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

In the Matter of	)	
	)	
Service Rules and Procedures to	)	
Govern the Use of Aeronautical Mobile	)	
Satellite Service Earth Stations	)	IB Docket No. 05-20
in Frequency Bands Allocated to the	)	
Fixed Satellite Service	)	

REPLY COMMENTS OF PANAMSAT CORPORATION

PanAmSat Corporation ("PanAmSat"), by its attorneys, hereby replies to the comments on the Notice of Proposed Rulemaking ("NPRM") that were submitted in the above-captioned rulemaking.[1] In this filing, PanAmSat responds to arguments made by other parties relating to the following issues: (1) primary vs. secondary allocation for AMSS; (2) off-axis starting angle/aggregate uplink EIRP density mask; (3) AMSS operations on extended Ku-band frequencies; (4) availability of ALSAT status for AMSS stations; (5) performance verification testing; and (6) AES tracking.

I.) <u>Affording Primary Status to AMSS is Contrary to the Public Interest.</u>

In its petition for rulemaking, Boeing proposed that AMSS stations continue to be authorized on an unprotected, non-conforming basis. In its comments on the NPRM, however, Boeing changed its position. Boeing now supports the addition of a footnote, as proposed in the NPRM, that would afford primary protection to AMSS terminals if they operate under the same parameters as earth stations in the fixed-satellite service. The other proponents of AMSS, ARINC and ViaSat, also propose that AMSS terminals be afforded primary protection.

[1] FCC 05-14 (Feb. 9, 2005).

In its initial comments, PanAmSat demonstrated that a primary allocation for AMSS stations is unnecessary, because AES receivers can and should be designed taking into account the interference environment in which they will operate.[2] Boeing had acknowledged as much in its petition for rulemaking.[3] Neither the NPRM nor the comments of the other parties provide any grounds for granting primary status to stations that are fully capable of operating on a secondary basis.

Furthermore, the deviations that have been proposed for AES terminal design and performance make AMSS stations unsuitable for primary protection. The AMSS proponents are requesting various waivers in order to overcome shortcomings inherent to AES terminals.[4] These proposals remove AMSS from the FSS mainstream, and warrant a different allocation status for FSS and AMSS stations.[5]

As the Commission has recognized, moreover, "AES terminals are a mobile application of FSS technology and, therefore, have a higher potential for creating interference to terrestrial and space systems than other FSS applications operating in the same frequencies"[6]. The fact that AES terminals are a mobile application also means that they will be more susceptible to receiving interference. Affording primary protection to AES terminals, therefore, would lead to uncertainties for adjacent satellite operators and would constrain their operations. For all of these reasons, AES terminals only should be permitted to operate on a non-protected basis in the 11.7-12.2 GHz band.

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[2] Comments of PanAmSat Corporation (July 5, 2005) at 1.
[3] *See id.*
[4] For example, Boeing and ViaSat request that the maximum off-axis EIRP density mask be relaxed by 10 dB at off-axis angles greater than 85°. *See, e.g.,* Boeing Comments at 16. ViaSat asks that off-axis EIRP density limits in the elevation plane be relaxed. *See* ViaSat Comments at 14-17. And Boeing requests that the minimum elevation angle provision of 5° be removed. *See* Boeing Comments at 28-29.
[5] In addition, unlike the majority of existing FSS systems, AMSS systems are comprised of extremely small aperture AES terminals moving at speeds of well over 500 miles/hour.
[6] See ¶ 56 of the NPRM.

II.) Definition of a Starting Angle and Possible Adoption of an Aggregate Uplink EIRP Density Mask

The starting off-axis angle at which AMSS stations are supposed to comply with the off-axis EIRP density mask is critical. The NPRM proposed a starting off-axis angle of 1°, which PanAmSat supported in its comments.[7] Setting the starting angle at 1º, in combination with the pointing accuracy requirements that the Commission has proposed, provides needed assurance that adjacent satellites will be adequately protected.

The AMSS proponents attempt to equate AES terminals with VSATs for purposes of the off-axis starting angle. Given that the starting angle for VSATs recently has been changed to 1.5°, some of the proponents maintain that the starting angle for AES terminals also should be 1.5° rather than 1°. Boeing goes even further, arguing that the "pattern should begin at 2° instead of 1.5° where AES antenna pointing errors are taken into account by the system operator in controlling the off-axis EIRP density."[8]

In seeking a starting angle for AES terminals that is the same as or higher than the VSAT starting angle, the AMSS proponents overlook critical distinctions between the two services. VSAT stations operate from a fixed location; AES terminals are mobile. As a result, AES terminals possess a greater potential for interfering with adjacent satellites. In addition, VSAT services have a well-established track record; AMSS services are relatively new and untested. These differences warrant a more cautious approach to adjacent satellite interference in the case of AMSS services. Therefore, PanAmSat reaffirms its initial position in support of a starting angle of 1º.

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[7] NPRM at ¶ 35. *See also* PanAmSat Comments at 3.
[8] Boeing Comments at 16.

ARINC also attempts to compare AMSS terminals to VSATs in connection with the issue of antenna mispointing. It states that "[l]ike VSATs, the mask alone - even without specifying pointing accuracy – is sufficient in the AMSS context."[9] ARINC's reliance on the rules for VSATs, however, is misplaced. Each VSAT is required to individually meet the input power density and antenna performance criteria established by the FCC in Sections 25.134 and 25.209 of the rules, respectively. No comparable requirement has been proposed for individual AMSS terminals. ARINC, therefore, is comparing apples with oranges.

ViaSat requests that the FCC relax its off-axis EIRP density limits in the elevation plane.[10] ViaSat contends that low profile AES terminals used on small jets do not meet the off-axis EIRP density limits in the elevation plane, and that constricting their power due to this inherent performance shortcoming "could severely limit the capacity of the individual antenna or conversely the aggregate network capacity."[11] Boeing, however, has committed that for its system "the alignment of the major axis of the antenna with respect to the tangent to the geostationary satellite orbital arc at the target satellite point will be taken into account in controlling the AES aggregate EIRP to meet the specified off-axis EIRP criteria."[12] PanAmSat considers this commitment to be essential. Without such a guarantee, traditional FSS users could be subject to great risk caused by substantially sub-performing antennas.

Finally, PanAmSat notes that if the Commission decides to adopt an aggregate off-axis EIRP limit, as opposed to limiting the off-axis EIRP density of each AES, then maintaining compliance with the aggregate off-axis EIRP mask in systems with

[9] ARINC Comments at 3.
[10] ViaSat Comments at 16.
[11] ViaSat Comments at 16.
[12] Boeing Comments at 50.

simultaneous co-frequency transmissions becomes a complex task of power management which requires sophisticated and elaborate techniques. In these circumstances, AMSS system applicants should be required to make a detailed showing as to the measures they propose to employ in an effort to comply with the aggregate off-axis EIRP masks. The arguments presented in this section in favor of a starting angle of 1º are also applicable if an aggregate off-axis EIRP limit is adopted, and therefore PanAmSat supports a 1º starting angle under this scenario as well.

III.) Allowing AMSS to Operate in the Extended Ku-band

PanAmSat supports the proposals made by AMSS proponents for allowing AMSS stations to operate on extended Ku-band frequencies.[13] Such usage would lead to more efficient use of the extended Ku-band downlink spectrum, namely 10.95-11.2 GHz and 11.45-11.7 GHz.

IV.) Extending ALSAT Authority to AMSS

In its initial comments, PanAmSat opposed ALSAT authority for AMSS operators. None of the arguments made in the comments of the AMSS proponents resolves the concerns that led PanAmSat to oppose ALSAT authority. In particular, given the uncertainties that are associated with the operation of AES networks, the Commission should take a conservative approach until it has a few years of experience in connection with the simultaneous operation of AES and other FSS applications.

[13] *See* Boeing Comments at 7-9; ARINC Comments at 25-26.

V.) Performance Verification Testing

PanAmSat supports Boeing's proposal that "AMSS licensees authorized by the Commission to provide service within the United States or on U.S.-registered aircraft should be required to required to submit an AMSS system performance verification report prior to commencement of commercial operations to ensure that the licensee adequately accounts for all factors affecting AES off-axis e.i.r.p density, including antenna pointing control, variations in the antenna patterns and transmit power variations."[14] Given all of the possible variations in AES terminals, and given the various algorithms used to control AMSS systems, it is important that licensees compile this information and present it to the Commission.

VI.) AES Tracking

PanAmSat supports the positions taken by Boeing with regard to tracking AES terminals. PanAmSat recognizes the magnitude and sensitivity of the information that can be collected in such databases, and acknowledges that the information needs to be tightly controlled in light of security and privacy considerations. PanAmSat agrees with Boeing that "such information should only be used in resolving reports of harmful interference or provided to the Commission in response to Commission enforcement activities."[15] Additionally, PanAmSat agrees with Boeing that such information need only be retained for 90 days, and that real time data should only be made available in the context of interference resolution.

[14] Boeing Comments at 29.
[15] Boeing Comments at 37.

As discussed in PanAmSat's comments, there is another dimension to tracking AES terminals, This additional dimension, which PanAmSat calls "passive tracking," involves the need for the operator of an AMSS system to maintain an accurate database of all installed AES terminals, whether these terminals are in active use or not. Maintaining a full inventory will ensure that AES operators do not lose track of AES terminals that are temporarily not in use. If an AES terminal were to become "lost" when not in use (*e.g.*, if an aircraft fitted with the AES terminal were sold to another carrier that did not subscribe to AMSS), then active tracking might not account for the terminal properly should it malfunction or unexpectedly resume transmission. This information is vital in interference resolution because the interference culprit often is a terminal that is not accounted for.

Respectfully submitted,

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