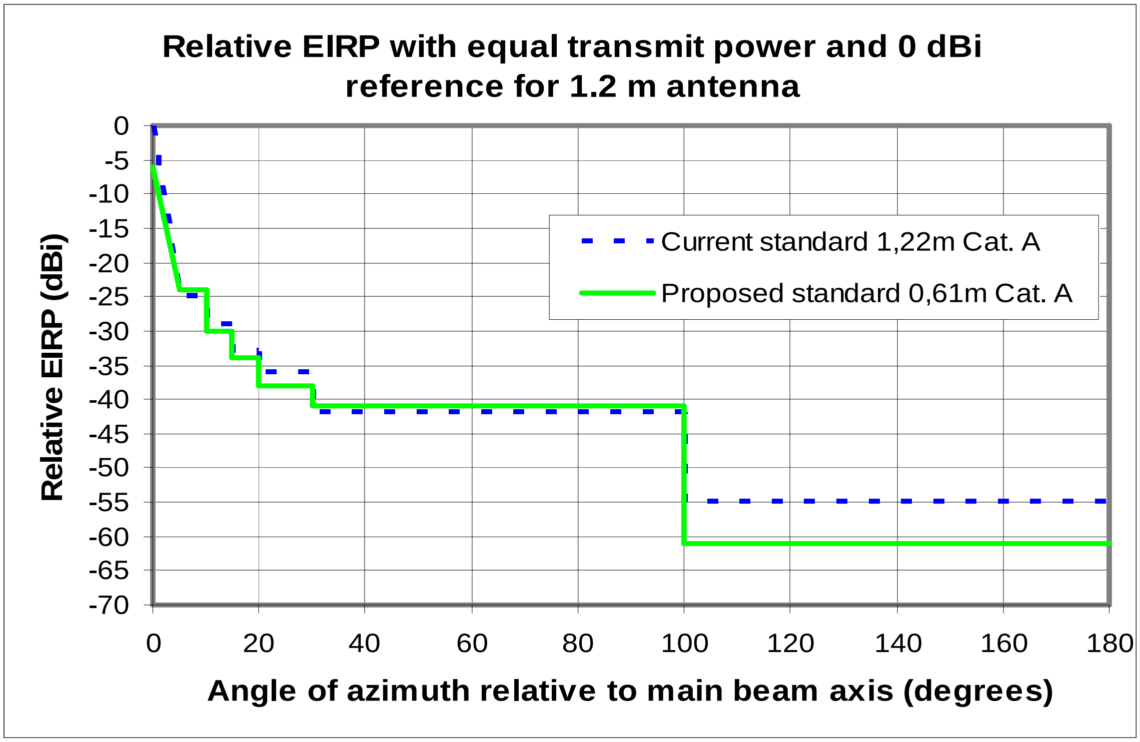
[3] For 0.61 m antennas, the EIRP is already effectively limited by the smaller antenna gain associated with such antennas. Moreover, the size of 0.61 m antennas imposes a practical limitation on their EIRP. Microwave antenna vendors, like Ericsson, must balance the radio output power of smaller antennas with heat dissipation and spurious emission level considerations. It simply is not technically feasible to increase the EIRP of such antennas to the levels possible for larger antennas. Therefore, additional EIRP limitations are unwarranted.

simply "boost" the transmit power of smaller antennas to achieve longer hop links because of heat dissipation and spurious emissions considerations (see footnote 2 below). Therefore, the hops for smaller antennas must be shorter.

Shorter hops are consistent with metropolitan and urban environments where antennas are typically deployed on rooftops. The high buildings associated with metropolitan and urban areas screen antenna locations and actually decrease the risk of interference. The shorter hop distance reduces the overall footprint of the microwave beam, which combines with the signal screening provided by urban landscapes to geographically limit interference opportunities.

Last, the delta in the signal angle associated with a 0.61 m antenna vs. a 1.2 m antenna is so small that the risk of increased interference from smaller antennas is extremely low, particularly given the lower gain of such antennas. For 0.61 m antennas, the main lobe's 3 dB points only extend 0.76^0 (a less than 1 degree angle differential) more at each side of the pointing direction than those of a 1.2 m antenna. In addition, the way in which smaller and larger antennas interact will actually mitigate interference opportunities. Since side lobe suppression is related to the main beam gain, the gain difference between 0.61 m and 1.2 m antennas of about 6 dB will proactively level out the difference in absolute EIRP between the current antenna standards and the proposed new values.

The Figure below illustrates the minimal difference in absolute EIRP associated with Class A antennas that comply with the current rules as opposed to those that comply with the proposed Class A rules.



The above graph shows the difference in EIRP expected after adjustment of 6 dB for the gain difference. The graph shows that in almost all directions the EIRP is from 6 dB better to 1 dB worse using 0.61 m antennas following the proposed new standard. Likewise, the proposed values for new Class B antennas will not only level out but also further reduce the EIRP levels in virtually all directions compared to the current Class B antennas. Thus, based on the technical performance characteristics of smaller antennas, the increased risk of interference caused by the proposed rule change is truly minimal.

C. Only the Proposed Targeted Rule Change is Necessary; No Additional Interference Mitigation Measures are Required.

Because smaller antennas do not substantially change the interference landscape, additional mitigation measures are not necessary. On the contrary, the proposed rule and existing Commission rules sufficiently address the need to protect 11 GHz and adjacent licensees. Specifically, there is no reason to implement any changed coordination procedures or to establish rules to remedy suggested pointing errors because smaller antennas simply do not materially increase the risk of either interference or pointing errors.

1. As Deployed, Smaller Antennas Will Not Substantially Increase the Risk of Interference.

As described above, the absolute EIRP level will not increase with a smaller antenna that complies with the proposed new rule. In fact, frequency re-use will be enhanced since 0.61 m antennas produce less absolute power in the main beam direction. Furthermore, the risk for harmful interference is limited to the radiation from the main lobe of the FS antenna into the side lobe of the FSS earth station antenna or from the side lobes of the FS antenna into the main lobe of the FSS earth station antenna. This makes the likelihood of interference extremely low and not outside the type of interference risks that such operators normally encounter. Consequently, the current coordination practices set forth in Part 101.103 and interference metrics (e.g. the threshold to interference ratio) that: 1) apply to all bands; 2) are independent of antenna size; and 3) with which frequency coordinators are extremely experienced are sufficient to ensure that interference is controlled.

2. The Incidence of Pointing Errors Does Not Increase with Smaller Antennas.

Two mechanisms implicate antenna alignment and the incidence of pointing errors: accurate signal measurement and mechanical adjustment. The Satellite Industry Association ("SIA") contends in its Opposition to FiberTower's Petition for Waiver, that smaller Antennas increase the incidence of pointing errors.[4] SIA's claims are unsupported by fact.

[4] Satellite Industry Association, *Opposition*, (filed Aug. 23, 2004) at page 7.

The procedures for both signal measurement and mechanical adjustment are the same for all antennas. Just as for larger antennas, when smaller antennas are deployed, technicians measure the received level in the antennas and aim to reach maximum power reception levels. When it comes to mechanical adjustment, i.e. tightening the bolts on the antenna, minor pointing deviations can occur. However, the likelihood and severity of such deviations are no greater with smaller antennas than for larger antennas. If anything, smaller deviations are expected with smaller antennas than with larger antennas due to their size, weight, etc. In practice, smaller antennas can be easily and accurately aligned within 0.3-0.4 of a degree.

Further, tower crews installing smaller antennas have both the skill and the incentive to carefully align them and avoid pointing errors. The reason for this is very simple. Antennas are aligned to achieve a certain Rx level so that they meet the required link engineering criteria. If an antenna is misaligned, it will not meet the appropriate Rx level, which means it will not perform as anticipated. No operator will accept less than optimum performance of *any* deployed equipment. Thus, there is little risk that misaligned links will even occur at all, if smaller antennas are permitted in the 11 GHz band. In addition, there is no evidence to support SIA's claim that nearby users will be subjected to higher levels of interference than otherwise predicted.

III. Conclusion

The 11GHz band is underutilized today even though it has the propagation characteristics necessary to support the high quality, high capacity transmission network critical to improving the coverage and penetration of enhanced 3G mobile and broadband services, especially in densely populated areas. This is in large measure due to the fact that antennas that meet the current Part 101 specifications, 1.2 m antennas, are nearly impossible to deploy in metropolitan and urban areas where such transmission capacity is desperately needed.

The change to Rule 101.115 proposed by FiberTower, which would allow operators to deploy 0.61 m antennas, opens up the 11GHz band for use in metropolitan and urban areas, with minimal risk of increased interference to FSS operators and adjacent licensees. Moreover, as detailed above, there is no material difference between the interference risks associated with a 0.61 m antenna as compared to a 1.2 m antenna. Thus, on balance, the benefits derived from smaller antennas, including fuller utilization of existing spectrum, make them well suited for use in metropolitan areas.

For these reasons, Ericsson strongly urges the Commission to modify Part 101.115 of its rules but to refrain from modifying Part 101.103 to establish new interference or coordination rules that are customized for FS and FSS stations.

Respectfully submitted this 25th day of May, 2007.

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