

SUMMARY

Panasonic Avionics Corporation (“Panasonic”) hereby submits its reply to the late-filed pleading of Row 44, Inc. regarding Panasonic’s application for blanket license authority to operate a limited number of aircraft earth stations (“AESs”) as part of the “eXConnect” Ku-band aeronautical mobile-satellite service (“AMSS”) system. In the pleading, Row 44 continues its spurious attacks on Panasonic’s straightforward AMSS application.

From a technical standpoint, Panasonic proposes to combine a small number of previously licensed MELCO antennas with well-known modem technology operating at a lower maximum power spectral density to provide aeronautical connectivity to the same aircraft that operated in the United States under prior Commission authority. From a procedural standpoint, Panasonic’s application was filed under Section 25.220 with the required supporting technical documentation and its operations have been fully coordinated with potentially affected satellite operators, so the Commission need not address Row 44’s unsupported criticisms.

Panasonic voluntarily provided supplemental technical data regarding MELCO antenna operations similar to that required for earth stations onboard vessels (“ESV”) and vehicle-mounted earth stations (“VMESs”) to further demonstrate compliance with the Commission’s two-degree spacing policies. However, Row 44 inappropriately seeks to bootstrap this additional technical information to require full compliance with the Commission’s ESV and VMES rules, even though its own AMSS application was considered under Section 25.220.

Although the Commission need not substantively consider Row 44’s latest filing, Panasonic addresses the arguments set forth in that submission. Specifically, Panasonic (i) correctly and appropriately incorporated by reference technical information from the prior MELCO AMSS licensing proceeding; (ii) addressed the differences between the Connexion by

Boeing and eXConnect systems in detail in its AMSS application and its response to Row 44's initial petition; (iii) submitted sufficient antenna gain and EIRP spectral density data; (iv) provided sufficient information regarding antenna pointing accuracy and pointing methodology; (v) confirmed the transmit bandwidth of the MELCO antenna; and (vi) adequately described the service area of the eXConnect System. Finally, Panasonic renews its objection to Row 44's unilateral modification of the Commission's filing deadlines and consideration of its late-filed pleading.

Row 44's baseless criticisms of Panasonic's AMSS application fly in the face of clear Commission precedent – precedent established in Row 44's own AMSS licensing order. In that proceeding, the Commission concluded that it need not address “arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.” Row 44 ignores this explicit precedent, misreads the Commission's rules and policies, and mischaracterizes Panasonic's AMSS application in a single-minded effort to delay an impending AMSS competitor.

The Commission should reject these efforts, substantively consider the Panasonic AMSS application and grant requested operating authority for the previously authorized MELCO antenna, as appropriately conditioned, at the earliest possible time.

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**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

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

REPLY TO “CONSOLIDATED REPLY” OF ROW 44, INC.

Panasonic Avionics Corporation (“Panasonic”), by its attorneys and in accordance with Section 1.45(c) of the Commission’s rules, 47 C.F.R. §1.45(c), hereby submits its reply to the recent, late-filed pleading of Row 44, Inc. in the above-captioned proceeding.¹ Panasonic is the applicant for blanket license authority to operate a limited number of aircraft earth stations (“AESs”) as part of the “eXConnect” Ku-band aeronautical mobile-satellite service (“AMSS”) system under Section 25.220 of the Commission’s rules, 47 C.F.R. §25.220.²

¹ See Consolidated Reply of Row 44, Inc. to Panasonic Avionics’ Response and Panasonic Avionics’ November 15 Amendment, File Nos. SES-LIC-201000805-00992, SES-AMD-20100914-01163 and SES-AMD-20101115-01432 (Call Sign E100089) (dated Dec. 1, 2010) (“December 1 Pleading”). Although Row 44 styles its pleading as a “Consolidated Reply,” it acknowledges the pleading should also be considered an opposition pursuant to Section 1.45(b) of the Commission’s rules. See Row 44 Notice Regarding Filing Deadlines (dated Nov. 19, 2010) at 1-2; December 1 Pleading at 1, 19-20. Thus, Panasonic may reply under Section 1.45(c) of the rules.

² 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, File Nos. SES-LIC-201000805-00992, SES-AMD-20100914-01163 and SES-AMD-20101115-01432 (Call Sign E100089).

I. INTRODUCTION

In its late-filed December 1 Pleading, Row 44 continues its efforts to obscure very straightforward issues implicated by Panasonic's AMSS application. From a technical standpoint, Panasonic proposes to combine a small number of previously licensed MELCO antennas with well-known modem technology operating at a lower maximum power spectral density to provide aeronautical connectivity to the same aircraft that operated in the United States under prior Commission authority. From a procedural standpoint, because Panasonic's application was filed under Section 25.220 with supporting technical documentation and its operations have been fully coordinated, the Commission need not address Row 44's unsupported technical assertions.³

Panasonic has submitted substantially more technical data on MELCO antenna operations than is required by the Commission's rules, and more than prior U.S. AMSS licensees such as The Boeing Company and ViaSat, Inc. The information in the record establishes that eXConnect Ku-band AMSS operations are compliant with applicable Commission rules and policies. Row 44's desperate efforts to interpose extraneous issues and unsubstantiated "requirements" constitute a transparent attempt to delay a new AMSS competitor. The Commission should reject these efforts, substantively consider the Panasonic AMSS application and grant the requested operating authority, as appropriately conditioned, at the earliest possible time.

³ Among other things, Row 44's most recent salvo was submitted after the deadline required by the Commission's rules and Row 44 failed to justify – and the Commission did not grant – an extension of the filing date. *See* Panasonic Response to Notice Regarding Filing Deadlines (dated Nov. 22, 2010) and Panasonic Opposition to Consideration of Late-Filed Pleading of Row 44, Inc. (dated Dec. 7, 2010). Nonetheless, Panasonic addresses Row 44's additional technical arguments herein.

II. ROW 44'S SPURIOUS ATTACKS DO NOT OBSCURE THE STRAIGHTFORWARD ISSUES IN THIS PROCEEDING

Row 44 has taken a “kitchen sink” approach to challenge Panasonic’s AMSS application – throwing everything it can at the application in the hope that something sticks. Row 44 inexplicably ignores its own AMSS licensing precedent, fundamentally misreads the Commission’s rules and policies, mischaracterizes Panasonic’s AMSS application, and invents inconsistency where none exists to suggest that Panasonic has failed to satisfy so-called “requirements” that have no foundation in the Commission’s rules. Row 44’s motives are clear – notwithstanding express Commission precedent in the AMSS licensing context, Row 44 erroneously seeks to impose inapplicable licensing requirements governing earth stations onboard vessels (“ESV”) and vehicle-mounted earth stations (“VMESs”) on Panasonic’s AMSS application in a transparent effort to delay a new competitor. Row 44’s misguided efforts do not obscure the straightforward procedural and technical issues implicated by this application.

A. Panasonic’s AMSS Application – The Facts

The Commission has previously examined the operational characteristics of the MELCO antenna, including pointing accuracy and related issues, and authorized its use with the Connexion by Boeing system. Panasonic proposes to operate the very same antenna with iDirect modem technology that has been employed in thousands of fixed and mobile VSAT applications throughout the United States. All of the relevant hardware, including the antenna, radome, power amplifiers, up-converters, power supplies and antenna controller – everything except the well-known iDirect modem – are the same equipment previously licensed by the Commission. The operating characteristics of the MELCO antenna have not changed, including antenna gain, antenna pointing accuracy, antenna pointing methodology and automatic shut-down functionality. From an adjacent satellite interference perspective, the only material difference is that Panasonic

requests authority to operate at a *lower* EIRP spectral density, thereby reducing the potential for interference from MELCO operations.

In addition, Panasonic has fully coordinated MELCO antenna operations with its satellite service providers and potential affected satellite operators. These operators are well aware of the MELCO antenna's operating characteristics, having examined them in the original Boeing application proceeding and more recently in concluding coordination for Panasonic's operations. With the detailed MELCO antenna data incorporated by reference (which the Commission found sufficient to support grant), additional technical information submitted by Panasonic in this proceeding, and coordination affidavits confirming that potentially affected operators do not object to grant of the instant application, the Commission plainly can authorize the MELCO antenna operations requested by Panasonic.

B. Panasonic's AMSS Application – The Law

Panasonic's AMSS application is being considered under Section 25.220 if the rules. Panasonic provided coordination affidavits and supporting technical information with its application, and expressly requested a waiver of the Commission's rules to the extent necessary to grant the application.⁴ The available information was sufficient to grant prior operating authority and the MELCO antenna has operated on an interference-free basis with both the Connexion by Boeing system and more recently with the eXConnect System.

Although the Panasonic AMSS application is considered under Section 25.220 and Panasonic need only provide the information required by that provision, it submitted extensive

⁴ The waiver request was made out of an abundance of caution because the Commission adopted Section 25.220, as well as other analogous rules, long after grant of original operating authority for the MELCO antenna and the available technical information may not precisely track subsequently adopted rule provisions.

supplemental technical data regarding MELCO antenna operations to demonstrate compliance with the Commission's two-degree spacing policies similar to that required of earth stations onboard vessels ("ESV") and vehicle-mounted earth station ("VMES") applicants under Section 25.222 and 25.226 of the rules, respectively. Row 44 incredibly seeks to bootstrap Panasonic's voluntary, supplemental technical demonstration into a formal requirement for the full range of application materials required of ESV and VMES applicants:

Although the Applicant cited both Sections 25.222 and 25.226, which govern ESV and VMES applicants, it principally referred to essentially the same EIRP spectral density provisions that appear in 25.218 of the FCC's Rules. *See* Application at 15-16. Nonetheless, in its October 18, 2010 Letter, the Applicant disclaimed reliance on any of these rules, but asserted that it cited these regulations "in the context of providing additional technical information not required by Section 25.220 to further demonstrate that Panasonic's proposed AMSS operations are compliant with the Commission's two-degree spacing policies and will not cause harmful interference ...". *See* Letter from Carlos M. Nalda and Joshua T. Guyan, Counsel to Panasonic Avionics, to Marlene H. Dortch, Secretary, FCC, at 2 (dated October 18, 2010). It would appear that the Applicant is under the mistaken impression that it can cite to these provisions if they are believed to be somehow helpful to its cause, but otherwise to ignore them as irrelevant. *Because it would make no sense as a matter of both policy and procedure to hold AMSS applicants to a lesser standard than ESV and VMES applicants, which have almost identical rules, these regulations must be considered relevant to Panasonic Avionics' Application.*⁵

Although Row 44 mischaracterizes Panasonic's position, it now boldly reveals the errant basis of its spurious attacks: Row 44 argues that Panasonic's AMSS application should be considered under the ESV and VMES rules. Row 44 is wrong as a matter of law and policy.

The Commission has not yet adopted AMSS licensing rules and Panasonic's AMSS application must be considered under the only rule provision available – Section 25.220. Panasonic has satisfied the requirements of this rule, has provided substantial supplemental material supporting its application, and has even requested a waiver to the extent the

⁵ *See* December 1 Pleading at 12, n. 10.

Commission concludes that any provision is not fully satisfied. Although Row 44's own AMSS application was also considered under Section 25.220 (despite the existence of analogous ESV and VMES licensing rules),⁶ Row 44 seeks to hold Panasonic to a very different standard.

Panasonic's voluntary submission of additional technical information does not alter the Commission's application requirements or somehow transform Panasonic's AMSS application under Section 25.220 into an ESV or VMES application considered under Sections 25.222 or 25.226. Importantly, Row 44 does not argue that Panasonic's supplemental data undermines or conflicts with its fundamental demonstration under Section 25.220, but rather Row 44 complains that the information does not fully satisfy the "requirements" of Sections 25.222 and 25.226. Panasonic disagrees with this assertion but, in any event, the supplemental material simply cannot be criticized for failure to comply with rules that do not apply to Panasonic's AMSS application. In other words, so long as additional data is consistent with the application's fundamental technical demonstration – and, in this case, it certainly is – submission of even a partial showing under analogous rules provisions can only enhance the demonstration under Section 25.220.

Finally, Row 44 inexplicably ignores clear Commission precedent embodied in Row 44's own licensing order. Virtually without exception, Row 44's criticisms are focused on issues affecting adjacent satellite interference. The Commission expressly concluded in the Row 44 licensing order that it need not address such issues in the context of AMSS operations that have been fully coordinated under Section 25.220. The Commission clearly stated, "[w]e decline to

⁶ See generally *See Row 44, Inc. Application for Authority to Operate Up to 1,000 Technically Identical Aeronautical Mobile Satellite Service Transmit/Receive Earth Stations Aboard Commercial and Private Aircraft*, Order and Authorization, DA 09-1752 (Int'l Bur. and OET, 2009) ("*Row 44 Order*").

address [petitioner's] arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.”⁷ As a result, Row 44's spurious attacks on Panasonic's AMSS application can be discounted in their entirety.

III. PANASONIC'S AMSS APPLICATION FULLY SATISFIES THE COMMISSION'S RULES

In its application, Panasonic provided technical and coordination information regarding proposed eXConnect Ku-band AMSS system operations as required by Section 25.220 of the Commission's rules, included supplemental technical data demonstrating compliance with the Commission's two-degree spacing requirements and analogous rules governing Ku-band mobile VSATs (i.e., ESVs and VMESs), and incorporated by reference extensive technical information on antenna performance set forth in the original application proceeding for the MELCO antenna. Panasonic also requested waiver of the Commission's rules to the extent necessary to grant Panasonic's AMSS application because there are no established AMSS licensing rules. In response to the petition filed by Row 44, Panasonic supplemented its AMSS application with explanatory material and amended the application to incorporate additional antenna patterns and lower operating power that reduced the potential for interference from eXConnect operations.⁸

Row 44 claims the Panasonic AMSS application remains deficient in several key respects relating to protection of adjacent satellites. However, Panasonic's AMSS application – like the AMSS application of Row 44 – is being considered under Section 25.220 of the rules, and repeated reference to inapplicable provisions of the Commission's rules neither undermines

⁷ See *id.*, ¶22.

⁸ See Response to Petition of Row 44, Inc. File Nos. SES-LIC-201000805-00992 and SES-AMD-20100914-01163 (dated Nov. 15, 2010) (“Panasonic Response”); see also File No. SES-AMD-20101115-01432 (further amending File No. SES-LIC-201000805-00992, Call Sign E100089).

Panasonic's fundamental demonstration nor diminishes the value of supplemental technical information. In the Row 44 application proceeding, the Commission also expressly "decline[d] to address [the sole petitioner's] arguments concerning adjacent satellite interference, because Row 44 has resolved these interference issues through coordination with all potentially affected satellite operators."⁹ Notwithstanding this crystal clear precedent, Row 44 persists in its attempts to distract and confuse by injecting irrelevant issues into this proceeding. Panasonic addresses the additional issues raised by Row 44 in its late-filed December 1 Pleading below.

A. Relevant Data From the Prior MELCO Application Proceeding Is Properly Considered in this Proceeding

1. Data Incorporated by Reference Is Specifically Cited, and Current and Accurate in All Significant Respects

Row 44 suggests that Panasonic's application does not comply with the instructions for FCC Form 312 regarding incorporation by reference because it fails to specify page and exhibit numbers of the materials in the prior application proceeding.¹⁰ Although Panasonic described the content and location of relevant information and is fully confident in the Commission's ability to identify pointing accuracy data and antenna patterns included in the prior materials, for the avoidance of doubt the key Boeing references are:

File No. SES-MOD-20030512-00639, Call Sign E000723 (Modification Application filed May 12, 2003)

- 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.

⁹ See *Row 44 Order*, ¶ 22. The Commission proceeded to consider and reject additional issues associated with the claim that it lacked authority to rely on adjacent satellite operator coordination in granting the Row 44 AMSS application as contemplated by Section 25.220. See *id.*, ¶¶ 23-25.

¹⁰ December 1 Pleading at 4-5.

- Technical Appendix, Section 3.1, Reflector Antenna AES Pointing and Polarization Control at 4-6.
- Technical Appendix, Section 3.2, Reflector Antenna Patterns, at 6-10.

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 Mispointing, at 4-9.

Row 44 also suggests that the prior antenna information is not “current and accurate in all significant respects.”¹¹ This claim is simply incorrect. Panasonic is principally relying on the prior MELCO application proceeding for antenna pattern and pointing accuracy data (cited previously and, more specifically, above), as well as general operating history (prior interference-free operations, confirmed by more recent operation with the eXConnect System). As both Panasonic and Row 44 acknowledge,¹² the MELCO antenna has not changed – so these references remain valid.

2. Panasonic Has Fully Addressed Differences between Prior MELCO Operations and Operations with the eXConnect System

The claim that Panasonic has not addressed differences between the prior Boeing AMSS system and the eXConnect System is also without foundation. Panasonic specifically addressed the differences between the Connexion by Boeing and eXConnect systems in its original application and in the Panasonic Response, including among other things:

- The use of TDMA considerably simplifies the interference analysis;
- Panasonic avoids Boeing’s complicated AES aggregation scheme; and

¹¹ *Id.* at 4-7.

¹² Row 44 emphasized that “the only common element between the Panasonic Avionics proposal and Boeing’s 2003 system is the MELCO Antenna hardware itself.” Petition of Row 44, Inc., File Nos. SES-LIC-201000805-00992 and SES-AMD-20100914-01163 (Call Sign E100089) at 3 (dated Oct. 15, 2010) (“Petition”).

- The MELCO antenna pattern remains unchanged, the MELCO antenna pointing accuracy remains unchanged and the transmit EIRP spectral density is lower, so the Commission can authorize eXConnect operations based on the MELCO precedent.

Row 44 suggests in particular that Panasonic has not explained differences between MELCO antenna pointing in the eXConnect and Connexion by Boeing systems.¹³ In an effort to bolster this hollow claim, Row 44 misrepresents MELCO antenna pointing – suggesting that “Boeing’s 2003 modification provided an explicit explanation of how its system’s pointing accuracy would be achieved through use of received-signal strength indicator (“RSSI”) modem data, as augmented by additional accuracy improving methods,” but Row 44 erroneously cites Boeing’s 2000 AMSS application for a phased array antenna with an entirely different pointing method.¹⁴

Boeing’s 2003 modification application describes the pointing of the MELCO antenna: “[r]eflector antenna AES pointing is accomplished through the use of the airplane navigation system and antenna rate gyro data, satellite position, and estimated antenna alignment parameters, as well as periodic measurement of actual antenna pointing performance.”¹⁵ Panasonic has made no modifications to the MELCO AES antenna system – all physical and software interfaces between the original data transceiver router (“DTR”) and the antenna subsystem have been implemented in Panasonic's broadband controller – and the antenna pointing methodology is the

¹³ See December 1 Pleading at 6-7.

¹⁴ *Id.* at 6 , n. 4.

¹⁵ *Application to Modify Blanket Authorization to Operate Up to Eight Hundred Technically Identical Transmit and Receive Mobile Earth Stations Aboard Aircraft in the 11.7-12.2 and 14.0-14.5 GHz Frequency Bands*, File Nos. SES-LIC-20001204-02300, SES-MOD-20020308-00429 and SES-MOD-20030512-00639 (Call Sign E000723), Modification Application at 8 (filed May 12, 2003).

same.¹⁶ Therefore, all referenced MELCO pointing accuracy analyses provided by Boeing are valid for Panasonic's eXConnect system (*i.e.*, there are no pointing differences to address).

Row 44's references to skew angle data are similarly misdirected. Row 44 notes that the Boeing points of communication were AMC-4 and Telstar 6, and infers a +/-25 degree maximum skew angle. This incorrectly assumes that U.S. coverage was divided between the two satellites. In fact, both satellites served all of CONUS for different customers. The skew angles in CONUS for Telstar 6, which is only 2 degrees away from G-17, are almost identical to Panasonic's proposed skew angle. AMC-4 would have similar maximum skew angles, but with the limitation occurring on the East coast rather than the West coast.

Row 44 fundamentally misses the point. Panasonic is relying on unchanged antenna technical and performance characteristics, as well as a significant history of interference-free operations, rather than the particular skew angles or points of communication. Moreover, Row 44's erroneous arguments and mischaracterizations are entirely moot since Panasonic's operation of the MELCO antenna has been fully coordinated with adjacent satellite operators.¹⁷

¹⁶ All real-time pointing is actually accomplished using aircraft Inertial Reference Unit (IRU) and antenna rate gyro information. The MELCO antenna performs sequential lobing, but only periodically to verify the alignment between the aircraft IRU and the antenna. The iDirect modem continuously measures the SNR of the forward link DVB-S2 carrier, which provides identical functionality as the Boeing RSSI and supports periodic sequential lobing calibration for interference-free operation of the antenna.

¹⁷ *See supra* at note 6 (the Commission need not address "arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.").

B. Panasonic’s Demonstration Regarding Off-Axis EIRP Spectral Density Along the GSO Arc Is Sufficient

1. Panasonic Has Submitted More Antenna Data than Other Ku-band AMSS Licensees

Row 44 continues its “shell game” with the Commission’s rules (sometimes its criticism can be found under Section 25.220, sometimes under Section 25.222, sometimes under Section 25.226, etc.) to challenge Panasonic’s suggestion that the MELCO antenna “has essentially equivalent performance” in both polarizations and across bands. Panasonic provided EIRP spectral density plots in the Panasonic Response based on measured patterns across polarizations and bands. Row 44 does not acknowledge this information or indicate why it was insufficient. Rather, Row 44 merely claims that Panasonic must submit “the full quantity of off-axis EIRP spectral density graphs that the existing Ku-band MSS rules for ESVs and VMESs require. *See* 47 C.F.R. §§ 25.222(a)(1) and 25.226(a)(1),”¹⁸ again revealing its intention to inappropriately impose inapplicable rule provisions on Panasonic’s AMSS application.

Panasonic’s AMSS application is considered under Section 25.220, rather than Sections 25.222 or 25.226. Furthermore, Section 25.222(a)(1) does not require the submission of any off-axis EIRP spectral density graphs, but rather demonstration of compliance with Section 25.222(a)(1) requirements is specified in 25.222(b)(1), which requires the submission of off-axis EIRP tables, not graphs. To supplement its application, Panasonic submitted off-axis EIRP and EIRP spectral density tables for the co-polarization patterns along and perpendicular to the geostationary arc for the condition that creates the maximum off-axis EIRP spectral density (*i.e.*, the highest proposed EIRP spectral density and skew angle).

¹⁸ *See* December 1 Pleading at 7.

Despite claims that its application remains insufficient, Panasonic in fact has submitted the following supplemental off-axis EIRP, off-axis EIRP spectral density and gain information (for the mid-band, vertical polarization case, at the maximum EIRP spectral density and skew angle):

- Graph of off-axis EIRP spectral density along the GSO arc with and without pointing error to 7 degrees off-axis (Panasonic AMSS Application, Technical Annex Page 12);
- Graph of off-axis EIRP spectral density along the GSO arc to 90 degrees off-axis (September 14, 2010 Amendment, Appendix C at 1);
- Graph of off-axis EIRP spectral density perpendicular to the GSO arc to 90 degrees off-axis (September 14, 2010 Amendment, Appendix C at 2);
- Table of off-axis EIRP spectral density along and perpendicular to the GSO arc (September 14, 2010 Amendment, Appendix C at 2); and
- Table of off-axis EIRP along and perpendicular to the GSO arc (September 14, 2010 Amendment, Appendix D at 1).

Panasonic will not allow the off-axis EIRP spectral density for this case to exceed permissible levels and will also adjust the maximum transmit EIRP spectral density at other bands and polarizations to ensure compliance with the mask. These adjustments are relatively small and straightforward as demonstrated by:

- Graph of off-axis EIRP spectral density along the GSO in V-pol and H-pol +/- 10 degrees off-axis (Panasonic Response at 15); and
- Graph of off-axis EIRP spectral density along the GSO for bottom, middle and top bands (Panasonic Response at 16).

In the Panasonic Response, Panasonic has also provided 60 principal plane antenna gain plots (in addition to those in the original Boeing MELCO application) covering various possible combinations under Section 25.132(b) of the rules, including:

- Transmit and receive bands;
- Bottom, middle and top bands;
- Horizontal and vertical polarizations;
- Azimuth and elevation; and
- Co- and cross-polarization.

Panasonic has submitted far more antenna data than other Ku-band AMSS licensees, including Boeing and ViaSat. This is more than enough data for the Commission (and interested parties) to fully understand the operation of the MELCO antenna with the eXConnect System, and for the Commission to render a positive judgment in this proceeding. Of course, the Commission need not rely on this supplemental data – or address Row 44’s unfounded criticisms of Panasonic’s technical demonstration regarding the protection of adjacent satellites – because the Panasonic AMSS application is considered under Section 25.220 of the rules.¹⁹

2. The Supplemental Information Submitted by Panasonic Is Based on Measured Antenna Data

Row 44 claims that Panasonic has failed to provide a complete set of off-axis EIRP spectral density patterns based on measured antenna data, and erroneously suggests that Panasonic failed to provide data that accounted for skew and mispointing.²⁰ Although not required under Section 25.220 of the rules, Panasonic has provided significant off-axis EIRP spectral density information based on measured antenna data, including patterns accounting for skew and mispointing.

Off-axis EIRP spectral density data is typically based on measured gain patterns and computed with input power density or maximum on-axis EIRP spectral density. Direct measurement of off-axis EIRP spectral density is unusual. Panasonic has all of the antenna gain data that was obtained by MELCO and Boeing in the course of the Connexion by Boeing program, and has used this data to develop maximum operating parameters for the MELCO antenna. Panasonic submitted extensive antenna gain pattern information in the Panasonic

¹⁹ See *supra* at note 6 (the Commission need not address “arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.”).

²⁰ December 1 Pleading at 7-9.

Response and associated minor amendment. Row 44 overlooks this information and instead complains that summary off-axis EIRP information submitted in Panasonic's earlier amendment appears to be based on calculated data. In fact, all of the data presented by Panasonic is based on measured gain patterns.²¹ Panasonic's additional antenna gain data, upon which it relies to set MELCO operating parameters, enhances Panasonic's supplemental off-axis EIRP spectral density showing.

In another significant stretch, Row 44 miscites Recommendation ITU-R M.1643 for the general proposition that "the aging of antenna equipment [must] be taken into consideration," and that "absent field testing and measurement, it cannot be certain that any of these antennas, and specifically all those being reactivated for use, are still able to operate within their original specifications [due to][a]ging and/or corrosion of bearings, gears, aperture, and/or hollow conductors."²² Recommendation ITU-R M.1643 actually provides:

2 The *design, coordination and operation* of an AES should, at least, account for the following factors which could vary the aggregate off-axis e.i.r.p. levels generated by the AES....

2.2 *variations in the antenna pattern* of AES. *Where applicable*, this includes, at least, effects caused by manufacturing tolerances, ageing of the antenna and environmental effects. AMSS networks using certain types of AES antennas, such as phased arrays, should account for variation in antenna pattern with scan angles (elevation and azimuth). *Networks using phased arrays* should also

²¹ The patterns presented for the maximum skew angle in the original application are based on measured gain patterns from 0 to 90 degrees off-axis. The data has been reflected across the 0 degree off-axis line, which accounts for the symmetry in the low level sidelobes noted by Row 44 in its December 1 Pleading at 8. While there may be asymmetries in the low level sidelobes, the main lobe and off-axis limiting portions of the first sidelobe are symmetric to within a few tenths of a dB. The impact on off-axis EIRP spectral density is minor.

²² December 1 Pleading at 9-10.

account for element phase error, amplitude error and *failure rate*.... (emphases added).²³

As indicated in the quoted excerpt from Recommendation ITU-R M.1643, the section addresses “design, coordination and operation” of an AES and the referenced factors specifically pertain to “variations in the antenna pattern of AES.” Panasonic’s operational approach (particularly assuming a pointing offset in setting maximum power levels) account for such variables affecting AES off-axis EIRP spectral density levels. Furthermore, ongoing system operational data and coordination will ensure that all such factors are fully accounted for (i.e., antenna performance changes or operator notice may indicate a potential issue is developing).

Row 44 offers nothing more than conclusory remarks to link aging of the MELCO antenna aperture to variation in antenna pattern. If Row 44 seeks to have the Commission require periodic update of comprehensive antenna aging information from AMSS licensees (including itself) that typically have 15-year license terms, it can make its case in the Commission’s AMSS rulemaking proceeding.²⁴ However, such a requirement does not exist and Row 44’s novel antenna aging claim has *never* been addressed by any U.S. AMSS applicant – including Row 44 itself. The suggestion is particularly inappropriate where the AES antenna has been in operation for the past year without incident and licensing is based on coordination with potentially affected satellite operators under Section 25.220.

²³ The antenna aging language in paragraph 2.2 specifically contemplated aging of phased array antennas such as the original Connexion by Boeing antenna, as indicated in the additional language in the provision.

²⁴ See *Service Procedures and Rules to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, IB Docket No. 05-20, Notice of Proposed Rulemaking, 20 FCC Rcd 2906 (2005).

C. Panasonic's Demonstration Regarding Off-Axis EIRP Spectral Density at Maximum Skew Angle Is Sufficient

Row 44 acknowledges that "Panasonic Avionics has submitted additional antenna gain patterns pursuant to Section 25.220(b) of the FCC's Rules. *See* 47 C.F.R. § 25.220(b); PAC Response/PAC Amendment at Attachment A."²⁵ Unconstrained by details such as the Commission's application requirements, Row 44 now boldly states without legal foundation that Panasonic should provide "antenna gain patterns for all skew angles up to the maximum 34 degree skew in order to demonstrate that there are no skew angles for which parasitic sidelobes occur in the angular range of approximately seven degrees to 85 degrees azimuth."²⁶

Row 44's creative suggestion must be rejected. Panasonic has submitted all required patterns under Section 25.220 (and well beyond what was submitted by Boeing in its MELCO licensing proceeding). Panasonic has also submitted off-axis EIRP spectral density plots for the maximum skew condition.²⁷ No AMSS applicant has ever met Row 44's newly invented standard, and Row 44 itself only provided principal plane and maximum skew angle plots. Providing such information would be unnecessary and unduly burdensome to produce.²⁸ Asking

²⁵ December 1 Pleading at 10.

²⁶ *Id.* at 11.

²⁷ Off-axis EIRP spectral density plots including skew and pointing error were included in Panasonic's original AMSS application. Row 44 grasps for straws by raising reflections off of the secondary reflector mounts, which are second order effects. The dominant side lobe effect for high aspect ratio antennas is increased sidelobe levels along the semi-major and semi-minor axes of the antenna (the principle planes), which correspond to the gain data already submitted.

²⁸ The requested skew angle plots from for skew angles from -34 degrees skew to +34 degrees skew at one degree increments for off-axis angles between +/-85 degrees off-axis would represent 69 (the number of integers between -34 degrees and +34 degrees including zero) antenna patterns for one frequency and polarization. Adding a detailed plot for +/-10 degrees, as is typically done, would raise the number to 138 plots. Repeating this for both polarizations

the Commission to examine literally hundreds of gain plots *for a previously authorized antenna* is also a colossal waste of Commission's scarce administrative resources.

D. Panasonic's Application Contains Sufficient Information Concerning Pointing Accuracy to Avoid Interference to Adjacent Satellites

Row 44 next suggests that Panasonic has not provided sufficient information regarding MELCO antenna pointing accuracy.²⁹ Since Panasonic is relying on adjacent satellite operator coordination under Section 25.220, detailed antenna pointing information is not required and the Commission need not address these claims.³⁰ In addition, since the MELCO antenna's pointing accuracy and pointing methodology have not changed, the information relied on to grant prior MELCO operating authority supports grant of similar operating authority today.

Row 44 claims that Panasonic must "demonstrate that the maximum pointing error can be achieved without exceeding the off-axis EIRP spectral density limits."³¹ In this connection, Row 44 mischaracterizes the MELCO antenna's pointing accuracy and maximum pointing offset.

Panasonic accurately stated that:

"the 0.25° 1-sigma pointing error (as thoroughly tested by Boeing) only applies to periods of very high-rate maneuvers, which occurs rarely in the flight profile of a wide

would raise this to 276 plots. Repeating this for three bands would raise the number to 828 plots. This would be in addition to the 60 gain plots already provided for a total of 888 plots.

²⁹ December 1 Pleading at 11-14.

³⁰ *See supra* at note 6 (the Commission need not address "arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.").

³¹ December 1 Pleading at 12. Row 44 erroneously assumes that Panasonic's application would be processed under the ESV rule Section 25.222(a)(1), which would lead to an off-axis EIRP spectral density demonstration under 25.222(b)(1). However, because Panasonic's application is based on coordination with target satellite operators, actual processing would be more appropriately under Section 25.222(a)(2), which does not have the corresponding off-axis EIRP spectral density demonstration and specifically contemplates exceedance of the off-axis mask.

body aircraft. Under most circumstances the pointing error will be considerably less than the specified pointing accuracy value.”³²

This statement is absolutely accurate. The pointing error calculation includes components that are maneuvering rate dependant. The quiescent (i.e., level flight) pointing error is much smaller and applies the vast majority of the time.

Panasonic also clearly stated that the MELCO antenna will shut down automatically at 0.5° pointing offset,³³ which means the effective maximum pointing error is 0.5°. Row 44’s assertion that the maximum offset exceeds this value is baseless. Panasonic’s satellite service providers and potentially affected satellite operators are well aware of, and have explicitly accepted, the pointing accuracy and off-axis EIRP spectral density levels of the MELCO antenna in the context of coordinating Panasonic’s proposed operations.

Row 44’s errors continue with the suggestion that “Panasonic Avionics does not even acknowledge” the “requirement” that the MELCO antenna cease transmissions within 100 milliseconds of reaching maximum pointing offset.³⁴ Although this “requirement” applies only to ESV and VMES terminals, Panasonic notes the MELCO antenna’s 0.5° maximum pointing offset and shut-down requirement no less than six times.³⁵ Panasonic also confirms the 100 msec time frame for shut down three times.³⁶ Such confirmation is identical to that included in Row 44’s original AMSS application and its modification to add another AES antenna.

³² Panasonic Response at 19-20.

³³ See Panasonic Application Narrative at 12, 13, 15; Technical Annex at 4, 9, 11.

³⁴ December 1 Pleading at 14.

³⁵ See Panasonic Application Narrative at 12, 13, 15; Technical Annex at 4, 9, 11.

³⁶ See *id.* at 13, 15; Technical Annex at 9.

Row 44 proceeds to conflate a number of unrelated issues in challenging the ability of the MELCO antenna to satisfy this self-declared 100 msec shut-down criterion. First, the reduction of EIRP spectral density in horizontal polarization has nothing to do with automatic shut-down, and is done statically when setting the EIRP spectral density limits for a particular transponder with a horizontal polarization. Second, the Boeing modem had no role whatsoever in real-time pointing or automatic shut-down of the MELCO antenna. It was only used to periodically verify the alignment of the antenna with the aircraft inertial system. In reality, MELCO antenna pointing error is determined for the difference in antenna pointing relative to the aircraft inertial navigation system and the local rate gyros – a shut off command is automatically generated when the pointing offset exceeds 0.5 degrees and antenna transmissions terminate within 100 msec.

Of course, whatever the shut-down time frame and methodology of the MELCO antenna, it was sufficient to grant prior operating authority for the antenna. Moreover, potentially affected satellite operators have accepted the technical characteristics of the MELCO antenna in the context of coordination – and the MELCO antenna has operated as part of the eXConnect System on a trial basis for approximately one year without reported interference incidents or shut-downs caused by antenna misalignment. Like other arguments raised by Row 44, this issue goes to adjacent satellite interference which need not be addressed by the Commission since the proposed operations have been fully coordinated.³⁷

³⁷ See *supra* at note 6 (the Commission need not address “arguments concerning adjacent satellite interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.”).

E. Panasonic's Application Confirms the MELCO Antenna's Transmit Bandwidth

Despite Row 44's confusion regarding the MELCO antenna's transmit bandwidth, all emissions designators and power levels are correct as amended. First, the 1.67 MHz noise bandwidth used in the link budget corresponds to the symbol rate of the signal, which does not correspond to the necessary bandwidth (for emission designator purposes).³⁸ While Panasonic need not include every conceivable emission designator in its application,³⁹ the designators included in the applications are accurate.

Second, Row 44 incorrectly suggests that "[u]sing the bandwidth value and the maximum EIRP spectral density from the necessary bandwidth, the maximum total EIRP can be calculated."⁴⁰ This is precisely the error that Panasonic corrected with its last submission. The assumption that a signal fills its entire necessary bandwidth at uniform EIRP density is highly unlikely for any real signal. Consider Row 44's own AMSS license (File No. SES-LIC-20080508-00570, Call Sign E080100, granted Aug. 5, 2009): the 1.6 MHz (1M60G7D) emissions designator has a maximum EIRP per carrier of 38.60 dBW and a maximum EIRP

³⁸ Necessary bandwidth is defined by Section 2.202(b) of the rules: "For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed, under specified conditions." iDirect recommends a channel spacing of $1.2 \times$ symbol rate, which is the filter roll off (α) of the modem. This corresponds to the minimum necessary bandwidth. A narrower bandwidth would cause a loss of transmission quality. Panasonic has constructed all of its emissions designators as $1.2 \times$ symbol rate. For example, the maximum symbol rate of the transmit modem is 7.5 Msps so the necessary bandwidth is 9 MHz and the emissions designator is 9M00G7D.

³⁹ See 47 C.F.R. § 25.275(c) (authorizes the licensee to operate any other type of carrier not specifically listed which does not exceed the highest bandwidth prescribed for any listed emission).

⁴⁰ December 1 Pleading at 16.

density of 14.6 dBW/4kHz. The maximum EIRP is computed from the bandwidth and the density, per Row 44's comment, is 40.6 dBW – 2 dB higher than the granted 38.6 dBW. Conversely, the EIRP spectral density computed from the maximum EIRP and the bandwidth would be 12.6 dBW/4 kHz, which is 2 dB lower than the 14.6 dBW/4 kHz value authorized. These differences are to be expected in real signals and Panasonic's powers and densities are correct.

Finally, Row 44's claim that "Panasonic must then provide actual measurements to verify the transmit signal bandwidth" is baseless.⁴¹ Row 44's inability to calculate necessary bandwidth does not force Panasonic to measure bandwidth under Section 2.202(c); it can rely on other permissible methodologies. In this connection, the iDirect modem is one of the most common VSAT modems in use, with tens of thousands of units in use in the United States alone. The spectral roll-off properties of this modem are not at issue here. The only relevant issue for interference is the peak power spectral density at which it is operated. Panasonic has established relevant transmit parameters in its application, has fully coordinated its operations with potentially affected parties and has operated the MELCO antenna for a year without incident.

F. Panasonic's Application Confirms the Geographic Service Area of the MELCO Antenna

Although its language is less strident, Row 44 continues to suggest that Panasonic "must provide [] information detailing the geographic scope of its service."⁴² Row 44 originally asserted – and cited the argument in its December 1 Pleading – that Panasonic's AMSS application "fails to include a coverage map, rendering it defective."⁴³ PAC responded by

⁴¹ *Id.*

⁴² *Id.* at 17.

⁴³ Row 44 Petition at 3; *see* December 1 Pleading at 17 (*citing* Row 44 Petition at 11).

pointing out that there was no requirement to provide a coverage map – and Row 44 now points to Section 25.220(g)(1), which requires that applicants provide a “detailed description of the service to be provided,” and the Ku-band ESV and VMES rules, which requires an exhibit “describing the geographic area(s) in which the [service] will operate.”⁴⁴

These rule provisions contemplate descriptions, not maps. Row 44 is inventing a requirement in the rules that does not exist. Panasonic provided descriptions of its geographic area of operation. In the FCC Form 312, the operating area was described as: CONUS, Alaska, Hawaii and U.S. Territories. In the application narrative, Panasonic confirmed that it “seeks to operate throughout the United States, including U.S. territories and possessions, subject to rules and conditions designed to protect other services in the band.”⁴⁵ For practical purposes, in view of the satellite coverage and skew angle limitations, Panasonic will restrict its area of operation for the identified points of communications to CONUS where the skew angle is less than or equal to 34°.

IV. THE COMMISSION SHOULD NOT ADDRESS THE ISSUES RAISED IN THE LATE-FILED DECEMBER 1 PLEADING

With respect to the December 1 Pleading, Row 44 made a unilateral proclamation absolving itself of compliance with the Commission’s filing deadlines and establishing an alternative date that better accommodated its own schedule.⁴⁶ Panasonic did not object to acceptance of another pleading from Row 44, so long as it was made in accordance with the Commission’s procedural rules.⁴⁷ However, Row 44 provided no basis for waiver of the rules,

⁴⁴ See December 1 Pleading at 17 (citations omitted).

⁴⁵ Panasonic AMSS Application at 2-3.

⁴⁶ See Row 44 Notice Regarding Filing Deadlines (dated Nov. 19, 2010).

⁴⁷ See Panasonic Response to Notice Regarding Filing Deadlines at 2 (dated Nov. 22, 2010).

failed to calculate the proposed alternative filing date correctly, ignored the important procedural issues raised by Panasonic on the first business day following its unilateral pronouncement,⁴⁸ and submitted the latest pleading on its self-declared filing date without a waiver from the Commission.

As legal matter, Row 44 actions cannot stand. The Commission cannot permit a party to a restricted proceeding to unilaterally alter filing deadlines or other procedural requirements at will. Row 44 provided no basis for waiver of the Commission's procedural rule and no waiver was granted by the Commission. Assuming *arguendo* that Row 44's reasoning regarding a consolidated pleading is correct, Panasonic noted (in a filing Row 44 ignored) that Row 44 had miscalculated the alternative deadline – by Row 44's own reasoning the pleading was due by November 30 rather than December 1, 2010.⁴⁹ Absent a waiver of this alternative November 30 deadline, the late-filed December 1 Pleading cannot be considered.

Even if the December 1 Pleading is accepted, the Commission need not consider the substantive arguments set forth therein. Like the vast majority of issues raised by Row 44, the December 1 Pleading focuses on issues associated with the prevention of adjacent satellite interference. As Row 44 is well aware, the Commission expressly concluded in Row 44's own licensing order that the Commission need not address such issues raised by a petitioner in an AMSS application proceeding considered under Section 25.220 of the rules. The Commission clearly stated, “[w]e decline to address [petitioner's] arguments concerning adjacent satellite

⁴⁸ See Panasonic Opposition to Consideration of Late-Filed Pleading of Row 44, Inc. (dated Dec. 7, 2010).

⁴⁹ See Panasonic Response to Notice Regarding Filing Deadlines at n.2.

interference, because [applicant] has resolved these interference issues through coordination with all potentially affected satellite operators.”⁵⁰

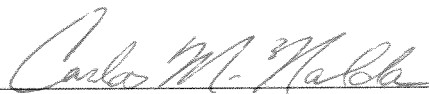
V. CONCLUSION

As discussed herein and in prior submissions, Panasonic’s AMSS application is fully consistent with Section 25.220 and the Commission’s Ku-band AMSS licensing policies and precedent. The Commission has previously authorized the operation of the MELCO antenna (with a higher power spectral density), and terminals installed on Lufthansa aircraft have operated on a trial basis for nearly a year with no reported cases of interference. Finally, although the Commission need not address them substantively, Panasonic has fully addressed each of the issues raised by Row 44 in this proceeding.

Grant of this AMSS application would strongly serve the public interest by enhancing competition and maintaining U.S. leadership in aeronautical broadband communications. Accordingly, the Commission should grant Panasonic’s application for blanket license authority to operate the MELCO AES antenna on a commercial basis at the earliest practicable time.

Respectfully submitted,

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December 13, 2010

⁵⁰ See *supra* at note 6.

Technical Certificate

I, Paul Sarraffe, hereby certify that I am the technically qualified person responsible for the preparation of the technical discussion contained in Panasonic Avionics Corporation's Reply to "Consolidated Reply" of Row 44, Inc., 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 Reply and found it to be complete and accurate to the best of my knowledge and belief.

By: Paul Sarraffe

Paul Sarraffe
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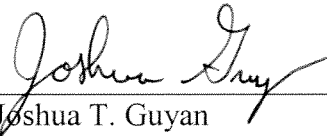
December 13, 2010

Certificate of Service

I, Joshua T. Guyan, hereby certify that on this 13th day of December, 2010, I caused a copy of Panasonic Avionics Corporation's Reply to "Consolidated Reply" of Row 44, Inc. to be served via U.S. first class mail on the party listed below.

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