

ATTACHMENT 3

COORDINATION INFORMATION



Robert Condurso
Director, Government and Regulatory Affairs

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February 8, 2010

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

To Whom It May Concern:

This letter certifies that Telesat Canada ("Telesat") is aware that Panasonic Avionics Corporation ("PAC") is seeking FCC authorization to access the Telstar 14 satellite at 63° WL,¹ 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.² However, as described below, Telesat believes that 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.³

Telesat understands that PAC plans to operate two AMSS antenna types: (i) the MELCO antennas previously operated with the Connexion by Boeing system; and (ii) the Aura LE antenna designed specifically for the eXConnect system and manufactured by EMS Technologies. We understand that 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). We understand that the Aura LE antenna is a mechanically steered, flat-plate AES with two transmit/receive apertures that is similarly designed

¹ Telesat, through its subsidiary Telesat Brasil Capacidade de Satelites Ltda., operates the Telstar 14 satellite pursuant to a license issued by Brazil. Telstar 14 has been granted FCC authority to serve the United States.

² See 47 CFR §25.209.

³ See 47 CFR §25.222.

to meet the technical requirements imposed on U.S. and international AMSS operations.⁴ The basic characteristics of the MELCO and Aura LE antennas, as specified by the manufacturers, 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

Based on our review of the technical specifications and conversations with PAC, we understand that 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 attitude 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 Inertial Navigation System (“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.⁵

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:

15-25log ₁₀ (Θ + 0.2)	dBW/4 kHz	for	1.5° ≤ Θ ≤ 7°
-6	dBW/4 kHz	for	7° < Θ ≤ 9.2°
18-25log ₁₀ (Θ + 0.2)	dBW/4 kHz	for	9.2° < Θ ≤ 48°
-24	dBW/4 kHz	for	48° < Θ ≤ 85°

⁴ 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.

⁵ See 47 C.F.R. § 25.222(a)(7) (Ku-band ESVs) and § 25.226(b)(1)(iv)(B)(Ku-band VMESs).

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.

We have been advised by PAC that the eXConnect system will limit off-axis EIRP spectral density to no more than these levels 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.

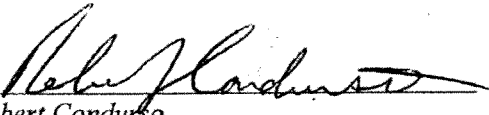
Based on the foregoing factors and discussions with PAC, we understand that the MELCO antenna will operate at a maximum input power density at the antenna waveguide flange of -21.6 dBW /4 kHz, employing BPSK modulation; and the Aura LE antenna will operate at a maximum input power density at the antenna 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, we believe that 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 Sections 25.209 and 25.212(c) of the FCC's rules, at all off-axis angles up to and including 6 degrees off-axis angle. PAC has advised us that it includes antenna pointing offsets in selecting the maximum power levels defined above to ensure that the operation of these antennas, with the associated off-axis EIRP density envelope, will not cause unacceptable interference into adjacent satellites.

Based on the above advice and understandings, Telesat agrees 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 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. PAC has represented to Telesat 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. If the use of these antennas should cause unacceptable interference into other systems, PAC has agreed that it will terminate transmission immediately upon notice from the affected parties.

Telesat further states that the maximum downlink satellite EIRP density of 13.0 dBW/4KHz, the operational level of the Ku-band AMSS network operated by PAC, is routinely used by satellite operators during frequency coordination at two-degree spacing without causing unacceptable interference to adjacent satellite operators.

Finally, Telesat confirms that the PAC Ku-band AMSS operations described above fall within the operating parameters previously coordinated with adjacent satellite operators within +/- 6 degrees of Telstar 14. Since the Telstar 14 satellite commenced commercial operations, Ku-band operations have been supported that are consistent with these coordination agreements. Telesat has no current plans to alter the coordinated operating parameters for the Telstar 14 satellite.

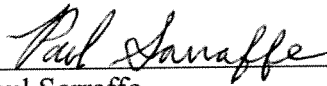
Sincerely,


Robert Condurso
for Telesat Canada

8 Feb 2010
Date

Acceptance by Panasonic Avionics Corporation:

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


Paul Sarraffe
Panasonic Avionics Corporation
eXConnect Systems Engineering

9-Feb-2010
Date




August 5, 2010

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

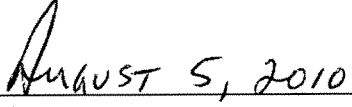
To Whom It May Concern:

This letter supplements the letter dated February 8, 2010 from Telesat Canada ("Telesat") regarding Panasonic Avionics Corporation's ("PAC") proposed Ku-band aeronautical mobile-satellite service ("AMSS") operations with the Telstar 14 satellite at 63° W.L. Telesat confirms that so long as PAC maintains FCC authority to communicate with Telstar 14, Telesat will take into account the technical parameters described in the aforementioned letter in all future satellite network coordinations for the satellite.

Sincerely,




Robert Conduro
for Telesat Canada



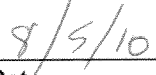
Date

Acceptance by Panasonic Avionics Corporation:

PAC hereby certifies that it will comply with all coordination agreements reached by Telesat for the Telstar 14 satellite.



Paul Saraffe
Panasonic Avionics Corporation
eXConnect Systems Engineering



Date

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.¹ 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.²

Intelsat understands that PAC plans to operate two AMSS antenna types: (i) the MELCO antennas previously operated with the Connexion 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.³ The basic

¹ See 47 CFR §25.209.

² See 47 CFR §25.222.

³ 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



INTELSAT

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 attitude 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.⁴

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:

15-25log ₁₀ (Θ + 0.2)	dBW/4 kHz	for	1.5° ≤ Θ ≤ 7°
-6	dBW/4 kHz	for	7° < Θ ≤ 9.2°
18-25log ₁₀ (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.

⁴ 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

Jose Albuquerque
Jose Albuquerque
Senior Director, Spectrum Engineering
Intelsat

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. Jonnalagadda 16 Dec 09
Krish Jonnalagadda Date
Manager, Spectrum Development
SES Americom

August 2, 2010



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

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
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
Paul Sarraffe
Panasonic Avionics Corporation
eXConnect Systems Engineering

August 3, 2010
Date