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October 1, 2012

VIA ELECTRONIC FILING

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

Re: Application for License Modification of Panasonic Avionics Corporation; File No. SES-MFS-20120913-00818, Call Sign E100089; Satellite Operator Certifications

Dear Ms. Dortch:

Panasonic Avionics Corporation ("Panasonic"), pursuant to Section 1.65 of the Commission's Rules, 47 C.F.R. § 1.65, hereby submits the enclosed satellite operator certifications supporting international operations of the eXConnect Ku-band AMSS network proposed in the above-referenced license modification application.

Panasonic encloses certifications from three operators of five satellites it seeks to add as authorized points of communication: Telesat Canada, operating Anik F1 and Telstar T11N; APT Satellite Company Limited, operating Apstar 6 and Apstar 7; and Asia Satellite Telecommunications Co., operating AsiaSat 5. These certifications confirm that Panasonic's planned operations fall within the operating parameters previously coordinated with adjacent satellite operators and, where foreign aircraft operations with a satellite have already commenced, confirm that there have been no reported cases of unacceptable interference relating to Panasonic's operation of the eXConnect system. Additional certification letters from other satellite operators will be provided shortly.

Lastly, Panasonic wishes to correct a minor typographical error regarding the orbital location of the AsiaSat 5 satellite, identified as an additional satellite point of communication in the application narrative and Schedule B of Form 312. AsiaSat 5 is currently located at 100.5° E.L., rather than 101° E.L. as indicated in the application materials.

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

Respectfully submitted,

Squire Sanders (US) LLP

/s/ Carlos M. Nalda

Carlos M. Nalda

Counsel to Panasonic Avionics Corporation

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

Telesat
1601 Telesat Court
Ottawa, Ontario K1B 5P4

RJF012-019
Oct. 1, 2012

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 Anik F1 satellite at 107.3° W.L. and the Telstar 11N satellite at 37.55° W.L. as authorized points 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, Telesat believes that the terminals comply with the coordinated off-axis EIRP spectral density levels for the PAC service carried on these satellites, which are higher than those contained in the FCC's two-degree spacing rules.[2]

Telesat understands that PAC is presently operating the Aura LE aeronautical earth station ("AES") terminal designed specifically for the eXConnect system and manufactured by PAC. We understand that the Aura LE is a mechanically steered, flat-plate AES with two transmit/receive apertures that is designed to meet the technical requirements imposed on U.S. and international AMSS operations. The basic characteristics of the Aura LE AES, as specified by PAC, are summarized in Table 1.

[1] *See* 47 CFR §25.209.

[2] Off-axis EIRP spectral density levels are set forth in analogous Ku-band earth stations onboard vessels ("ESV") and vehicle-mounted earth stations ("VMES") rules. *See* 47 CFR §§25.222 and 25.226.

Telesat

Table 1. Aura LE Antenna Characteristics

Characteristic	Aura LE
Frequency	Tx: 14.0 GHz to 14.5 GHz Rx: 10.7 GHz to 12.75 GHz
Aperture Size	2 Apertures of 34.7" X 6.6" each
EIRP	48.0 dBW
G/T	10-14 dB/K
Tracking Rate	40 deg/sec in Azimuth 20 deg/sec in Elevation
Az Pointing Accuracy	0.2 deg 1-sigma

Based on our review of the technical specifications of the antenna and conversations with PAC, we understand the following. The Aura LE antenna is designed to maintain pointing towards the intended satellite through the full range of maneuvers carried out by commercial aircraft. The antenna is 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 Aura LE will be less than 0.2°, 1-sigma. Pointing error will be continuously monitored and if it ever exceeds 0.35°, then transmissions will be automatically inhibited within 100 ms.[3]

The FCC off-axis EIRP spectral density limits applied to AMSS operations are the same as those defined for ESV and VMES operations. The off-axis EIRP spectral density generated by an AMSS terminal operating in a two-degree spacing environment should not exceed:

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

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. In regions where larger orbital spacing is the norm, off-axis EIRP spectral density limits may be coordinated to higher levels.

We have been advised by PAC that the eXConnect system will limit off-axis EIRP spectral density to the levels coordinated for the service on the Anik F1 and Telstar 11N satellites through various means, including: (i) limiting transmit power spectral density

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

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 0.35°. 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 Aura LE antenna will operate at an effective maximum input power density at the antenna waveguide flange of -26.0 dBW /4 kHz with Anik F1, -26.6 dBW /4 kHz with Telstar 11N (US beam) and -24.6 dBW /4 kHz with Telstar 11N (AOR beam), assuming an antenna gain of 37 dBi and employing BPSK modulation. At all times, the maximum off-axis EIRP spectral density levels are consistent with the coordinated values for this service on the Anik F1 and Telstar 11N satellites. PAC takes advantage of larger orbital spacing and/or coordination limits by operating at larger skew angles to increase the geographic coverage area of its service.

Even in the rare circumstance when transmitting at maximum pointing offset, we believe that this terminal is compliant with the applicable off-axis EIRP density level requirements for potential affected satellites up to and including 6° off-axis. PAC has advised us that it includes antenna pointing offsets in selecting the maximum power levels defined above to ensure that the operation of the Aura LE, with the associated off-axis EIRP density envelope for each satellite point of communication, will not cause unacceptable interference into adjacent satellites. Telesat further states that the maximum downlink satellite EIRP density of 13.0 dBW/4KHz, operational level of the Ku-band AMSS network operated by PAC, is within the coordinated limits and will not cause unacceptable interference to adjacent satellite operators. In summary,

1. Telesat is familiar with the technical characteristics of the eXConnect phased-array AMSS terminal. *See, e.g.,* FCC Modification Application, File No. File No. SES-MFS-20120913-00818, and Experimental License, File No. 0281-EX-PL-2010.

2. The eXConnect phased-array AMSS terminal operations described above, including PAC's planned operations on the Anik F1 and Telstar 11N satellites, fall within the operating parameters previously coordinated with adjacent satellite operators.

3. Telesat acknowledges that it will include the subject non-conforming earth station operations in relevant future satellite network coordinations.

4. Telesat further states that there have been no reported cases of unacceptable interference relating to PAC's existing operation of the eXConnect system on Telesat's Telstar 11N or Telesat 14R satellites, either from other customers or from adjacent satellite operators.

Based on the above advice and understandings, Telesat agrees that operation of the eXConnect phased-array AMSS terminal will not cause unacceptable interference into other operations on Anik F1 and Telstar 11N, or adjacent satellites, and is otherwise in accordance with Telesat's technical requirements.

John Forsey, P. Eng.

John Forsey
Director
ITU and Regulatory Division

September 21, 2012

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

To Whom It May Concern:

Dear Sirs/Madams

This letter certifies that APT Satellite Company Limited. ("APT Satellite") is aware that Panasonic Avionics Corporation ("PAC") is seeking FCC authorization to access Apstar 6 at 134° E.L. and Apstar 7 at 76.5° E.L., 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, APT Satellite believes that the terminals comply with the coordinated off-axis EIRP spectral density levels of these satellites, which are up to 4 dB higher than the FCC's two-degree spacing rules.[2]

APT Satellite understands that PAC will soon operate the Aura LE AES terminal designed specifically for the eXConnect system on the Apstar 6 and Apstar 7 satellites. APT Satellite understands that the Aura LE 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. The basic characteristics of the Aura LE AES are summarized in Table 1.

Table 1. Aura LE Antenna Characteristics

Characteristic	Aura LE
Frequency	Tx: 14.0 GHz to 14.5 GHz Rx: 10.7 GHz to 12.75 GHz
Aperture Size	2 Apertures of 34.7" X 6.6" each
EIRP	48.0 dBW
G/T	10-14 dB/K
Tracking Rate	40 deg/sec in Azimuth

[1] *See* 47 CFR §25.209.

[2] Off-axis EIRP spectral density levels are set forth in analogous Ku-band earth stations onboard vessels ("ESV") and vehicle-mounted earth stations ("VMES") rules. *See* 47 CFR §§25.222 and 25.226.

	20 deg/sec in Elevation
Az Pointing Accuracy	0.2 deg 1-sigma

Based on our review of the technical specification and conversations with PAC, APT Satellite understands that the Aura LE antenna is designed to maintain pointing towards the intended satellite through the full range of maneuvers carried out by commercial aircraft. The antenna is 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 Aura LE will be less than 0.2° 1-sigma. Pointing error will be continuously monitored and if it ever exceeds 0.35°, then transmissions will be automatically inhibited within 100 ms.[3]

The off-axis EIRP spectral density limits applied to AMSS operations are the same as those defined for ESV and VMES operations. The off-axis EIRP spectral density generated by an AMSS terminal operating in a two-degree spacing environment should not exceed:

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

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. In regions where larger orbital spacing is the norm, off-axis EIRP spectral density limits may be up to 4 dB higher.

APT Satellite has been advised by PAC that the eXConnect system will limit off-axis EIRP spectral density to the levels coordinated for the Apstar 6 and Apstar 7 satellites 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 0.35°. 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, APT Satellite understands that the Aura LE antenna will operate at an effective maximum input power density at the antenna waveguide flange of -16.7 dBW/4 kHz with Apstar 6 and -26.2 dBW/4 kHz with Apstar 7, assuming an antenna gain of 37 dBi and employing BPSK modulation. Even in the rare circumstance when transmitting at maximum pointing offset of 0.35°, this terminal is compliant with the applicable off-axis EIRP density level requirements for potential affected satellites up to and including 6°

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

off-axis. PAC has advised that his conservative approach of including antenna pointing offsets in selecting the maximum power levels defined above ensures that the operation of the Aura LE, with the associated off-axis EIRP density envelope for each satellite point of communication, will not cause unacceptable interference into adjacent satellites.

APT Satellite further certifies that the maximum downlink satellite EIRP densities of 20.4 dBW/4KHz for Apstar 6 and 13.0 dBW/4KHz for Apstar 7 at the beam peaks , operational levels of the Ku-band AMSS network operated by PAC, is routinely used without causing unacceptable interference to adjacent satellite operators.

In view of the foregoing and additional consultations between APT Satellite engineering staff and PAC, APT Satellite hereby certifies the following:

1. APT Satellite is familiar with the technical characteristics of the eXConnect phased-array AMSS terminal. *See, e.g.,* FCC Modification Application, File No. SES-MFS-20120913-00818, and Experimental License, File No. 0281-EX-PL-2010.

2. The eXConnect phased-array AMSS terminal operations described above, including PAC's planned operations on the Apstar 6 and Apstar 7 satellite, fall within the operating parameters previously coordinated with adjacent satellite operators.

In sum, APT Satellite confirms that operation of the eXConnect phased-array AMSS terminal described above will not cause unacceptable interference into other operations on Apstar 6 and Apstar 7, or adjacent satellites, and is otherwise in accordance with APT Satellite's technical requirements.

Please let me know if you require any additional information regarding APT Satellite's experience with PAC's operation of the eXConnect phased-array AMSS terminal on the Apstar 6 and Apstar 7 satellites.

Sincerely,

梁福玉

Liang Fuyu
for APT Satellite

Sep 21, 2012

Date

September 20, 2012

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

To Whom It May Concern:

This letter certifies that Asia Satellite Telecommunications Co. ("AsiaSat") is aware that Panasonic Avionics Corporation ("PAC") is seeking FCC authorization to access AsiaSat 5 at 100.5° E.L. 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 coordinated off-axis EIRP spectral density levels of this satellite, which are up to 8 dB higher than the FCC's two-degree spacing rules.[2]

PAC is presently operating the Aura LE AES terminal designed specifically for the eXConnect system on the AsiaSat 5 satellite. The Aura LE 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. The basic characteristics of the Aura LE AES are summarized in Table 1.

Table 1. Aura LE Antenna Characteristics

Characteristic	AuraLE
Frequency	Tx: 14.0 GHz to 14.5 GHz Rx: 10.7 GHz to 12.75 GHz
Aperture Size	2 Apertures of 34.7" X 6.6" each
EIRP	48.0 dBW
G/T	10-14 dB/K
Tracking Rate	40 deg/sec in Azimuth 20 deg/sec in Elevation
Az Pointing Accuracy	0.2 deg 1-sigma

[1] *See* 47 CFR §25.209.

[2] Off-axis EIRP spectral density levels are set forth in analogous Ku-band earth stations onboard vessels ("ESV") and vehicle-mounted earth stations ("VMES") rules. *See* 47 CFR §§25.222 and 25.226.

Asia Satellite Telecommunications Company Limited
19/F, Sunning Plaza, 10 Hysan Avenue, Causeway Bay, Hong Kong
Telephone: +852 2500 0888 Facsimile: +852 2576 4111
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The Aura LE antenna is designed to maintain pointing towards the intended satellite through the full range of maneuvers carried out by commercial aircraft. The antenna is 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 Aura LE will be less than 0.2° 1-sigma. Pointing error will be continuously monitored and if it ever exceeds 0.35°, then transmissions will be automatically inhibited within 100 ms.[3]

The off-axis EIRP spectral density limits applied to AMSS operations are the same as those defined for ESV and VMES operations. The off-axis EIRP spectral density generated by an AMSS terminal operating in a two-degree spacing environment should not exceed:

$15-25\log_{10}(\Theta + 0.2)$	dBW/4 kHz	for	$1.5° \leq \Theta \leq 7°$
-6	dBW/4 kHz	for	$7° < \Theta \leq 9.2°$
$18-25\log_{10}(\Theta + 0.2)$	dBW/4 kHz	for	$9.2° < \Theta \leq 48°$
-24	dBW/4 kHz	for	$48° < \Theta \leq 85°$
-14	dBW/4 kHz	for	$85° < \Theta \leq 180°$

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. In regions where larger orbital spacing is the norm, off-axis EIRP spectral density limits may be up to 8 dB higher.

The eXConnect system will limit off-axis EIRP spectral density to the levels coordinated for the AsiaSat 5 satellite 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 0.35 . The specific transmit power, bandwidth and skew angle thresholds will be selected based on the desired terminal transmission rates, coverage area, and satellite performance.

The Aura LE antenna will operate at an effective maximum input power density at the antenna waveguide flange of -17.7 dBW /4 kHz, assuming an antenna gain of 37 dBi and employing BPSK modulation. Even in the rare circumstance when transmitting at maximum pointing offset, this terminal is compliant with the applicable off-axis EIRP density level requirements for potential affected satellites up to and including 6° off-axis. PAC's conservative approach of including antenna pointing offsets in selecting the maximum power levels defined above ensures that the

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

operation of the Aura LE, with the associated off-axis EIRP density envelope for each satellite point of communication, will not cause unacceptable interference into adjacent satellites.

Based on the above advice and understandings, and review of the technical characteristics of the eXConnect phased-array AMSS terminal (*see, e.g.,* FCC Modification Application, File No. SES-MFS-20120913-00818) AsiaSat agrees that the use of the above antenna, including PAC's planned operations on the AsiaSat 5 satellite, fall with the assigned operation parameters which are based on coordination agreement with adjacent satellite operators.

AsiaSat 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 without causing unacceptable interference to adjacent satellite operators. AsiaSat confirms that there have been no reported cases of unacceptable interference relating to PAC's operation of the eXConnect system from other customers operating on the AsiaSat 5 satellite or from adjacent satellite operators.

Please let me know if you require any additional information regarding AsiaSat's experience with PAC's operation of the eXConnect phased-array AMSS terminal on the AsiaSat 5 satellite.

Sincerely,

Roger Tong
VP Engineering and Operations
for AsiaSat

21/ Sept/2012
Date