

BEFORE THE  
**Federal Communications Commission**  
WASHINGTON, DC 20554

In re: Application of	)	
<b>Panasonic Avionics Corporation</b>	)	File Nos. SES-LIC-20100805-00992
	)	SES-AMD-20100914-01163
For Authority to Construct and Operate an	)	
Aeronautical-Mobile Satellite Service Earth	)	Call Sign E100089
Station Network Operating in the Ku-Band	)	

To: Chief, International Bureau

**PETITION OF ROW 44, INC.**

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October 15, 2010

*Its Attorney*

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To: Chief, International Bureau

**PETITION OF ROW 44, INC.**

Row 44, Inc. (“Row 44”), by its attorneys and pursuant to Section 25.154 of the Commission’s Rules, hereby petitions the International Bureau (the “Bureau”) to take no action on the above-captioned application until the applicant, Panasonic Avionics Corporation (“Panasonic Avionics” or “Applicant”), amends the application to come into compliance with the FCC’s Rules and provide information critical to the Bureau’s evaluation of its proposal. As filed, and as further supplemented on September 14, 2010,<sup>1</sup> Panasonic Avionics’ application (the “Application”) fails to provide the full complement of information required for the Bureau to determine whether its proposal to operate a Ku-band aeronautical mobile-satellite service (“AMSS”) Earth station network is compliant with the requirements of either Section 25.218 or Section 25.220 of the FCC’s Rules and can operate without causing harmful interference to other Ku-band FSS users. Absent the submission of additional clarifying information to

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<sup>1</sup> See Amendment to Application, FCC File No. SES-AMD- 20100914-01163, filed September 14, 2010.

provide the required showing, the Application should be dismissed as defective, or simply denied.

**I. Introduction, Summary and Statement of Interest.**

Row 44 is a licensed AMSS network operator with a strong and continuing interest in the integrity of Ku-band operating environment. Row 44 was granted a system license on August 5, 2009<sup>2</sup> after deploying a limited number of AMSS Earth stations pursuant to Special Temporary Authority for a period of almost six months during 2009.<sup>3</sup> Row 44 has subsequently modified its license to add an additional antenna,<sup>4</sup> and has begun the general roll-out of its system on commercial airliners operated by Southwest Airlines.<sup>5</sup> For these reasons, Row 44 has both significant expertise dealing with the technical issues related to successful non-interfering operation of a Ku-band AMSS system and a strong interest in ensuring that the current spectrum use conditions that have facilitated development of beneficial Ku-band MSS services, including Row 44's, are maintained without disruption.

Moreover, Panasonic Avionics specifically references Row 44's 2008 AMSS license application in its own system description, insisting that it is providing a technical demonstration "similar" to that upon which the 2009 grant of Row 44's license was based. Application at 4. Row 44 believes, however, that the Application falls short of providing the depth and breadth of required technical information that was included in Row 44's 2008 application. As it currently stands, the Application, as amended, does not include a complete

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<sup>2</sup> See *Row 44, Inc.*, 24 FCC Rcd 10223 (IB/OET 2009).

<sup>3</sup> See FCC File Nos. SES-STA 20080711-00928 (granted 3/13/2009), SES-STA-20090417-00507 (granted 5/15/2009), SES-STA-20090709-00854 (granted 7/14/2009).

<sup>4</sup> See FCC File No. SES-MOD-20091021-01342 (granted 1/20/2010).

<sup>5</sup> See, e.g., "WiFi Here and Now," Southwest Airlines Blog, posted September 8, 2010, available at <http://www.blogsouthwest.com/blog/wifi-here-and-now>.

technical showing equivalent to that submitted by Row 44 and other AMSS licensees, and is internally inconsistent or lacking adequate detail in several key respects.

First, Panasonic Avionics' Application is not clear on which of two pathways to licensure it is seeking to follow – EIRP spectral density compliance under Section 25.218 of the FCC's Rules, or demonstration of no harmful interference through coordination under Section 25.220 of the Rules. *See* 47 C.F.R. §§ 25.218 & 25.220. As a whole, the Application does not present a complete showing under either approach, providing only some of the information that is required under each of the relevant rules. Moreover, the Application itself makes plain that it does not comply with Section 25.218.

Second, the link budget and other supporting documentation provided in the Application are internally inconsistent with the actual operating parameters for which it requests licensing in Form 312. Its link budget exhibit also fails to include a coverage map, rendering it defective for purposes of demonstrating the ability of the proposed network to operate successfully at the proposed input power and EIRP levels.

Third, Panasonic Avionics' general reliance on the prior FCC approval of Boeing's 2003 application to employ the same Mitsubishi Electronics Corporation antenna ("MELCO Antenna") is misplaced. In view of the significantly different hardware, wave forms, access protocol and other differing technical parameters that are now being proposed for this antenna, its prior approval seven years ago for use by a different applicant using a different modem, modulation and access protocol is of little relevance. In fact, the only common element between the Panasonic Avionics proposal and Boeing's 2003 system is the MELCO Antenna hardware itself.

Finally, the Application specifically relies upon Panasonic Avionics' assertion that the MELCO Antenna has "recently operated without interference during flight trials pursuant to FCC experimental authority." Application at 3-4. It suggests that this testing is probative of its capability to avoid harmful interference to other spectrum users, yet does not provide any of the data that may have been gathered during these operations to support this conclusory statement. This stands in contrast to other applicants that have provided such real world data in connection with their own applications.<sup>6</sup>

The Bureau should require Panasonic Avionics to correct these deficiencies before it proceeds with further processing of the Application. In the event that it fails to correct these omissions, the Application should be dismissed or denied.

## **II. Panasonic Avionics Has Failed to Provide a Complete Showing With Respect to its EIRP Spectral Density and Antenna Gain Performance.**

From the outset, Panasonic Avionics' Application presents a confusing and inconsistent picture with respect to compliance with the Commission's current Part 25 Rules. The FCC's Rules provide that "an antenna not conforming to the standards of paragraphs (a) and (b) of" Section 25.209, which establishes antenna performance standards, "will be authorized only if the applicant meets its burden of demonstrating that its antenna will not cause unacceptable interference." 47 C.F.R. § 25.209(f). In turn, the rule further provides that applicants seeking approval for mobile Ku-band FSS Earth stations not covered by the Earth Stations on Vessels ("ESV") or Vehicle-Mounted Earth Stations ("VMES") rules "must comply with the procedures set forth in §§ 25.218 *or* 25.220." including the antenna pattern requirements of

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<sup>6</sup> See, e.g., Row 44, Inc., "Satellite Interference Test Plan and Report, Row 44 Satellite Broadband System," FCC File Nos. SES-LIC-20080508-00570, as amended, and SES-STA-20080711-00928 (filed May 11, 2009).

Section 25.132(b). *Id.* (emphasis added). The Applicant does not make plain at any point which of these two pathways to licensure it is seeking to follow, nor does it present a complete showing under either of these alternative approaches.

In its original narrative and associated Technical Appendix, Panasonic Avionics included a Regulatory Compliance Index (“Index”) listing the FCC Rules purportedly referenced in the Application along with the pages of both the narrative and the Technical Appendix that address alleged satisfaction of each rule requirement. As detailed herein, however, the Index ultimately proves to be more confusing than helpful.<sup>7</sup> There is no reference at all in the Index to Section 25.218 of the Rules, which became effective in March of 2009, yet within the Application itself, Panasonic Avionics appears to place significant reliance on Section 25.218(f) to demonstrate its capability to operate in the conventional Ku-band on a non-interference basis. *See* Application at 14-16; Technical Appendix at 10-12.

**A. Insufficient Data Has Been Submitted to Demonstrate Compliance with the Off-Axis EIRP Limits Under Section 25.218(f) of the FCC’s Rules.**

The technical standards set forth in Section 25.218 of the FCC’s Rules are further illuminated by the specific application requirements contained in Section 25.115(h). There, the Rules make plain that any applicant seeking to demonstrate compliance with the new off-axis EIRP spectral density limits must provide “three tables showing the off-axis EIRP level of the proposed Earth station antenna of the plane of the geostationary orbit, the elevation plane, and towards the horizon.” 47 C.F.R. § 25.115(h). Further, in each table, “the EIRP level must be

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<sup>7</sup> The Index is very similar to the index bearing the same title contained in Row 44’s 2008 application, but lacks necessary updates to account for rule changes that have occurred since that time, other than the addition of a superfluous reference to Section 25.226, which deals only with VMES applications. *Compare* Application, Regulatory Compliance Index and Row 44 Application, FCC File No. SES-LIC-20080508-00570, at iii (Regulatory Compliance Index).

provided at increments of 0.1° for angles between 0° and 10° off-axis, and at increments of 5° for angles between 10° and 180° off-axis.” *Id.* In its initial Application, Panasonic Avionics provided only a single EIRP spectral density plot, which it described as representing “worst-case power (edge of coverage), worst-case skew, etc.,” and no accompanying tables for any of the required planes. This very limited and ambiguous showing is not sufficient to comply with the detailed requirements of the Rules. Moreover, even with respect to its “worst case” demonstration, the Applicant did not explain the full range of variables that were considered to define this “worst case” scenario, and whether it includes worst case pointing error consistent with the general FCC requirement to maintain pointing accuracy to within 0.2 degrees and the pointing accuracy requirements of ITU-R Recommendation M.1643. *See* 47 C.F.R. §§ 25.222(a)(1)(ii) & (iii) & (b)(1)(iii) and 25.226(a)(1)(ii) & (iii) & (b)(1)(iii); ITU-R Rec. M.1643, Part A.

In its subsequent supplemental filing, Panasonic Avionics filed additional tables that appeared to constitute a partial showing under Section 25.115(h) and 25.218(f), although the amendment itself nowhere references Section 25.218. Even these additional tables, however, fall short of providing the complete data set requested under the rules, failing both to include information regarding off-axis EIRP for angles between 90° and 180° and to provide any data at all for the horizontal plane.<sup>8</sup>

The fact that the Application’s demonstration under Section 25.218(f) remains incomplete is ultimately immaterial, however, as it appears that even submission of the complete data required under Sections 25.218(f) and 25.215(h) could not show the required

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<sup>8</sup> Section 25.115(h) is not explicit in requiring negative azimuth data, but given the asymmetry of the Applicant’s antenna pattern, as well as the absence of compliance with Section 25.209 in any plane, this data seems especially necessary.



compliance with 25.218(f)(2) for off-axis EIRP spectral density “in all other directions.” In its initial filing, Panasonic Avionics actually stated unequivocally that “The MELCO AES antenna exceeds the off-axis EIRP spectral density values set forth in the Commission’s rules in directions away from the geostationary arc.” Application at 16 (Section VI.B.). That being the case, it is plain that the antenna does not meet the standards set out in Section 25.218(f).

**B. Panasonic Avionics Has Failed to Provide the Information Required to Satisfy Section 25.220 of the FCC’s Rules.**

As Panasonic Avionics admittedly does not comply with the requirements of Section 25.218, it is essential that it make a full showing under Section 25.220. In contrast to its omission of references to Sections 25.215(h) and 25.218(f), the Index to the Application does make reference to both Sections 25.220(c) and (e), although these references are outdated, referring to subsections that were eliminated last year and effectively replaced by revised subsection (d). Section 25.220(d) now details the specific requirements to coordinate the use of a non-conforming antenna. More importantly, an applicant that has not made the EIRP spectral density showing under Section 25.218 must satisfy all of the requirements contained in Section 25.220. *See* 47 C.F.R. § 25.220(a)(1) (Section 25.220 applies to applications “other than ESV, VMES and ... feeder link applications in which the proposed earth station operations do not fall within the applicable off-axis EIRP envelope specified in § 25.218”). In the pages referenced by the Index as relating to Section 25.220, however, Panasonic Avionics simply states that it has entered into coordination letters with the space segment providers at the two orbital locations it seeks to use without supplying the required technical information that should have provided the technical underpinning for these coordination letters.<sup>9</sup>

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<sup>9</sup> Row 44 also notes that, while the coordination letter submitted with respect to proposed use of Intelsat’s Galaxy 17 at 91° W.L. is countersigned by SES Americom, as is customary for these agreements, the letter submitted with respect to Telesat’s Telstar 14 at 63° W.L. is not

Specifically, Section 25.220 requires that applicants not fully compliant with Sections 25.209 or 25.218 must submit the complete antenna gain data set forth in Section 25.132(b) of the FCC's Rules. *See* 47 C.F.R. § 25.132(b). Data of the same nature required to demonstrate compliance with Section 25.209 is sought for frequencies at the top, middle and bottom of each allocated frequency band, showing two orthogonal cuts, vertical and horizontal, both co-polarized in the azimuth plane (both +/- 7 degrees and +/- 180 degrees) and the elevation plane (0 to 45 degrees), and cross-polarized in the E- and H-planes (+/- 9 degrees). *Id.* Panasonic Avionics' Application provides only a single set of plots for azimuth and elevation without identifying which of the multiple data sets requested under the rules these plots are intended to represent. *See* Application, Technical Appendix at 16-17 (Section B). Although the patterns are unlabeled as to the polarization sense shown or the portion of the frequency band that is represented, it appears that the figures show antenna gain at 14 GHz with vertical polarization.

The missing data is of particular importance as it is essential for Panasonic Avionics and the neighboring satellite operators with which its operations must be coordinated to understand fully the performance of its antenna at all off-axis angles in all types of situations. Notably, the Application reveals that the MELCO Antenna does not comply with Section 25.209 of the FCC's Rules even in the azimuth plane with vertical polarization. For example, Figure B.1 in Appendix B to the Technical Appendix shows that the Section 25.209 antenna gain mask is exceeded by approximately 8 dB in the vicinity of +/- 3° azimuth. Yet when Boeing sought approval of the MELCO Antenna, the side lobe level in azimuth for horizontal

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countersigned by any of the operators within six degrees of that satellite. *See* Application, Attachment B.

polarization was at least 1 dB higher than for vertical polarization<sup>10</sup>, suggesting that submission of additional patterns by the Applicant could show even worse performance (the horizontal pol side lobes are also much more asymmetric). In addition, with an elliptical Cassegrain reflector, there will be significant variation in the antenna patterns at different frequencies, and the Applicant has provided plots at only one frequency, which is not clearly identified. In the absence of full data, Panasonic Avionics cannot reasonably claim to have sufficient knowledge of the operating characteristics of its antenna to maintain compliance with the FCC mask or to otherwise avoid harmful interference.

Moreover, insufficient antenna pattern data has been provided to ensure that the MELCO Antenna will be able to comply with the antenna pointing requirements of ITU-R Rec. M.1643. In the Technical Appendix, Panasonic Avionics claims that the pointing error is less than  $0.25^\circ$ , which is inconsistent with the statement in each of the coordination letters that pointing accuracy is maintained to  $0.25^\circ$  1-sigma. If the overall pointing error is  $0.25^\circ$  1-sigma, then the number of cases in which the actual pointing error exceeds  $0.25^\circ$  will still be greater than fifteen percent. Accordingly, in neither case can it be determined with sufficient accuracy whether the pointing error is less than  $0.2^\circ$  or greater than  $0.5^\circ$  as is required for mobile antennas operating in the Ku-band.

In sum, under the FCC's Rules, where a proposed antenna is not compliant with the requirements of Section 25.209, a full set of antenna patterns is required in order to obtain

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<sup>10</sup> See Application of The Boeing Company, SES-MOD-20030512-00639, Technical Appendix at 9.

consideration under the coordination provisions of Section 25.220.<sup>11</sup> Panasonic Avionics has not yet met that threshold.

**III. Technical Documents Submitted by Panasonic Avionics in Support of its Proposal Are Inconsistent with the Operating Parameters Requested in the Application Itself.**

In addition to the issues identified above, there are multiple contradictions in the supporting materials for the Application with respect to the values of critical operating parameters, particularly EIRP and EIRP spectral density. For example, the link budget provided with the Application as Appendix A is invalid for the parameters actually requested in Form 312. The link budget is premised on a maximum EIRP per carrier of 47.2 dBW, more than 5 dBW higher than the value of 42.1 dBW given for this parameter in the Application itself.<sup>12</sup> The higher value appears to identify the maximum potential EIRP for the MELCO Antenna, rather than the actual operating authority being sought. Because the AMSS Earth Station is not proposed to operate at this high power, the Appendix A link budget carries no weight in evaluating the Application. The ability to close the link to the requested satellite at the higher value has no bearing on the Applicant's ability to close the link under the operational characteristics actually specified in the Application. Accordingly, Panasonic Avionics needs to submit a corrected link budget.

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<sup>11</sup> Panasonic also has yet to enter into a coordination agreement with NASA, which it recognizes as a prerequisite for operations at the lower conventional Ku-band transmit frequencies in certain geographic areas. *See* Application at 18 (absent a coordination agreement with NASA, "Panasonic agrees not to operate MELCO AES antennas within the 14.0-14.2 GHz band within line of site of NASA TDRSS facilities").

<sup>12</sup> This same discrepancy infects the radiation hazard analysis provided for the antenna (Technical Appendix, Attachment A), and both of the coordination letters signed by Intelsat and Telesat (Technical Appendix, Attachment B).

In addition, to establish the expected coverage capability of its network with the operating parameters requested, a coverage map is required to illustrate the scope of operation predicted using the correct operating parameters. Accordingly, when it submits its corrected link budget, Panasonic Avionics should also include a hemispheric coverage map detailing the expected coverage at its proposed operating power and maximum EIRP of 42.1 dBW.

The discrepancies between the Form 312 and the link budget are compounded by different values for the same parameters in other Applicant submissions. For example, in the September 14, 2010 Application Amendment, a distinct and inconsistent maximum EIRP value of 41.3 dBW is provided in new Appendix D.<sup>13</sup> These discrepancies, in turn, raise questions regarding the correct values for other critical operating parameters, such as EIRP spectral density and signal bandwidth. These are the types of internal inconsistencies that generally warrant dismissal of the application as defective under Section 25.112(a)(1) of the FCC's Rules. *See* 47 C.F.R. § 25.112(a)(1).<sup>14</sup>

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<sup>13</sup> Overall, there are at least four different figures given for Maximum EIRP in different parts of the materials provided with the Panasonic Avionics Application – 42.1 dBW (Form 312, Schedule B at Line E40), 46.7 dBW (Application Attachment A, Radiation Hazard Analysis at 3), 47.2 dBW (Technical Appendix at 4 (Table 1) and Appendix A (Link Budget) and in both coordination letters (Attachment B); and 41.3 dBW (September 14 Application Amendment, Appendix D).

<sup>14</sup> The rule provides: “An application will be unacceptable for filing and will be returned to the applicant with a brief statement identifying the omissions or discrepancies if ... the application is defective with respect to completeness of answers to questions, informational showings, internal inconsistencies, execution, or other matters of a formal character.” *See also, e.g.,* Letter from Kathryn Medley, Chief, Satellite Engineering Branch, to Raul Magallanes, Counsel to Data Technology Solutions, FCC File No. SES-LIC-20090807-00971, at 1 (dated September 15, 2010) (application dismissed as defective because “[w]e cannot determine the proposed emission power ... due to inconsistencies among the proposed maximum EIRP density per carrier listed in the Schedule B of the application and the average EIRP density calculated from other parameters”).

**IV. Panasonic Avionics' Reliance on Prior Approval of the MELCO Antenna in 2003 is Misplaced Given the Different Operating System and Technical Parameters for Its Proposal.**

The Applicant also places significant reliance on the claim that the MELCO Antenna which it seeks to operate was previously approved for use by Boeing. *See* Application at 3 & footnotes 5 & 6. In asserting that this fact is relevant to processing its own Application, however, Panasonic ignores the substantial differences in the operating parameters approved for the Boeing network in comparison to those included in its Application. Most significantly, Panasonic Avionics is proposing to operate using Time Division Multiple Access (“TDMA”) rather than the Code Division Multiple Access (“CDMA”) protocol that Boeing employed. Considering the impact of high-speed motion on signal timing and the lower spreading factor to be used in Panasonic Avionics’ TDMA proposal as compared to Boeing’s previously-authorized CDMA system, the Application presents a much different set of interference considerations than the previously approved CDMA operation employing the MELCO Antenna. For example, Boeing's Connexion system spread its 1024 kbps signal over 32.4 MHz (a spreading factor of 31) with an EIRP of 44.6 dBW, yielding an EIRP spectral density of ~5.6 dBW/4 kHz, which is well within FCC requirements.<sup>15</sup> The Applicant, however, appears to use a spreading factor that is closer to 16, which for the same data rate and bandwidth would be about 3 dB poorer than Boeing’s, *i.e.*, the 8.6 dBW/4kHz spectral density indicated by the Application is 3 dB higher than Boeing's. In short, to really understand Panasonic Avionics’ design, the Bureau would need to know the maximum data rate, the spreading factor used and the actual signal bandwidth. For these reasons, the Applicant’s reference to the prior licensing of the MELCO antenna under Boeing’s proposal is meaningless, as the Bureau should

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<sup>15</sup> *See* FCC File No. SES-MOD-20030512-00639.

independently evaluate the operating proposal contained in the current Application rather than relying in any way on past grant of a distinct system proposal involving operation of the MELCO Antenna under very different circumstances.

**V. Panasonic Avionics Should Provide the FCC with Data from Its Experimental Testing Demonstrating Interference-Free Operation of Its AMSS Earth Stations.**

At several points in the Application, Panasonic Avionics alleges that an additional fact supporting approval of its proposal is its recent operation of the MELCO Antenna pursuant to FCC experimental authority.<sup>16</sup> For example, it states near the beginning of the Application narrative that the antenna has “previously operated without interference on a commercial basis, and has more recently operated without interference during flight trials pursuant to FCC experimental authority.” Application at 3-4. If, as the Applicant contends, the operational results observed during its experimental testing are relevant to the Bureau’s consideration of its Application, then it should submit for the record the data on tracking and pointing performance that it has derived from this testing. Indeed, Row 44 provided such data in connection with its own AMSS license application, upon which Panasonic Avionics now specifically relies as precedent.<sup>17</sup>

Row 44 notes that the FCC’s Rules nowhere require flight testing prior either to the filing of an FCC Earth Station application or to FCC action on such an application, but where an applicant has placed significant reliance on claims of successful non-interference operation during flight testing, it is appropriate for it to submit such data as it may have derived from such testing to demonstrate the accuracy of these claims. The data provided should show that

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

<sup>17</sup> See page 2 and 3-4 & n.6, *supra*.

both tracking rate and tracking acceleration are sufficiently accurate and responsive to changing flight dynamics to ensure cessation of transmissions within 100 milliseconds in the event that pointing error would otherwise exceed 0.5°. *See, e.g.*, 47 C.F.R. § 25.115(h)(4) & § 25.226(b)(1)(iii).

## VI. Conclusion

For all of the foregoing reasons, Row 44 petitions the Commission to require that Panasonic Avionics provide the additional data noted herein that is currently missing from the Application. Action on the Application should be deferred until this additional information is provided. Alternatively, the Application should be dismissed or denied in the event that the Applicant does not timely submit the additional information necessary to complete its required showing of compliance with the FCC's Rules.

Respectfully submitted,

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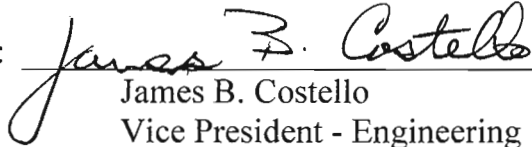
*Its Attorney*



## TECHNICAL CERTIFICATE

I, James B. Costello, hereby certify that I am the technically qualified person responsible for the preparation of the technical discussion contained in the foregoing "Petition," 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 and supporting facts contained herein and found them to be complete and accurate to the best of my knowledge and belief.

October 15, 2010

By:   
James B. Costello  
Vice President - Engineering  
Row 44, Inc.

CERTIFICATE OF SERVICE

I, Sharon Krantzman, hereby certify that a true and correct copy of Row's 44, Inc.'s foregoing Petition was sent by first-class, postage prepaid mail this 15<sup>th</sup> day of October, 2010, to the following:

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A handwritten signature in blue ink that reads "Sharon Krantzman". The signature is written in a cursive style with a large, sweeping initial "S".

Sharon Krantzman