



**UNITED STATES OF AMERICA  
FEDERAL COMMUNICATIONS COMMISSION  
RADIO STATION AUTHORIZATION**

Name: Panasonic Avionics Corporation

Call Sign: E100089

Authorization Type: Modification of License

File Number: SES-MFS-20150609-00349

Non Common Carrier

Grant date: 06/30/2016

Expiration Date: 08/31/2026



Nature of Service: Earth Station Aboard Aircraft  
Nature of Service: Fixed Satellite Service

Class of Station: Other

**A) Site Location(s)**

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	Special Provisions NAD (Refer to Section H)
1)	MELCO Remotes	Operate up to 50 ESAA stations (0.68 m) US&P and over International waters Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.				NA
2)	PPA Remotes	Operate up to 2000 ESAA stations (0.89m) US&P and over International waters Licensee certifies antenna(s) do not comply with Section 25.209. Please refer to Section E for special conditions placed upon antennas at this site.				NA

*Subject to the provisions of the Communications Act of 1934, The Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning August 31, 2011 (3 AM Eastern Standard Time) and ending August 31, 2026 (3 AM Eastern Standard Time) . The required date of completion of construction and commencement of operation is June 30, 2017 (3 AM Eastern Standard Time) . Grantee must file with the Commission a certification upon completion of construction and commencement of operation.*

**B) Particulars of Operations**

The General Provision 1010 applies to all receiving frequency bands.  
The General Provision 1900 applies to all transmitting frequency bands.  
For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1)	14000.0000-14500.0000	H, V	500KG7D	Tx	36.30	16.12	MELCO		BPSK, QPSK DIGITAL DATA
2)	14000.0000-14500.0000	H, V	9M00KG7D	Tx	48.00	15.27	MELCO		BPSK, QPSK DIGITAL DATA
3)	14000.0000-14400.0000	H, V	160KG7D	Tx	24.60	8.60	MELCO		BPSK, QPSK digital data
4)	14000.0000-14400.0000	H, V	2M56G7D	Tx	36.70	8.60	MELCO		BPSK, QPSK digital data



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For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
5)	14000.0000-14400.0000	H, V	9M00G7D	Tx	42.10	8.60	MELCO		BPSK, QPSK digital data
6)	14000.0000-14400.0000	H, V	500KG7D	Tx	33.20	13.02	MELCO		BPSK, QPSK DIGITAL DATA
7)	14000.0000-14400.0000	H, V	9M00G7D	Tx	45.75	13.02	MELCO		BPSK, QPSK DIGITAL DATA
8)	11700.0000-12200.0000	H, V	36M0KG7D	Rx			MELCO		PSK
9)	11700.0000-12200.0000	H, V	160KG7D	Rx			MELCO		BPSK, QPSK digital data
10)	11700.0000-12200.0000	H, V	2M56G7D	Rx			MELCO		BPSK, QPSK digital data
11)	11700.0000-12200.0000	H, V	9M00G7D	Rx			MELCO		BPSK, QPSK digital data
12)	11700.0000-12200.0000	H, V	1M20KG7D	Rx			MELCO		BPSK, QPSK DIGITAL DATA
13)	11700.0000-12200.0000	H, V	54M0KG7D	Rx			MELCO		BPSK, QPSK DIGITAL DATA
14)	10950.0000-12750.0000	H, V	54M0G7D	Rx			MELCO		BPSK, QPSK DIGITAL DATA
15)	10950.0000-12500.0000	H, V	1M20KG7D	Rx			MELCO		PSK
16)	10950.0000-12500.0000	H, V	36M0KG7D	Rx			MELCO		PSK
17)	10950.0000-12500.0000	H, V	54M0KG7D	Rx			MELCO		PSK
18)	10700.0000-12750.0000	H, V	1M20G7D	Rx			MELCO		BPSK, QPSK DIGITAL DATA
19)	10700.0000-12750.0000	H, V	36M0G7D	Rx			MELCO		BPSK, QPSK DIGITAL DATA
20)	14000.0000-14500.0000	H, V	500KG7D	Tx	43.00	22.80	PPA		BPSK, SPREAD SPECTRUM
21)	14000.0000-14500.0000	H, V	500KG7D	Tx	43.50	23.32	PPA		BPSK, SPREAD SPECTRUM
22)	14000.0000-14500.0000	H, V	500KG7D	Tx	44.50	24.32	PPA		BPSK, SPREAD SPECTRUM
23)	14000.0000-14500.0000	H, V	9M00G7D	Tx	48.00	15.30	PPA		BPSK, SPREAD SPECTRUM
24)	14000.0000-14500.0000	H, V	9M00G7D	Tx	48.00	21.42	PPA		BPSK, SPREAD SPECTRUM
25)	14000.0000-14500.0000	H, V	9M00KG7D	Tx	48.00	15.27	PPA		BPSK, SPREAD SPECTRUM
26)	12500.0000-12750.0000	H, V	1M20KG7D	Rx			PPA		PSK
27)	12500.0000-12750.0000	H, V	54M0KG7D	Rx			PPA		PSK
28)	12250.0000-12750.0000	H, V	1M20KG7D	Rx			PPA		PSK



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The General Provision 1010 applies to all receiving frequency bands.  
The General Provision 1900 applies to all transmitting frequency bands.  
For the text of these provisions, refer to Section H.

#	Frequency (MHz)	Polarization Code	Emission	Tx/Rx Mode	Max EIRP /Carrier (dBW)	Max EIRP Density /Carrier (dBW/4kHz)	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
29)	12250.0000-12750.0000	H, V	54M0KG7D	Rx			PPA		PSK
30)	11700.0000-12200.0000	H, V	1M20KG7D	Rx			PPA		PSK
31)	11700.0000-12200.0000	H, V	36M0KG7D	Rx			PPA		PSK
32)	11700.0000-12200.0000	H, V	54M0KG7D	Rx			PPA		PSK
33)	11450.0000-12750.0000	H, V	1M20G7D	Rx			PPA		PSK
34)	11450.0000-12750.0000	H, V	36M0G7D	Rx			PPA		PSK
35)	11450.0000-12750.0000	H, V	72M0G7D	Rx			PPA		PSK
36)	11450.0000-12750.0000	H, V	1M20KG7D	Rx			PPA		PSK
37)	11450.0000-12750.0000	H, V	27M0KG7D	Rx			PPA		PSK
38)	10950.0000-12500.0000	H, V	1M20KG7D	Rx			PPA		PSK
39)	10950.0000-12500.0000	H, V	36M0KG7D	Rx			PPA		PSK
40)	10950.0000-12500.0000	H, V	54M0KG7D	Rx			PPA		PSK
41)	10950.0000-11700.0000	H, V	1M20KG7D	Rx			PPA		PSK
42)	10950.0000-11700.0000	H, V	54M0KG7D	Rx			PPA		PSK
43)	10950.0000-11200.0000	H, V	1M20KG7D	Rx			PPA		PSK
44)	10950.0000-11200.0000	H, V	27M0KG7D	Rx			PPA		PSK
45)	10700.0000-12750.0000	H, V	1M20G7D	Rx			PPA		PSK
46)	10700.0000-12750.0000	H, V	36M0G7D	Rx			PPA		PSK
47)	10700.0000-12750.0000	H, V	54M0G7D	Rx			PPA		PSK



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**C) Frequency Coordination Limits**

#	Frequency Limits (MHz)	Satellite Arc (Deg. Long.)		Elevation (Degrees)		Azimuth (Degrees)		Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
		East Limit	West Limit	East Limit	West Limit	East Limit	West Limit		
1)	11700.0000-12200.0000	37.5W	114.9W	05.0	05.0	000.0	360.0	0	MELCO
2)	14000.0000-14400.0000	37.5W	114.9W	05.0	05.0	000.0	360.0	-7.6	MELCO
3)	10700.0000-12750.0000	37.5W	114.9W	05.0	05.0	000.0	360.0		MELCO
4)	10950.0000-12750.0000	37.5W	114.9W	05.0	05.0	000.0	360.0		MELCO
5)	14000.0000-14500.0000	37.5W	114.9W	05.0	05.0	000.0	360.0	-7.6	MELCO
6)	11700.0000-12200.0000	37.5W	114.9W	05.0	05.0	000.0	360.0		MELCO
7)	10950.0000-12500.0000	37.5W	114.9W	05.0	05.0	000.0	360.0		MELCO
8)	14000.0000-14500.0000	70.5E	177.0W	05.0	05.0	000.0	360.0	-5.5	PPA
9)	11450.0000-12750.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
10)	10700.0000-12750.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
11)	12500.0000-12750.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
12)	12250.0000-12750.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
13)	11700.0000-12200.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
14)	10950.0000-11700.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
15)	10950.0000-11200.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA
16)	10950.0000-12500.0000	70.5E	177.0W	05.0	05.0	000.0	360.0		PPA

**D) Points of Communications**

The following stations located in the Satellite orbits consistent with Sections B and C of this Entry:

- 1) MELCO Remotes to GALAXY 17 (S2715) @ 91 degrees W.L. (U.S.-licensed)
- 2) MELCO Remotes to Estrela do Sul 2 (S2821) @ 63 degrees W.L. (Brazil-licensed)
- 3) MELCO Remotes to TELSTAR 11N (S2357) @ 37.55 degrees W.L. (U.S.-licensed)
- 4) MELCO Remotes to SES-6 (S2870) @ 40.5 degrees W.L. (Netherlands-licensed)
- 5) MELCO Remotes to GALAXY 16 (S2687) @ 99 W.L. (U.S.-licensed)
- 6) MELCO Remotes to AMC 16 (S2181) @ 85 degrees W.L. (U.S.-licensed)
- 7) MELCO Remotes to EUTELSAT 115WB (S2938) @ 114.9 degrees W.L. (formerly SATMEX 7) (Mexico-licensed)
- 8) MELCO Remotes to INTELSAT 29e (S2913) @ 50.0 degrees W.L. (U.S.-licensed)
- 9) PPA Remotes to EUTELSAT 172A (S2610) @ 172 degrees E.L. (formerly GE-23) (U.S.-licensed)
- 10) PPA Remotes to Estrela do Sul 2 (S2821) @ 63 degrees W.L. (Brazil-licensed)
- 11) PPA Remotes to Eutelsat 10A (W2A) (M0311) @ 10 degrees E.L. (France-licensed)
- 12) PPA Remotes to ANIK F1 (S2745) @ 107.3 degrees W.L. (Canada-licensed)
- 13) PPA Remotes to TELSTAR 11N (S2357) @ 37.55 degrees W.L. (U.S.-licensed)
- 14) PPA Remotes to INTELSAT 14 (S2785) @ 45 degrees W.L. (U.S.-licensed)



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**D) Points of Communications**

The following stations located in the Satellite orbits consistent with Sections B and C of this Entry:

- 15) PPA Remotes to AMAZONAS 2 (S2793) @ 61 degrees W.L. (Brazil-licensed)
- 16) PPA Remotes to GALAXY 17 (S2715) @ 91 degrees W.L. (U.S.-licensed)
- 17) PPA Remotes to APSTAR 6 (M292090) @ 226 degrees W.L. (China-licensed)
- 18) PPA Remotes to ASIASAT 5 (M090163) @ 100.5 degrees E.L. (China-licensed)
- 19) PPA Remotes to SES-6 (S2870) @ 40.5 degrees W.L. (Netherlands-licensed)
- 20) PPA Remotes to INTELSAT 15 (S2789) @ 85.0 degrees W.L. (U.S.-licensed)
- 21) PPA Remotes to Yamal 300K @ 177 degrees W.L. (Russia-licensed)
- 22) PPA Remotes to ANIK G1 @ 107.3 degrees W.L. (Canada-licensed)
- 23) PPA Remotes to EUTELSAT 117WA (S2873) @ 116.8 degrees W.L. (formerly SATMEX 8) (Mexico-licensed)
- 24) PPA Remotes to Superbird C2 (M334100) @ 144 degrees E.L. (Japan-licensed)
- 25) PPA Remotes to Apstar 7 (M090165) @ 76.5 degrees E.L. (China-licensed)
- 26) PPA Remotes to GALAXY 16 (S2687) @ 99 W.L. (U.S.-licensed)
- 27) PPA Remotes to JCSAT 5A (M063130) @ 132 degrees E.L. (Japan-licensed)
- 28) PPA Remotes to AMC 16 (S2181) @ 85 degrees W.L. (U.S.-licensed)
- 29) PPA Remotes to EUTELSAT 115WB (S2938) @ 114.9 degrees W.L. (formerly SATMEX 7) (Mexico-licensed)
- 30) PPA Remotes to INTELSAT 29e (S2913) @ 50.0 degrees W.L. (U.S.-licensed)
- 31) PPA Remotes to Eutelsat 70B (M090167) @ 70.5 degrees E.L. (France Licensed)
- 32) PPA Remotes to Yamal 401 @ 90 degrees E.L. (Russia-licensed)
- 33) PPA Remotes to NSS-6 @ 95 E.L. (Netherlands-licensed)

**E) Antenna Facilities**

Site ID	Antenna ID	Units	Diameter (meters)	Manufacturer	Model number	Site Elevation (Meters)	Max Antenna Height (Meters)	Special Provisions (Refer to Section H)
MELCO Remote	MELCO	50	0.68	Mitsubishi Electronics	726-20176-101		0 AGL/ 0 AMSL	
Max Gains(s):		32.2 dBi @	14.2500 GHz	31.6 dBi @	11.9500 GHz			
Maximum total input power at antenna flange (Watts) =					9.90			
Maximum aggregate output EIRP for all carriers (dBW) =					42.10			
PPA Remotes	PPA	2000	0.89	PANASONIC	AURA LE			
Max Gains(s):		37.3 dBi @	14.0500 GHz	37.0 dBi @	14.2500 GHz	36.5 dBi @		
		14.4500 GHz	36.7 dBi @	12.7500 GHz	35.7 dBi @	11.2500 GHz	36.2	
		12.0000 GHz						
Maximum total input power at antenna flange (Watts) =					16.00			
Maximum aggregate output EIRP for all carriers (dBW) =					48.00			



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**F) Remote Control Point:**

MELCO 26200 Enterprise Way, (0.68 m antennas)  
Remotes

Call Sign: E100089

Lake Forest, Orange, CA 92630  
949-462-1683

PPA Remotes 26200 Enterprise Way, (0.89 m antennas)

Call Sign: E100089

Lake Forest, Orange, CA 92630  
949-462-1683

**G) Antenna Structure marking and lighting requirements:**

None unless otherwise specified under Special and General Provisions

**H) Special and General Provisions**

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 1010 --- Applicable to all receiving frequency bands. Emission designator indicates the maximum bandwidth of received signal at associated station(s). Maximum EIRP and maximum EIRP density are not applicable to receive operations.
- 1900 --- Applicable to all transmitting frequency bands. Authority is granted to transmit any number of RF carriers with the specified parameters on any discrete frequencies within associated band in accordance with the other terms and conditions of this authorization, subject to any additional limitations that may be required to avoid unacceptable levels of inter-satellite interference.
- 2010 --- This authorization is issued pursuant to the Commission's Second Report and Order adopted June 16, 1972 (35 FCC 2d 844) and Memorandum, Opinion and Order adopted December 21, 1972 (38 FCC 2d 665) in Docket No. 16495 and is subject to the policies adopted in that proceeding.
- 2916 --- Transmitter(s) must be turned off during antenna maintenance to ensure compliance with the FCC-specified safety guidelines for human exposure to radiofrequency radiation in the region between the antenna feed and the reflector. Appropriate measures must also be taken to restrict access to other regions in which the earth station's power flux density levels exceed the specified guidelines.
- 3219 --- All existing transmitting facilities, operations and devices regulated by the Commission must be in compliance with the Commission's radiofrequency (RF) exposure guidelines, pursuant to Section 1.1307(b)(1) through (b)(3) of the Commission's rules, or if not in compliance, file an Environmental Assessment (EA) as specified in Section 1.1311. See 47 CFR § 1.1307 (b) (5).



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90053 --- The licensee shall take all necessary measures to ensure that the antenna 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 wherever such exposures might occur. 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/lrfsafety](http://www.fcc.gov/oet/lrfsafety)) 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. The licensee shall ensure installation of terminals on aircraft by qualified installers who have an understanding of the antenna's radiation environment and the measures best suited to maximize protection of the general public and persons operating the aircraft and equipment. A terminal exhibiting radiation exposure levels exceeding 1.0 mW/cm<sup>2</sup> in accessible areas, such as at the exterior surface of the radome, shall have a label attached to the surface of the terminal warning about the radiation hazard and shall include thereon a diagram showing the regions around the terminal where the radiation levels could exceed 1.0 mW/cm<sup>2</sup>.
- 90062 --- 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.
- 90066 --- Stations authorized herein must not be used to provide air traffic control communications.
- 90067 --- Operation in the territory or airspace of any country other than the United States must be in compliance with the applicable laws, regulations, and licensing procedures of that country, as well as with the conditions of this authorization.
- 90073 --- Reception of downlink transmissions in the 11.95-12.2 GHz frequency band from Intelsat 14 (Call Sign S2785) at 45° W.L. is not permitted by this authorization. Intelsat 14's authorization does not include those frequencies. (IBFS File No. SAT-RPL-20090123-00007).
- 90075 --- Licensee is afforded 30 days from the date of release of this grant and authorization to decline this authorization as conditioned. Failure to respond within this period will constitute formal acceptance of the authorization as conditioned.
- 90079 --- Antenna elevation for all operations must be at least 5 degrees above the geographic horizon while the aircraft is on the ground.
- 90081 --- All operations shall be on a non-common carrier basis.
- 90094 --- The licensee must maintain a U.S. point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein.
- 90104 --- For any new antenna authorized by this grant, the licensee must file with the Commission a certification including the following information: name of the licensee, file number of the application, call sign of the antenna, Site ID, date of the license and certification that the antenna model was put into operation.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90105 --- Authority is granted to operate this station by remote control provided that the operator is responsible for ensuring the operations are in accordance with the terms and conditions of the license and pursuant to Section 25.271 of the Commission's rules. 47 C.F.R. 25.271.
- 90114 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 C.F.R. § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. ANIK F1 is a Boeing 702 model spacecraft that was launched on July 17, 2004, prior to the effective date of the rule. Applicant states that due to its design, ANIK F1's two helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 90 grams of helium at end of life, with each tank volume being 68.8 liters. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served by sealing the helium tanks without completely venting them. However, we grant a partial waiver of the rule because undue hardship would result from requiring modification of the space station at this time.
- 90115 --- The applicant's request for waiver of Section 25.283(c) of the Commission's rules, 47 C.F.R. § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Eutelsat 10A is an Alcatel Alenia Space Spacebus-4000C4 model spacecraft that was launched in 2009. Applicant states that due to its design, Eutelsat 10A's two helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 0.9 kg of helium in each tank at end of life, with each tank volume being 90 liters. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served by sealing the helium tanks without completely venting them. However, we grant a partial waiver of the rule because undue hardship would result from requiring modification of the space station at this time.
- 90117 --- In the event that a non-geostationary orbit satellite system commences operations in the 14.0-14.5 GHz frequency band, the licensee must cease operations unless such operations have been coordinated with the operator of the NGSO system or licensee has demonstrated that its operations will not cause harmful interference to the NGSO system.
- 90118 --- The licensee shall comply with any pertinent limits established by the International Telecommunication Union to protect other services allocated internationally.
- 90122 --- The earth stations in this blanket license are operated by remote control. The remote control point is a material term of the license and may not be changed without prior authorization under Section 25.117 of the Commission's rules. Public Notice "The International Bureau Provides Guidance Concerning the Relocation of Earth Station Remote Control Points," DA 06-978 (rel. May 4, 2006).
- 90123 --- Operations authorized pursuant to this license are operations by U.S.-registered aircraft anywhere within the coverage area/frequency bands identified in the application for the satellites listed as points of communication. Operations authorized pursuant to this license also include operations by non-U.S.-registered aircraft within U.S. territory, including territorial waters. Authorization for operations by U.S.-registered aircraft outside U.S. territory, pursuant to this license, does not constitute a grant of access to the market in the United States under the Commission's DISCO II policies.





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Non Common Carrier

Grant date: 06/30/2016

Expiration Date: 08/31/2026

## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90167 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 C.F.R. § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Superbird C2 is a Mitsubishi Electric Corp. DS2000 model spacecraft that was launched on August 15, 2008. Applicant states that due to its design, Superbird C2's two identical helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 640 grams of helium at end of life, with each tank volume being 81.39 liters. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served by sealing the helium tanks without completely venting them. However, we grant a partial waiver of the rule because undue hardship would result from requiring modification of the space station at this time.
- 90168 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 C.F.R. § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Apstar 7 is a Thales Alenia Space Spacebus-4000C2 model spacecraft that was launched on March 31, 2012. Applicant states that due to its design, Apstar 7's two identical helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 2100 grams of helium at end of life, with each tank volume being 91 liters. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served by sealing the helium tanks without completely venting them. However, we grant a partial waiver of the rule because undue hardship would result from requiring modification of the space station at this time.
- 90169 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 C.F.R. § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Yamal 300K is a JSC Gazprom Space Systems spacecraft that was launched on November 2, 2012. Applicant states that Yamal 300K will retain a de minimis amount of residual nitrogen and xenon at end of life. Applicant states that there will be 250 grams of nitrogen in a tank volume of 39.3 liters, and 1 kilogram of xenon in each of two interconnected identical tanks, each with a volume of 38 liters. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served by sealing the helium tanks without completely venting them. However, we grant a partial waiver of the rule because undue hardship would result from requiring modification of the space station at this time.
- 90246 --- ESAs authorized herein 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.
- 90247 --- ESAs authorized herein 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 ESAA to determine if it is malfunctioning, and each ESAA must self-monitor and automatically cease transmission on detecting an operational fault that could cause harmful interference to a fixed-satellite service network.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90304 --- Operation pursuant to this authorization must be in compliance with the terms of the licensee's coordination agreements with the National Science Foundation and the National Aeronautics and Space Administration pertaining to operation of ESAs in the Ku-Band.
- 90305 --- 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 ESA must not produce ground-level power flux density (pfd) in such territory in excess of the following values unless the foreign administration has imposed other conditions for protecting its FS stations:  $-132 + 0.5 \times \text{THETA}$  dB(W/(m<sup>2</sup> MHz)) for  $\text{THETA} \leq 40^\circ$ ;  $-112$  dB(W/(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.
- 90306 --- Communications between Panasonic Avionics Corporation's ESAs and the Estrela Do Sul 2 and Amazonas 2 space stations must be in compliance with all existing and future space station coordination agreements reached between Brazil and other Administrations.
- 90307 --- Communications between Panasonic Avionics Corporation's ESAs and the Eutelsat 10A and Eutelsat 70B space stations must be in compliance with all existing and future space station coordination agreements reached between France and other Administrations.
- 90308 --- The ESAs are authorized to receive downlink transmissions in the 11.7-12.2 GHz frequency band from the geostationary orbit space stations listed as a point of communication in Section D above subject to the particulars of operation and identified frequencies included in Section B above and the licensee's application. Reception is authorized on a primary basis as an application of the Fixed-Satellite Service pursuant to the allocation determinations and service rules in IB Docket No.12-376 (Docket Name: Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands). Operations must be in accordance with the Federal Communications Commission's rules not waived herein, the technical specifications contained in licensee's application, and are subject to the other conditions listed in the authorization.
- 90309 --- The ESAs are authorized to receive downlink transmissions in the 10.95-11.2 GHz and 11.45-11.7 GHz frequency band from the geostationary orbit space stations listed as a point of communication in Section D above subject to the particulars of operation and identified frequencies included in Section B above and the licensee's application. Reception is authorized on an unprotected basis as an application of the Fixed-Satellite Service pursuant to the allocation determinations and service rules in IB Docket No.12-376 (Docket Name: Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands). Operations must be in accordance with the Federal Communications Commission's rules not waived herein, the technical specifications contained in licensee's application, and are subject to the other conditions listed in the authorization.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90310 --- For each ESAA transmitter, the licensee shall maintain records of the following data for each operating ESAA, a record of the aircraft location (i.e., latitude/longitude/altitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than one year. Records shall be recorded at time intervals no greater than one (1) minute while the ESAA is transmitting. The ESAA operator shall make this data available, in the form of a comma delimited electronic spreadsheet, within 24 hours of a request from the Commission, NTIA, or a frequency coordinator for purposes of resolving harmful interference events. A description of the units (i.e., degrees, minutes, MHz ...) in which the records values are recorded will be supplied along with the records.
- 90311 --- The ESAAs are authorized to transmit in the 14.0-14.5 GHz frequency band to the geostationary orbit space stations listed as a point of communication in Section D above subject to the particulars of operation and identified frequencies included in Section B above and the licensee's application. Such transmissions are authorized on a primary basis as an application of the Fixed-Satellite Service pursuant to the allocation determinations and service rules in IB Docket No. 12-376 (Docket Name: Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands). Operations must be in accordance with the Federal Communications Commission's rules not waived herein, the technical specifications contained in licensee's application, and are subject to the other conditions listed in the authorization.
- 90312 --- Reception of downlink transmissions is on a non-interference, non-protected basis from the following geostationary orbit space stations: SES 6 (S2870) at 40.5° W.L. in the 11.2-11.45 GHz frequency band (limited to the downlink North Atlantic beam in IBFS File No. SES-MFS-20130930-00845), Eutelsat 172A (formerly GE-23) (Call Sign: S2610) at 172° E.L. in the 12.2-12.75 GHz frequency band; Eutelsat 10A at 10° E.L. in the 12.5-12.75 GHz frequency band; Apstar 6 in the 12.25-12.75 GHz frequency band; Apstar 7 in the 12.50-12.75 GHz frequency band; Superbird C2 in the 12.2-12.75 GHz frequency band; Intelsat 15 in the 12.5-12.75 GHz frequency band; Eutelsat 70B at 70.5° E.L. in the 10.95-11.7 GHz and 12.5-12.75 GHz frequency band; Galaxy 16 (S2687) at the 99° W.L. in the 11.7-12.2 GHz frequency band; JCAT-5A at 132° E.L. in the 12.25-12.75 GHz frequency band; Yamal 401 at 90° E.L. in the 10.95-11.2 GHz, 11.45-11.7 GHz and 12.2-12.75 GHz frequency band; NSS-6 at 95° E.L. in the 11.45-11.7 GHz and 12.5-12.75 GHz frequency band; IS-29e (S2913) at 50° W.L. in the 10.95-11.7 GHz and 12.2-12.5 GHz frequency band; and Yamal 300K at 177° W.L. in the 10.95-11.2GHz and 11.45-11.7 GHz frequency band. When receiving transmissions from these satellites in these frequency bands, the ESAA operations authorized herein must accept interference from any authorized user of the band.
- 90313 --- Communications between Panasonic Avionics Corporation's ESAAs and the Anik F1 and Anik G1 space stations must be in compliance with all existing and future space station coordination agreements reached between Canada and other Administrations.
- 90314 --- This authorization is subject to an overall limit of 2050 remote terminals, of the types identified in Section A above, operating at one time.
- 90315 --- Communications between Panasonic Avionics Corporation's ESAAs and the Eutelsat 115WB and the Eutelsat 117WA space stations must be in compliance with all existing and future space station coordination agreements reached between Mexico and other Administrations.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90316 --- Communications between Panasonic Avionics Corporation's ESAAs and the Superbird C2 and JCSAT-5A space stations must be in compliance with all existing and future space station coordination agreements reached between Japan and other Administrations.
- 90317 --- Communications between Panasonic Avionics Corporation's ESAAs and the SES-6 and NSS-6 space stations must be in compliance with all existing and future space station coordination agreements reached between the Netherlands and other Administrations.
- 90318 --- Communications between Panasonic Avionics Corporation's ESAAs and the Apstar 6, Apstar 7, and Asiasat 5 space stations must be in compliance with all existing and future space station coordination agreements reached between China and other Administrations.
- 90319 --- Communications between Panasonic Avionics Corporation's ESAAs and the Yamal 300K and Yamal 401 space stations must be in compliance with all existing and future space station coordination agreements reached between Russia and other Administrations.
- 90320 --- Operation pursuant to this authorization must be in compliance with the terms of coordination agreements between the operators of the Eutelsat 172A, Eutelsat 10A, Estrela Do Sul 2, Intelsat 14, Telstar 11N, Anik F1, Galaxy-17, Amazonas 2, Anik G1, Apstar 6, Apstar 7, Asiasat 5, Intelsat 15, Eutelsat 117WA, SES-6, Superbird C2, Galaxy-17, Telstar 11N, Estrela do Sul 2, SES-6, Yamal 300K, Eutelsat 70B, Galaxy 16, JCSAT-5A, Yamal 401, and NSS-6 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 fixed-satellite service space station commences operation in the 14.0-14.5 GHz band at a location within six degrees of any of these space stations, ESAAs operating pursuant to this authorization must cease transmitting to that space station unless and until such operation has been coordinated with the new space station's operator or Panasonic Avionics Corporation demonstrates that such operation will not cause harmful interference to the new co-frequency space station.
- 90321 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Yamal 300K is an ISS Reshetnev Ekspress-1000NTA spacecraft that was launched on November 2, 2012. Applicant states that Yamal 300K has one tank, with a volume of 40 liters, containing nitrogen and hydrazine separated by an internal membrane. At satellite end of life the tank will retain 132.5 grams of nitrogen in a total tank volume of 39.3 liters. We grant a waiver of Section 25.283(c) with respect to this de minimis inert gas. The applicant also states that hydrazine will be depleted at end of life, with an estimated residual mass of 700 grams of hydrazine in a total tank volume of 0.7 liters. The applicant also states that, at end of life, two identical interconnected tanks will retain 1.08 kilograms of xenon in a total volume of 76 liters. We find that the measures described in the application for depletion of hydrazine and xenon are appropriate.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90322 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Yamal 401 is an ISS Reshetnev Ekspress-2000A spacecraft that was launched on December 15, 2014. Applicant states that Yamal 401 has three tanks, each with a volume of 40 liters, and each containing nitrogen and hydrazine separated by an internal membrane. At satellite end of life the tanks will retain a total of 397.5 grams of nitrogen in total tank volume of 117.9 liters. We grant a waiver of Section 25.283(c) with respect to this de minimis inert gas. The applicant also states that hydrazine will be depleted at end of life, with an estimated residual mass in each tank of 700 grams remaining in 0.7 liters. The applicant also states that, at end of life, four identical interconnected tanks will retain 2.16 kilograms of xenon in a total volume of 152 liters, corresponding to the minimum operating pressure of the plasma thrusters. We find that the measures described in the application for depletion of hydrazine and xenon are appropriate.
- 90323 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. NSS-6 is a Lockheed-Martin A2100AXS spacecraft that was launched on December 17, 2002, before the rule was adopted. Applicant states that shortly following orbital insertion, the oxidizer tanks were permanently sealed by firing a pyrotechnic valve. Applicant states that there are 25.5 kilograms of oxidizer in a total tank volume of 655 liters, and 3.53 kilograms of helium pressurant in the same 655-liter tank volume. Compliance with Section 25.283(c) is not achievable except through direct retrieval of spacecraft. The information submitted is not sufficient to support a finding that the underlying purpose of Section 25.283(c) would be served.
- 90324 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Eutelsat 70B is an EADS Astrium Eurostar E-3000 spacecraft that was launched on December 3, 2012. Applicant states that Eutelsat 70B's helium tank was sealed following the launch and early orbit phase of satellite operations and cannot be further discharged. Applicant states that the sealed helium tank will retain a total mass of 1270 grams of helium at end of life, in a tank volume of 178 liters. We grant a waiver of the Section 25.283(c) with respect this de minimis inert gas. The applicant also provides information concerning its chemical propulsion system, which will be depleted at the satellite's end of life. Applicant states that, following raising of the satellite to a disposal altitude, it is expected that two tanks, each with a volume of 650 liters, will each hold 4590 grams of NTO and 1150 grams of helium, and two other tanks, also each with a volume of 650 liters, will each hold 1890 grams of MMH and 1150 grams of helium. NTO lines with a volume of 1.6 liters will also hold 2330 grams, and MMH lines with a volume of 1.58 liters will also hold 1400 grams. At that point, Eutelsat will undertake additional passivation activities that will expel some of these residual materials. These activities include reducing tank pressures during the passivation process to 1 bar. We find that the measures described in the application for depletion of propellants are appropriate.
- 90325 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Superbird C2 is a Mitsubishi Electric Corp. DS2000 model spacecraft that was launched on August 15, 2008. Applicant states that Superbird C2's two identical helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 640 grams of helium at end of life, with each tank volume being 81.39 liters. We grant a waiver of the Section 25.283(c) with respect this de minimis inert gas.



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## H) Special and General Provisions

A) This RADIO STATION AUTHORIZATION is granted subject to the following special provisions and general conditions:

- 90326 --- The applicant's request for a waiver of Section 25.283(c) of the Commission's rules, 47 CFR § 25.283(c), is granted. Section 25.283(c) specifies that space stations must discharge all stored energy sources at end-of-life of the space station. Apstar 7 is a Thales Alenia Space Spacebus-4000C2 model spacecraft that was launched on March 31, 2012. Applicant states that Apstar 7's two identical helium tanks were sealed immediately following the last orbit-raising maneuver during the launch phase for the satellite and cannot be further discharged. Applicant states that the sealed helium tanks will retain a total mass of approximately 2100 grams of helium at end of life, with each tank volume being 91 liters. We grant a waiver of the Section 25.283(c) with respect this de minimis inert gas.
- 90327 --- Yamal 300K has previously been granted U.S. market access in IBFS File No. SES-MFS-20160404-00304. Operations under this authorization are limited to ESAA terminals. Gateway operations have been addressed in IBFS File No. SES-MFS-20160404-00304.
- 90346 --- Applicant's request for a waiver of Section 25.210(f) of the Commission's rules is GRANTED, as conditioned. Section 25.210(f) requires that space stations operating in the Fixed-Satellite Service in certain frequency bands, including 10.7-12.7 GHz and 13.75-14.5 GHz bands, employ full frequency reuse. 47 C.F.R. § 25.210(f). This requirement is part of the Commission's two-degree spacing policy, and the purpose is to ensure that scarce orbit and spectrum resources are used efficiently and to encourage the deployment of technologically innovative satellites. The Commission has waived this requirement where doing so would allow satellite capacity that would otherwise lay dormant to be used to provide service. Yamal 300K is in-orbit and will operate from the 177° W.L. orbital location regardless of whether we permit it to provide service in the United States. Yamal 300K is capable of full-frequency use on some, but not all, of the frequency bands requested for operations with the United States. We find that preventing Yamal 300K from offering its capacity in the United States would preclude the provision of Ku-band service in the U.S. from this orbit location, and it is in the public interest to grant a limited waiver of the full frequency reuse requirement for the 10.95-11.2 GHz and 14.0-14.25 GHz frequency bands. Limited waiver is granted subject to the condition that no compliant satellite is offering service to the United States in the 10.95-11.2 GHz and 14.0-14.25 GHz frequencies at that orbital location.



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B) This RADIO STATION AUTHORIZATION is granted subject to the additional conditions specified below:

This authorization is issued on the grantee's representation that the statements contained in the application are true and that the undertakings described will be carried out in good faith.

This authorization shall not be construed in any manner as a finding by the Commission on the question of marking or lighting of the antenna system should future conditions require. The grantee expressly agrees to install such marking or lighting as the Commission may require under the provisions of Section 303(q) of the Communications Act. 47 U.S.C. § 303(q).

Neither this authorization nor the right granted by this authorization shall be assigned or otherwise transferred to any person, firm, company or corporation without the written consent of the Commission. This authorization is subject to the right of use or control by the government of the United States conferred by Section 706 of the Communications Act. 47 U.S.C. § 706. Operation of this station is governed by Part 25 of the Commission's Rules. 47 C.F.R. Part 25.

This authorization shall not vest in the licensee any right to operate this station nor any right in the use of the designated frequencies beyond the term of this license, nor in any other manner than authorized herein.

This authorization is issued on the grantee's representation that the station is in compliance with environmental requirements set forth in Section 1.1307 of the Commission's Rules. 47 C.F.R. § 1.1307.

This authorization is issued on the grantee's representation that the station is in compliance with the Federal Aviation Administration (FAA) requirements as set forth in Section 17.4 of the Commission's Rules. 47 C.F.R. § 17.4.

The following condition applies when this authorization permits construction of or modifies the construction permit of a radio station.

This authorization shall be automatically forfeited if the station is not ready for operation by the required date of completion of construction unless an application for modification of authorization to request additional time to complete construction is filed by that date, together with a showing that failure to complete construction by the required date was due to factors not under control of the grantee.

Licensees are required to pay annual regulatory fees related to this authorization. The requirement to collect annual regulatory fees from regulatees is contained in Public Law 103-66, "The Omnibus Budget Reconciliation Act of 1993." These regulatory fees, which are likely to change each fiscal year, are used to offset costs associated with the Commission's enforcement, public service, international and policy and rulemaking activities. The Commission issues a Report and Order each year, setting the new regulatory fee rates. Receive only earth stations are exempt from payment of regulatory fees.

