

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATION Enter a description of this application to identify it on the main menu:  
Panasonic application for interim operation of Aura LE terminal and to correct number of MELCO terminals

**1. Applicant**

<b>Name:</b>	Panasonic Avionics Corporation	<b>Phone Number:</b>	949-462-1683
<b>DBA Name:</b>		<b>Fax Number:</b>	
<b>Street:</b>	26200 Enterprise Way	<b>E-Mail:</b>	mark.defazio@panasonic.aero
<b>City:</b>	Lake Forest	<b>State:</b>	CA
<b>Country:</b>	USA	<b>Zipcode:</b>	92630 -
<b>Attention:</b>	Mark DeFazio		



File # SES-STA-20120913-00820  
E100089  
Call Sign \_\_\_\_\_ Grant Date 3-22-13  
(or other identifier)  
Term Dates  
From 3-22-13 To: 5-2-13  
Approved: Paul E. [Signature]

**Applicant:** Panasonic Avionics Corporation  
**Call Sign:** E100089  
**File No.:** SES-STA-20120913-00820

Panasonic Avionics Corporation (Panasonic) is granted special temporary authority from March 22, 2012 to May 21, 2013 to operate twenty technically identical aircraft earth stations aboard U.S.-registered aircraft using Panasonic model AURA LE 0.89 meter antennas. The aircraft earth stations will transmit to the following geostationary-orbit space stations in the 14.0-14.5 GHz (Earth-to-space) bands: Galaxy 17 (Call Sign S2715) at 91° W.L.; EutelSat 172A (formerly GE-23) (Call Sign S2610) at 172° E.L.; Estrela do Sul 2 (Call Sign S2821) at 63° W.L.; and Telstar 11N (Call Sign S2357) at 37.5° W.L. The aircraft earth stations will receive transmissions in the 11.45-11.7 GHz, 10.95-11.2 GHz, and 12.2-12.75 GHz (space-to-Earth) frequency bands from EutelSat 172A; in the 11.45-12.2 GHz (space-to-Earth) frequency band from Estrela do Sul 2; in the 11.7-12.2 GHz (space-to-Earth) frequency band from Galaxy 17; and in the 11.45-12.2 GHz and 11.7-12.2 GHz (space-to-Earth) frequency bands from Telstar 11N. Operations under this STA must be in accordance with the terms and conditions contained in Panasonic's application, as supplemented, and the Federal Communications Commission's rules, and are subject to the following conditions:

1. Communications with Panasonic's aircraft earth stations in the space-to-Earth direction are limited to the following frequency bands and coverage areas identified by Panasonic in its supplemental letter dated November 30, 2012:


Space Station	Downlink Frequencies (space-to-Earth)	ITU Region(s)
EutelSat 172A (Call Sign S2610)	11.45-11.7 GHz	Region 2 (incl. AK and HI) and Region 3
	10.95-11.2 GHz	Region 3
	12.2-12.75 GHz	Region 3
Estrela do Sul 2 (Call Sign S2821)	11.45-12.2 GHz	Regions 1 and 2 (outside US airspace)
Galaxy 17 (Call Sign S2715)	11.7-12.2 GHz	Region 2 (Continental U.S.)
Telstar 11N (Call Sign S2357)	11.45-12.2 GHz	Regions 1 and 2 (outside US airspace)
	11.7-12.2 GHz	Region 2 (Continental U.S.)

2. Operation under this grant of special temporary authority must be on an unprotected and non-harmful interference basis, *i.e.*, while operating under this temporary authority Panasonic must not cause harmful interference to, and must not claim protection from interference caused to it by, any other lawfully operating radiocommunication system. Panasonic must cease operations immediately upon notification of such interference and must immediately inform the Commission, in writing, of such an event.

3. Communications in the 11.45-11.7 GHz band (space-to-Earth) must be in accordance with the space station authorization for EutelSat 172A. See SAT-LOA-20031218-00358 (granted July 13, 2004).
4. Panasonic must maintain records of the following data for each earth station operating pursuant to this temporary authorization: location (latitude, longitude, altitude); aircraft attitude (pitch, yaw, roll); transmit frequency and occupied bandwidth; data rate; EIRP; and target satellite. This data must be recorded at intervals of no more than two minutes while an aircraft earth station is transmitting and every 30 seconds when aircraft roll angle is greater than 10 degrees. Panasonic must also record antenna pointing error at 30-second intervals when the error exceeds 0.25 degrees. Panasonic shall make this data available upon request to an FSS system operator or the Commission within 24 hours after receiving the request.
5. When operating in international airspace within line-of-sight of the territory of a foreign administration where Fixed Service networks have a primary allocation in the 14.0-14.5 GHz band, an AURA LE earth station must not produce ground-level pfd in such territory in excess of the following values unless the foreign administration has imposed other conditions for protecting its FS stations:  $-132 + 0.5 \times \text{THETA}$  dBW/(m<sup>2</sup> MHz) for  $\text{THETA} \leq 40^\circ$  -  $112$  dBW/(m<sup>2</sup> MHz) for  $40^\circ < \text{THETA} \leq 90^\circ$ . Where: THETA is the angle of arrival of the radio-frequency wave in degrees above the horizontal, and the aforementioned limits relate to the pfd and angles of arrival that would be obtained under free space propagation conditions.
6. Operation pursuant to this authorization must be in compliance with of Panasonic's coordination agreements with the National Aeronautics and Space Administration and National Science Foundation pertaining to the operation of aircraft earth stations in the Ku-band. (See e.g., "Coordination Agreement for the Joint Usage of the Band 14.0 - 14.5 GHz Between the National Science Foundation and Panasonic Avionics Corporation," Version 1.1, signed on December 18, 2009).
7. Operation pursuant to this authorization outside the United States in the 14.0-14.5 GHz band must be in compliance with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz band.
8. Operation pursuant to this authorization must be in compliance with the terms of coordination agreements between the operators of the Galaxy 17, EutelSat 172A, Estrela do Sul 2, and Telstar 11N space stations and operators of other Ku-band geostationary space stations within six angular degrees of those space stations. In the event that another GSO FSS space station commences operation in the 14.0-14.5 GHz band at a location within six degrees of any of these space stations, aircraft earth stations operating pursuant to this temporary authority shall cease transmitting to that space station unless and until such operation has been coordinated with the new space station's operator or Panasonic demonstrates that such operation will not cause harmful interference to the new co-frequency space station.

9. Communications between Panasonic's aircraft earth stations and the Estrela do Sul 2 space station must be in compliance with all existing and future space station coordination agreements reached between Brazil and other administrations.
10. Panasonic's aircraft earth stations must employ a tracking algorithm that is resistant to capturing and tracking adjacent satellite signals, and each station must be capable of inhibiting its own transmission in the event it detects unintended satellite tracking.
11. Panasonic's aircraft earth stations must be monitored and controlled by a ground-based network control and monitoring center. Such stations must be able to receive "enable transmission" and "disable transmission" commands from the network control center and must cease transmission immediately after receiving a "parameter change" command until receiving an "enable transmission" command from the network control center. The network control center must monitor operation of each aircraft earth station to determine if it is malfunctioning, and each aircraft earth station must self-monitor and automatically cease transmission on detecting an operational fault that could cause harmful interference to a fixed satellite service network.
12. Panasonic must take all necessary measures to ensure that the operation authorized herein does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310. Measures must be taken to ensure compliance with limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Requirements for restrictions can be determined by predictions based on calculations, modeling or by field measurements. The FCC's OET Bulletin 65 (available on-line at [www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety)) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for workers.
13. Panasonic must maintain a point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein, for discussing interference concerns with other licensees and U.S. Government agencies, and must submit a letter to be included in its license file with the name and telephone number of the point of contact prior to commencing operation.
14. Stations authorized herein must not be used for air traffic control communications.
15. In connection with the provision of service in any particular country, Panasonic is obliged to comply with the applicable laws, regulations, rules, and licensing procedures of that country.
16. Grant of this authorization is without prejudice to any determination that the Commission may make regarding pending applications. *E.g.* IBFS File No. SES-MFS-20120913-00818.

17. Any action taken or expense incurred as a result of operations pursuant to this special temporary authority is solely at Panasonic's risk.
18. Panasonic is afforded thirty days from the date of action to decline this temporary authorization as conditioned. Failure to respond within this period will constitute formal acceptance of the authorization as conditioned.
19. This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective immediately. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106, 1.115, may be filed within 30 days of the date of the public notice indicating that this action was taken.

 <b>GRANTED</b> International Bureau	<b>File #</b> <u>SES-STA-2420913-00820</u>
	<b>Call Sign</b> <u>E-100089</u> <b>Grant Date</b> <u>3-22-13</u>
	<b>(or other identifier)</b>
	<b>From</b> <u>3-22-13</u> <b>Term Dates To:</b> <u>5-1-13</u>
	<b>Approved:</b> <u>[Signature]</u>

<b>2. Contact</b>	
<b>Name:</b> Carlos M. Nalda	<b>Phone Number:</b> 202-626-6659
<b>Company:</b> Squire Sanders (US) LLP	<b>Fax Number:</b>
<b>Street:</b> 1200 19th Street NW	<b>E-Mail:</b> Carlos.Nalda@squiresanders.com
Suite 300	
<b>City:</b> Washington	<b>State:</b> DC
<b>Country:</b> USA	<b>Zipcode:</b> 20036 -
<b>Attention:</b> Carlos Nalda	<b>Relationship:</b> Legal Counsel
(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)	
3. Reference File Number or Submission ID	
4a. Is a fee submitted with this application?	
<input checked="" type="radio"/> If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114).	
<input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee	
<input type="radio"/> Other (please explain):	
4b. Fee Classification CGB – Mobile Satellite Earth Stations	
5. Type Request	
<input checked="" type="radio"/> Use Prior to Grant <input type="radio"/> Change Station Location <input type="radio"/> Other	
6. Requested Use Prior Date	
10/01/2012	

7. City	8. Latitude (dd mm ss.s h) 0 0 0.0
9. State	10. Longitude (dd mm ss.s h) 0 0 0.0
11. Please supply any need attachments. Attachment 1: Narrative Statement                      Attachment 2: Specs and Tech Appen                      Attachment 3: Coordination	
12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.) <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">Panasonic application for interim operation of Aura LE terminal and to correct number of MELCO terminals</div>	
13. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes. <input checked="" type="radio"/> Yes <input type="radio"/> No	
14. Name of Person Signing Mark DeFazio	15. Title of Person Signing Manager, GCS Regulatory and Business Operations
WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).	

**FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT**

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

**THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.**



**ATTACHMENT 3**

**COORDINATION INFORMATION**



December 16, 2009

Federal Communications Commission  
International Bureau  
445 12th Street, S.W.  
Washington, D.C. 20554

To Whom It May Concern:

This letter certifies that Intelsat is aware that Panasonic Avionics Corporation ("PAC") is seeking FCC authorization to access Galaxy 17 at 91° WL, as an authorized point of communication, for its eXConnect Ku-band aeronautical mobile-satellite service ("AMSS") system using transmit/receive antennas that are not strictly compliant with the FCC's antenna gain requirements.<sup>1</sup> However, as described below, the terminals comply with the FCC's two-degree spacing rules by maintaining off-axis EIRP spectral density levels below those set forth in analogous Ku-band earth stations onboard vessels ("ESV") and vehicle-mounted earth stations ("VMES") rules.<sup>2</sup>

Intelsat understands that PAC plans to operate two AMSS antenna types: (i) the MELCO antennas previously operated with the Conexion by Boeing system; and (ii) the Aura LE antenna designed specifically for the eXConnect system and manufactured by EMS Technologies. The MELCO antenna is a mechanically-steered Cassegrain antenna with an elliptical profile that was previously examined by the FCC and authorized for AMSS operations in experimental Call Sign WC2XVE (File No. 0002-EX-PL-2004) and commercial blanket license Call Sign E000723 (File No. SES-MOD-20030512-00639). The Aura LE antenna is a mechanically steered, flat-plate AES with two transmit/receive apertures that is similarly designed to meet the technical requirements imposed on U.S. and international AMSS operations.<sup>3</sup> The basic

<sup>1</sup> See 47 CFR §25.209.

<sup>2</sup> See 47 CFR §25.222.

<sup>3</sup> The Aura LE antenna's two transmit/receive apertures are coherently combined to form a single beam. At very low elevation angles, only the front aperture is used due to blockage. This allows the antenna to maintain high performance over a large range of elevation angles between 5 degrees and 90 degrees while maintaining a low profile for aerodynamic integration with an aircraft.



characteristics of the MELCO and Aura LE antenna are also summarized in Table 1.

Table 1. Aura LE and MELCO Antenna Characteristics

Characteristic	EMS Aura LE	MELCO Reflector
Frequency	Tx: 14.0 GHz to 14.5 GHz. Rx: 10.7 GHz to 12.75 GHz. (11.7-12.2 GHz in the U.S.)	Tx: 14.0 GHz to 14.4 GHz Rx: 11.2 GHz to 12.8 GHz (11.7-12.2 GHz in the U.S.)
Aperture Size	2 Apertures of 35" X 6" each	25.6' X 7.7"
EIRP	42.5 dBW @ 5 deg Elevation 48.0 dBW @ 90 deg Elevation	47.2 dBW
G/T	11 dB/K @ 5 deg Elevation 14 dB/K @ 90 deg Elevation	8.0 dB/K @ 11.2 to 11.7GHz 9.3 dB/K @ 11.9 to 12.8GHz
Tracking Rate	40 deg/sec in Azimuth 25 deg/sec in Elevation	40 deg/sec in Azimuth 25 deg/sec in Elevation
Az Pointing Accuracy	0.2 deg 1-sigma	0.25 deg 1-sigma

Both the MELCO and Aura LE antennas are designed to maintain pointing towards the intended satellite through the full range of maneuvers carried out by commercial aircraft. The antennas are pointed based on aircraft position and altitude information obtained from the ARINC 429 data bus, which is standard on commercial aircraft. This information is augmented with higher rated data from an inertial sensor package that is integrated with the antenna and compensates for INS errors that result from latency and bending of the airframe between the aircraft INS unit and the antenna. The pointing accuracy of the MELCO reflector is 0.25 deg 1-sigma and the pointing accuracy of the EMS Aura LE antenna will be less than 0.2 deg 1-sigma. Pointing error will be continuously monitored and if it ever exceeds 0.5 degrees, then transmissions will be automatically inhibited within 100 ms.<sup>4</sup>

The FCC's off axis EIRP spectral density limits for analogous ESV and VMES operations are defined by Sections 25.222(a)(1) and 25.226(a)(1)(i). The effective off-axis EIRP spectral density generated by a conforming terminal will be:

15-25log10(Θ + 0.2)	dBW/4 kHz	for	1.5° ≤ Θ ≤ 7°
-6	dBW/4 kHz	for	7° < Θ ≤ 9.2°
18-25log10(Θ + 0.2)	dBW/4 kHz	for	9.2° < Θ ≤ 48°
-24	dBW/4 kHz	for	48° < Θ ≤ 85°
-14	dBW/4 kHz	for	85° < Θ ≤ 180°

where Θ is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite.

<sup>4</sup> See 47 C.F.R. § 25.222(a)(7) (Ku-band ESVs) and § 25.226(b)(1)(iv)(B)(Ku-band VMESs).



**INTELSAT**

The eXConnect system will limit off-axis EIRP spectral density to no more than this level through various means, including: (i) limiting transmit power spectral density by controlling the transmit power of the terminal and by selecting appropriate carrier bandwidths; (ii) controlling the off-axis gain of the antenna along the GSO by inhibiting transmissions when the skew angle exceeds a specified threshold and (iii) controlling pointing error and inhibiting transmissions when the pointing offset exceeds a threshold of 0.5 deg. The specific transmit power, bandwidth and skew angle thresholds will be selected based on the desired terminal transmission rates, coverage area, and satellite performance.

Based on the foregoing factors, the MELCO antenna will operate at a maximum input power density at the antenna waveguide flange of -21.6 dBW /4 kHz, employing BPSK modulation; and the Aura LE antenna will operate at a maximum input power density at the antenna waveguide flange of -15.1 dBW /4 kHz, employing BPSK modulation. Even in the rare circumstance when transmitting at pointing offsets equivalent to their design tolerances, these antenna terminals are compliant with the off-axis EIRP density level requirements specified in Sections 25.222 and 25.226, or the combined effect of 25.209 and 25.212(c) of the Commission's Rules, at all off-axis angles up to and including 6 degrees off-axis angle. PAC's conservative approach of including antenna pointing offsets in selecting the maximum power levels defined above ensures that the operation of these antennas, with the associated off-axis EIRP density envelope, will not cause unacceptable interference into adjacent satellites.

The undersigned further certifies that the maximum downlink satellite EIRP density of 13.0 dBW/4kHz, operational level of the Ku-band AMSS network operated by PAC, is routinely used at 2-degree spacing without causing unacceptable interference to adjacent satellite operators.

Furthermore, in order to prevent unacceptable interference into adjacent satellites, Horizons and PAC acknowledge that the antennas will be installed in compliance with the technical, operational and performance requirements of Part 25 of the FCC Rules and any requirements set forth in the licenses granted by the FCC for the above AMSS antenna system.

Horizons and PAC confirm that the use of the above antennas will not cause unacceptable interference into adjacent satellites in accordance with the FCC's two-degree spacing policy and accept that these antennas will not require more protection from adjacent satellites compared to an earth station employing an antenna conforming to the FCC antenna performance standards defined in Section 25.209 of the FCC rules. If the use of this antenna should cause unacceptable interference into other systems, PAC has agreed that it will terminate transmission immediately upon notice from the affected parties.

Sincerely,



**INTELSAT.**  
Senior Director, Spectrum Engineering  
Intelsat

Jose Albuquerque

Jose Albuquerque

16 December 2009

Date

*Acceptance by Panasonic Avionics Corporation:*

PAC testifies that the information provided to Intelsat and reflected in this affidavit is true and accurate to the best of PAC's knowledge.

Paul Sarraffe

Paul Sarraffe

Panasonic Avionics Corporation  
eXConnect Systems Engineering

Dec. 16, 2009

Date

*Acceptance by SES Americom:*

SES Americom agrees to the use of the PAC MELCO and Aura LE antennas with the above-power density into the antenna flange and the uplink EIRP density level as stated in this letter, with respect to SES satellites and the associated satellite networks that are within +/- 6 degrees orbital spacing from Galaxy 17 at 91° WL.

K. Jommalagadda

Krish Jommalagadda  
Manager, Spectrum Development  
SES Americom

16 Dec 09

Date



**INTELSAT.**

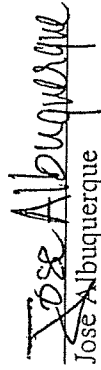
Federal Communications Commission  
International Bureau  
445 12th Street, S.W.  
Washington, D.C. 20554

August 2, 2010

To Whom It May Concern:

This letter supplements the letter dated December 16, 2009 from Intelsat regarding Panasonic Avionics Corporation's ("PAC") proposed Ku-band aeronautical mobile-satellite service ("AMSS") operations with the Galaxy 17 satellite at 91° W.L. Intelsat confirms that so long as PAC maintains FCC authority to communicate with Galaxy 17, Intelsat will include the technical parameters described in the aforementioned letter in all future satellite network coordinations for the satellite.

Sincerely,



Jose Albuquerque  
for Intelsat

2 August 2010  
Date

*Acceptance by Panasonic Avionics Corporation:*

PAC hereby certifies that it will comply with the all coordination agreements reached by Intelsat for the G-17 satellite.



Paul Sarraffe  
Panasonic Avionics Corporation  
eXConnect Systems Engineering

August 3, 2010  
Date