



Squire Sanders (US) LLP
1200 19th Street, NW
Suite 300
Washington, D.C. 20036

O +1 202 626 6600
F +1 202 626 6780
squiresanders.com

Carlos M. Nalda
T +1 202 626 6659
carlos.nalda@squiresanders.com

July 12, 2013

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: **Application of Panasonic Avionics Corporation for License Modification
File Nos. SES-MFS-20120913-00818, SES-AMD-20130109-00028, SES-AFS-
20130220-00189 (Call Sign E100089)**

Dear Ms. Dortch:

Pursuant to Section 1.65 of the Commission's Rules, 47 C.F.R. § 1.65, Panasonic Avionics Corporation ("Panasonic") hereby submits additional orbital debris/end of life information to supplement the information provided by the satellite operators in connection with Panasonic's request to add the Eutelsat E10A and Telesat Anik F1 satellites as authorized points of communication.

Panasonic provides the following orbital debris mitigation/end-of-life disposal information and associated waiver requests for the Eutelsat E10A and Anik F1 satellites to supplement the information discussed in Panasonic's amendment filed on February 20, 2013,¹ responding to the Commission's request for information.²

¹ *In the Matter of* Amendment to the Application of Panasonic Avionics Corporation to Modify AMSS License To Permit Operation of Up to 2000 Technically Identical Aeronautical Mobile-Satellite Service ("AMSS") Aircraft Earth Stations ("AESs") in the 14.0-14.5 GHz and 10.95-12.75 GHz Frequency Bands, *Amendment to Modification Application*, IBFS File No. SES-AFS-20130220-00189, Call Sign E100089 (Feb. 20, 2013) [hereinafter "Amendment"].

² Letter from Fern J. Jarmulnek, Acting Chief, Satellite Division, International Bureau, FCC, to Carlos M. Nalda, Counsel for Panasonic Avionics Corporation, Squire Sanders (US) LLP (Feb. 6, 2013) (DA 13-164, IBFS File Nos. SES-MFS-20120913-00818, SES-AMD-20130109-00028, Call Sign: E100089).

37 Offices in 18 Countries

Squire Sanders (US) LLP is part of the international legal practice Squire Sanders which operates worldwide through a number of separate legal entities.

Please visit squiresanders.com for more information.

I. Additional Information for Eutelsat10A

Eutelsat10A satellite includes two (2) interconnected helium tanks. Before switch-off of the Eutelsat10A satellite, thrusters will be fired as much as possible to deplete the propellant and depressurize the tanks. The Orbital Debris Plan for Eutelsat10A satellite³ states that “where possible” fuel lines and valves will be left open. Regarding the valves for the MMH and MON1 tanks, the thruster propellant flow control valves are left closed after switching off the spacecraft because power is needed to open them.

Eutelsat employs a combination of methods, including bookkeeping and PVT measurements and, where possible, measurements of tanks thermal inertia, to calculate the predicted end-of-life mass values. The end-of-life values for the propellant tanks and lines can be considered as the worst-case post-passivation remaining mass for MON and MMH. They correspond to the static residuals of MON and MMH at the end-of-life. The helium pass in the pressurant tanks corresponds to the value measured at the end of LEOP.

The residual pressure statement (less than 1 bar) corresponds to temperatures between 18° C and 30° C. The predicted pressures at end-of-life for the remaining materials are as follows: 14.7 bars before passivation for MON-1 propellant tank; 13.8 bars before passivation for MMH propellant tank; and 67 bars for pressurant tank 1 and 2.

The end-of-life values given for masses and pressures and temperatures are when the satellite is taken out of service. Then, Eutelsat starts the orbit raise activity and finishes by the passivation exercise by emptying the fuel and oxidizer tanks as far as possible. During the satellite life, Eutelsat performs gauging activities to monitor the remaining liquid quantities to determine the remaining masses in the tanks.

The passivation exercise is not a closed system due to the fact that matter is expelled. Eutelsat expels the remaining liquid as it evaporates at lower pressures, then expels as much pressurant as possible to lower the tank pressures down to 1 bar or below.

All the tanks have been designed, manufactured, and validated according to the MIL-STD-1522 standard with a break-up security coefficient of 1.5 for the whole mission; *i.e.*, including full-load and maximum-pressure conditions. Clearly, the security coefficient is much higher than this (probably in orders of magnitude) for depleted conditions where the pressure is around 1 bar, but no analysis exists to provide the actual value.

³ Amendment at Attachment 1 – Technical Appendix, 4-2, page 6 of 7.

II. Additional Information for Anik F1

Anik F1 includes two helium tanks, each with a volume of 68.8 liters. The two tanks are interconnected via a manifold to each other, so mass can move freely from one tank to the other. The manifold is then isolated from the rest of the system immediately upon completion of launch and orbit raising.

Panasonic stated that 90 grams of helium will remain after deorbit, and the estimated remaining pressure is 400 kPa, approximately equal to 58 Psi.⁴ The 90 grams is the total mass across both tanks. Therefore, if both tanks are the same temperature, etc., then 45 grams of helium would remain in each. However, in general, there might be slightly more helium in one side depending on the temperature in the individual tanks.

The 500 kPa value was derived from telemetry, using a sensor on the line between the tanks. The temperature was 18° C. The value really is a worst case, as once the spacecraft is deorbited and powered off, the temperature and pressure will go down. Note that the tanks are qualified to 36.2 MPa with a 1.5 safety factor and the tanks are designed to leak before burst.

* * * *

Please feel free to contact the undersigned with any questions you may have or if Panasonic can provide any additional information to facilitate expeditious action on its application.

Respectfully submitted,

Squire Sanders (US) LLP

/s/ Carlos M. Nalda

Carlos M. Nalda

Counsel to Panasonic Avionics Corporation

cc: Paul Blais, FCC International Bureau
Stephen Duall, FCC International Bureau

⁴ Amendment at 10.