

**FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of

Request of Panasonic Avionics Corporation	)	
for Special Temporary Authorization to	)	File No.
Operate Up to 10 Technically Identical	)	
Aeronautical Mobile-Satellite Service	)	
("AMSS") Aircraft Earth Stations ("AESs")	)	
in the 14.0-14.4 GHz and 11.7-12.2 GHz	)	
Frequency Bands	)	

**REQUEST FOR SPECIAL TEMPORARY AUTHORIZATION**

Panasonic Avionics Corporation ("Panasonic"), an applicant for commercial license authority for the eXConnect Ku-band Aeronautical Mobile-Satellite Service ("AMSS") system,<sup>1</sup> pursuant to Section 25.120(b)(3) of the Commission's rules, 47 C.F.R.

§ 25.120(b)(3), hereby seeks special temporary authorization ("STA") to operate up to ten (10) MELCO aircraft earth stations ("AES") throughout the continental United States, Alaska, Hawaii and U.S. territories and possessions.<sup>2</sup>

Panasonic presently holds an FCC experimental license that includes authority to operate 10 MELCO AES antennas for limited market studies, which we understand includes the initial introduction of payable service to examine take-up rates, network loading and other factors at chosen price points. However, out of an abundance of caution, Panasonic requests the instant STA to the extent necessary to facilitate the initial introduction of payable WiFi

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<sup>1</sup> See *Application of Panasonic Avionics Corporation for Authority to Operate Up to 15 Technically Identical Aeronautical Mobile-Satellite Service ("AMSS") Aircraft Earth Stations ("AESs") in the 14.0-14.4 GHz and 11.7-12.2 GHz Frequency Bands*, Call Sign E100089, IBFS File Nos. SES-LIC-20100805-00992, SES-AMD-20100914-01163 and SES-AMD-20101115-01432 ("Panasonic AMSS Application").

<sup>2</sup> In accordance with Section 25.120(a), a copy of this STA application has been forwarded to the Commission's Columbia Operations Center.

connectivity on or about February 1, 2011 onboard Lufthansa aircraft that intermittently transit U.S. airspace.<sup>3</sup>

## **I. INTRODUCTION AND BACKGROUND**

As the Commission is aware, Panasonic, a leading provider of in-flight entertainment (“IFE”) systems, has developed the eXConnect Ku-band AMSS system to provide satellite-based broadband connectivity to commercial aircraft. eXConnect provides broadband Internet access, real-time video content, voice and other services aboard commercial aircraft. Passengers may use these services for entertainment and to enhance productivity. These services are also available to the crew and enable a range of airline operational and administrative applications, allowing airlines to operate more effectively and efficiently.

The eXConnect system uses Ku-band Fixed-Satellite Service (“FSS”) satellites under an existing domestic and international secondary allocation to Mobile-Satellite Service (“MSS”) in the 14.0-14.5 GHz band. The eXConnect System protects adjacent FSS satellites from harmful interference by limiting the off-axis EIRP spectral density along the GSO arc to no more than the levels permitted for routinely licensed Ku-band VSAT and other Ku-band mobile terminals (i.e., earth stations onboard vessels (“ESVs”) and vehicle-mounted earth stations (“VMES”)).

On January 7, 2010, the Commission granted Panasonic a six month experimental STA to conduct ground and flight testing for demonstration purposes of up to ten (10) AESs each (up to 20 total) of two types, the Aura LE and the MELCO antennas, as well as authority to conduct limited market studies.<sup>4</sup> Before the expiration of its STA, Panasonic filed an

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<sup>3</sup> If the International Bureau concludes that a commercial STA is warranted, consistent with Section 25.120(b)(3) of the rules, Panasonic respectfully requests an initial STA period of 60 days commencing on February 1, 2011.

<sup>4</sup> See ELS File No. 0339-EX-ST-2009 (Call Sign WD9XQT).

application for a full two-year experimental license for ground and flight testing of the terminals, including continuation of limited market study authority.<sup>5</sup>

On August 5, 2010, Panasonic filed an application for blanket AES authority to operate a network of MELCO antennas and provide AMSS service commercially.<sup>6</sup> Panasonic provided detailed technical information on the MELCO antenna in its AMSS application and subsequent amendments, which are hereby incorporated by reference.<sup>7</sup> Comments on the application were filed and the pleading cycle has ended. A decision regarding full commercial authority is expected in due course. There is ample Commission precedent to grant the instant application for a sixty (60) day STA while the AMSS application is pending, just as the Commission did in the AMSS licensing proceeding of Row 44, Inc.<sup>8</sup>

## **II. DESCRIPTION OF PROPOSED COMMERCIAL OPERATIONS**

Panasonic is currently operating several MELCO AESs in trials onboard Lufthansa aircraft to support free WiFi access to end-users under the limited market study authority in

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<sup>5</sup> See ELS File No. 0281-EX-PL-2010. Therefore, pursuant to Section 5.61(b) of the Commission's rules, Panasonic can continue to operate under its STA while the experimental license application is pending.

<sup>6</sup> See Panasonic AMSS Application, Call Sign E100089, IBFS File No. SES-LIC-20100805-00992. Minor amendments to the Panasonic AMSS Application were filed subsequently. See IBFS File Nos. SES-AMD-20100914-01163 and SES-AMD-20101115-01432.

<sup>7</sup> See Panasonic AMSS Application and additional information submitted in that proceeding; see also Section III, notes 13 and 14, *infra*, at 7.

<sup>8</sup> See IBFS File No. SES-STA-20080711-00928. Pursuant to Section 25.120(b)(3), because Panasonic has already filed an application for a long-term AMSS license, the STA can be granted for up to sixty (60) days without placing the application on public notice. Since Panasonic is already operating the MELCO AES antenna in the United States on an interim basis and the issues implicated by the STA request are the same as those in Panasonic's AMSS license application proceeding, such an approach would be appropriate in this case.

Panasonic's experimental STA.<sup>9</sup> On or about February 1, 2011, Lufthansa plans to introduce payable WiFi access and, during this introductory period, Panasonic will work with the airline to study price points, demand for the service, network loading and related factors.

Panasonic has consulted with Commission staff and understands that its existing limited market study authority will support the introduction of payable WiFi connectivity onboard Lufthansa airlines on an interim basis. Specifically, although questions may exist concerning the direct applicability of FCC policies on services provided to passengers onboard foreign-registered aircraft, Panasonic's limited market study authority for AES operations would support payable WiFi connectivity onboard Lufthansa aircraft because pricing is an essential aspect of a viable market study. This is particularly true in the nascent AMSS market, where the first global AMSS service provider was forced to discontinue service after only a brief history of commercial operations. Nevertheless, out of an abundance of caution, Panasonic is submitting the instant STA request for Bureau action if such authority is deemed necessary or appropriate on an interim basis to support the introduction of limited, payable WiFi connectivity while Panasonic's AMSS license application remains pending.

### **III. MELCO AES ANTENNA PERFORMANCE**

The MELCO AES antenna was developed by Mitsubishi Electronics Company for the Connexion by Boeing AMSS system. It is a mechanically-steered Cassegrain antenna with an elliptical profile designed to be compatible with installation and operation onboard an aircraft. The MELCO antenna was previously examined by the Commission and authorized

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<sup>9</sup> Panasonic has implemented measures to comply with the Commission's experimental license rules and policies governing limited market studies (e.g., retaining ownership of AESs involved in such studies, providing notice that present AES operations are conducted on an experimental basis only, etc.).

in experimental Call Sign WC2XVE and commercial blanket license Call Sign E000723.<sup>10</sup>

The basic characteristics of the MELCO antenna are summarized in Table 1.

**Table 1. MELCO Antenna Characteristics<sup>11</sup>**

<b>Characteristic</b>	<b>MELCO Reflector</b>
Frequency	Tx: 14.0 GHz to 14.4 GHz Rx: 11.7 GHz to 12.2 GHz
Aperture Size	25.6" X 7.7"
Maximum EIRP	41.3 dBW
Receive G/T	8.0 dB/K @ 11.2 to 11.7 GHz
Tracking Rate	40 deg/sec in Azimuth 25 deg/sec in Elevation
Az Pointing Accuracy	0.25 deg 1-sigma
Antenna Patterns	<i>See</i> Panasonic AMSS Application, Technical Appendix

The MELCO AES is fully compliant with the technical provisions governing Ku-band AMSS operations embodied in Recommendation ITU-R M.1643, and international rules and policies governing such operations.

The MELCO AES antenna is paired with a broadband controller ("BC"), which contains the modem and control functionality of the AES terminal. The modem includes a DVB-S2 demodulator and iDirect D-TDMA modulator. The BC includes the ability to inhibit transmissions as a function of location and skew angle, control transmit power and select the serving satellite as a function of location.<sup>12</sup> Skew angle control is enforced

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<sup>10</sup> *See* ELS File No. 0002-EX-ML-2004 and IBFS File No. SES-MOD-20030512-00639.

<sup>11</sup> The maximum EIRP of the antenna is 47.2 dBW, but a lower maximum operating transmit EIRP of 41.3 dBW is requested (for emissions designator 9M00G7D). For the applicable emissions designators and other relevant technical parameters, *see* IBFS File No. SES-AMD-20101115-01432, Form 312. The MELCO antenna will operate at less than peak input power and maximum transmit EIRP to comply with the Commission's two-degree spacing policies.

<sup>12</sup> The ability to inhibit transmission by location (based on maps loaded onto the BC) is designed to protect radio astronomy and space research in the Ku-band, and to ensure that the terminal does not operate in geographic areas where Panasonic does not have authority to transmit. The ability to inhibit transmission as a function of skew angle and control transmit power is designed to control the off-axis EIRP spectral density projected along the GSO arc.

regardless of whether the skew angle results from the location of the aircraft with respect to the satellite or the attitude of the aircraft.<sup>13</sup> The BC also will select the serving satellite based on preloaded maps.

Additional technical information regarding the eXConnect AES segment – including its ability to control off-axis EIRP spectral density to that of a routinely licensed VSAT terminal as contemplated by the Commission’s rules and policies governing mobile VSAT operations, and maintain pointing accuracy to avoid interference to adjacent satellites – is set forth in Panasonic’s AMSS Application and subsequent amendments, and incorporated herein by reference.<sup>14</sup> Panasonic also incorporates by reference the technical information for the MELCO AES antenna provided in a prior commercial license proceeding, including the Condition 5948 Compliance Report, upon which the Commission granted authority for the antenna to operate.<sup>15</sup>

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<sup>13</sup> Panasonic monitors and retains records of eXConnect operating characteristics, which it will make available to the Commission or an FSS system operator within twenty-four (24) hours of receiving such a request. *See* Panasonic AMSS Application at 19.

<sup>14</sup> *See* Panasonic AMSS Application at 6, 11-14 and Technical Appendix; Panasonic AMSS Application - Minor Amendment, IBFS No. SES-AMD-20100914-01163 (containing off-axis EIRP and off-axis EIRP spectral density tables, as well as expanded off-axis EIRP spectral density plots, for the MELCO terminal); and Panasonic AMSS Application - Minor Amendment, IBFS No. SES-AMD-20101115-01432 (containing complete antenna gain data for the MELCO antenna required under Section 25.132(b)). The latter amendment includes a revised link budget and a radiation hazard analysis. *See* Panasonic AMSS Application - Minor Amendment, IBFS No. SES-AMD-20101115-01432, Attachments C and D.

<sup>15</sup> *See* Call Sign E000723, File No. SES-MOD-20030512-00639 (Narrative, Section II. A, Description of the Reflector Antenna AES Subsystem at 5-8; Technical Appendix, Section 3, Reflector Antenna AES Description at 3-4; Technical Appendix, Section 3.1, Reflector Antenna AES Pointing and Polarization Control at 4-6; and Technical Appendix, Section 3.2, Reflector Antenna Patterns, at 6-10). *See also* File No. SES-MOD-20030512-00639, Call Sign E000723 (Boeing AMSS System License Compliance Report – Reflector Antenna AES Update, filed February 12, 2004) (Section 3.1, AES Antenna Mispoining, at 4-9).

#### **IV. SATELLITE POINTS OF COMMUNICATION AND GATEWAY EARTH STATION**

Panasonic's experimental authority expressly permits communication with the Horizons-1 satellite at 127° W.L., the Galaxy 17 satellite at 91° W.L. and the Galaxy 19 satellite at 97° W.L.<sup>16</sup> On March 11, 2010, Panasonic added the Telstar 14 satellite at 63° W.L.<sup>17</sup> Consistent with its license application, Panasonic herein requests authority to communicate only with the Galaxy 17 satellite at 91° W.L. and the Telstar 14 satellite at 63° W.L.<sup>18</sup> The operators of these satellites (Intelsat and Telesat, respectively) have substantial experience with Ku-band mobile networks, including AMSS operations, and have coordinated eXConnect operational parameters with potentially affected networks. Panasonic has filed coordination affidavits from Intelsat and Telesat that reflect adjacent satellite operator consent for the proposed operations.<sup>19</sup>

The eXConnect System utilizes a licensed gateway earth station located in Holmdel, New Jersey, an iDirect hub at that location, and the interface to the Internet and other content sources. This gateway earth station is separately licensed by the Commission and not part of this application.

The eXConnect System will be monitored and controlled from two network operating centers ("NOCs") (a primary Panasonic NOC in Lake Forest, California, and a secondary NOC operated by Maritime Telecommunications Network ("MTN") at Panasonic's direction and control in Miramar, Florida) on a 24/7 basis. The NOCs make use of the iDirect's

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<sup>16</sup> See ELS File No. 0339-EX-ST-2009 (Call Sign WD9XQT).

<sup>17</sup> See Letter to Anthony Serafini dated March 11, 2010, re Panasonic Avionics Corporation, Call Sign WD9XQT, File No. 0339-EX-ST-2009; Addition of Satellite Point of Communication.

<sup>18</sup> See Panasonic AMSS Application at 8.

<sup>19</sup> See ELS File No. 0281-EX-PL-2010, Application Narrative, Exhibit 2.

Network Management System (“NMS”) to provide complete control and visibility to all components of the eXConnect network. The iDirect NMS is among the most widely deployed NMS systems for VSATs in the world. iDirect NMS applications allow the operator to configure the network, commission terminals, and monitor the network in real time and for historical trends. The NMS system has the capability to shut down any component in the system, including an individual AES, that is malfunctioning.

The points of contact for eXConnect operations include the Panasonic NOC:

Primary: Philippe Lagarde; (Office) 1-425-415-9164; (Mobile) 1-425-319-3537  
Secondary: Gilbert Dizon; (Office) 1-949-462-1940; (Mobile) 1-949-614-3163  
Phone: 425-415-9800 or 877-627-2300 (US Domestic Toll-free)  
Fax: (425) 482-3515.  
NOC email address: [MCC@panasonic.aero](mailto:MCC@panasonic.aero)

Address:  
Panasonic Avionics Corporation  
Attn: Network Operating Center  
26200 Enterprise Way  
Lake Forest, CA 92630 USA

as well as the MTN NOC:

Primary: Edgar Estevan; (Office) 1-954-538-4110; (Mobile) 1-305-776-7795  
Secondary: Greg Hill; (Office) 1-954-538-4195; (Mobile) 1-954-376-1531  
NOC Direct Telephone: 1-954-538-4074  
NOC email address: [NOC@mtnsat.com](mailto:NOC@mtnsat.com)

Address:  
MTN Satellite Communications  
Attn: Network Operating Center  
3044 N. Commerce Parkway  
Miramar, FL 33025

## **V. PROTECTION OF OTHER USERS IN THE 14.0-14.5 GHZ**

Panasonic has demonstrated in its AMSS Application how its terminals will operate in such a manner that the off-axis EIRP levels are no greater than the levels produced by routinely licensed VSAT earth stations to protect adjacent satellite operators from interference. Panasonic has also filed coordination affidavits from the operators of its target



satellites. Panasonic, however, will also protect the other users of the 14.0-14.5 GHz band as discussed below.

*Protection of Potential NGSO FSS Systems.* Panasonic acknowledges that non-geostationary orbit (“NGSO”) systems are also permitted to operate in the Ku-band. However, no such systems are currently authorized or plan to operate within the period contemplated for the proposed temporary operations.

*Protection of Terrestrial Radio Services.* Panasonic has examined current spectrum use in the 14.0-14.5 GHz band and has determined that there are no active FCC-licensed terrestrial services in this band in North America with which its proposed operations could conflict.

*Protection of the Radio Astronomy Service.* For purposes of protecting radio astronomy sites, consistent with Recommendation ITU-R M.1643, Part C, Panasonic limits aggregate power flux density (“pfd”) in the band of 14.47 GHz to 14.5 GHz as follows:

- 221 dBW/m<sup>2</sup>/Hz (for protection of Green Bank, Arecibo and Socorro)
- 189 dBW/m<sup>2</sup>/Hz (for protection all other Radio Astronomy sites)

Panasonic has completed a coordination agreement with the National Science Foundation obligating Panasonic to limit aggregate pfd to the specified levels.<sup>20</sup> This approach is consistent with analogous provisions of the Commission’s VMES rules.<sup>21</sup>

*Protection of Space Research Service.* Panasonic recognizes the utilization of the frequency band from 14.0-14.05 GHz and the possible use of the band from 14.05-14.2 GHz allocated to the National Aeronautics and Space Administration (“NASA”) Tracking and Data Relay Satellite System (“TDRSS”) for space research conducted at White Sands, New

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<sup>20</sup> See Panasonic AMSS Application, Technical Appendix, Attachment C. In addition, the MELCO antenna has a notch filter at 14.4 GHz, above which it does not transmit.

<sup>21</sup> See 47 C.F.R. § 25.226(d).

Mexico and Blossom Point, Maryland. For purposes of this STA application, Panasonic will avoid AES operation within line-of-sight vicinity of these earth stations. However, Panasonic is actively engaged in discussions with NASA to develop an appropriate coordination agreement regarding the protection of these current and future TDRSS sites, and will submit the final coordination agreement to the Commission as part of its STA request once executed. This approach is consistent with analogous provisions of the Commission's ESV and VMES rules.<sup>22</sup>

## **VI. WAIVER REQUEST**

Panasonic seeks a waiver of the allocation table to permit the MELCO AES antenna to receive transmissions in the FSS space-to-earth band at 11.7-12.2 GHz. All downlink transmissions to Panasonic's AES terminals operate within the space station authorizations and coordinated limits for downlink EIRP spectral density of the Galaxy 17 and Telstar 14 satellites, as agreed by the operators of adjacent satellites within +/- 6 degrees.

Panasonic will accept interference from lawful operation of any station in the 11.7-12.2 GHz band in accordance with the U.S. Table of Frequency Allocations, 47 C.F.R. § 2.106. In addition, Panasonic will immediately terminate eXConnect operations upon notification that such operations are not permitted under the terms of a coordination agreement with, or are causing harmful interference to, any lawfully operating radio system in the 11.7-12.2 GHz band in conformance with the U.S. Table of Frequency Allocations.

In addition, because this STA request is submitted in the absence of service rules governing Ku-band AMSS system operations, Panasonic respectfully requests additional waiver(s) in the unique circumstances of this case to the extent the Commission concludes that any potentially applicable rule or policy may not be fully satisfied. For example, Section

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<sup>22</sup> See 47 C.F.R. §§ 25.222(c) and 25.226(c).

25.218(f)(2) of the Commission's rules and analogous provisions in the Ku-band ESV and VMES licensing rules impose EIRP spectral density limits in directions other than the GSO arc. Although these rules do not directly apply to Ku-band AMSS operations and there are no NGSO FSS systems planned or authorized to commence operations within the period covered by the requested STA, the Commission may deem it necessary to waive such provisions in the context of grant.

In this connection, Panasonic notes that it proposes to operate for a limited period of time a small number of antennas that were previously authorized to operate with the Connexion by Boeing system onboard Lufthansa commercial aircraft with a higher EIRP spectral density. These AES antennas operated without interference for years and the inclusion of next-generation modulation and control technologies (e.g., adding iDirect D-TDMA with spreading, which eliminates the complexities associated with aggregation) makes the eXConnect System more straightforward to operate – and more robust – than its predecessor. The MELCO antenna has continued to operate for the past year on a trial basis without interference.

Not only has the Commission previously concluded that the MELCO AES antenna satisfies its applicable rules and policies, but German regulatory authorities have twice concluded (during original licensing and more recent licensing for Panasonic) that the antenna can operate consistent with domestic and international requirements governing Ku-band AMSS operations. These conclusions are confirmed by interference-free flight test operations of the MELCO antenna over the past several months. Panasonic also has included coordination affidavits in its AMSS Application that confirm that the proposed operations are consistent with the coordinated parameters of its serving satellites, each of which has previously supported Ku-band AMSS operations. Given these unique circumstances, there is

ample ground for the Commission to waive any other rules or policies necessary to authorize the Ku-band AMSS operations proposed herein.

## **VII. CONCLUSION**

In view of the foregoing, extraordinary circumstances exist for the grant of the instant STA application to the extent necessary to support the planned operations.<sup>23</sup> Panasonic has fully coordinated its AES operations with potentially affected satellite operators and is already operating its eXConnect AESs pursuant to experimental authority. Panasonic has also filed an application for commercial blanket license authority and the pleading cycle on that application has ended, allowing interested parties to raise all potential issues associated with long-term commercial operation of the system. Moreover, the MELCO AES was previously licensed to operate at higher EIRP spectral densities.

Panasonic holds Commission authority to conduct limited market studies in connection with the operation of its MELCO AES antenna. Panasonic has confirmed that this authority includes the ability to support payable WiFi connectivity on an interim basis to passengers onboard Lufthansa aircraft that intermittently traverse U.S. airspace. Nevertheless, if the Bureau deems it necessary or appropriate, Panasonic seeks authority to operate the MELCO AES under a commercial STA.

The authority requested herein will allow Panasonic to operate the MELCO AES on an interim basis during the pendency of its commercial license application. Grant of the requested STA is justified by the information included and incorporated in the instant request, is consistent with past AMSS licensing precedent and will clearly serve the public interest by facilitating the initial implementation of Panasonic's cost-effective, broadband AMSS service to passengers and crew onboard commercial aircraft.

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<sup>23</sup> See 47 C.F.R. § 25.120(b)(1).

## Technical Certificate

I, Paul Sarraffe, hereby certify that I am the technically qualified person responsible for the preparation of the technical discussion contained in the Panasonic Request for Special Temporary Authorization, that I am familiar with Part 25 of the Commission's Rules (47 C.F.R. Part 25), and that I have either prepared or reviewed the technical information submitted in this application and found it to be complete and accurate to the best of my knowledge and belief.

By: Paul Sarraffe

Paul Sarraffe  
Panasonic Avionics Corporation  
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January 4, 2011