Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of

Application of Panasonic Avionics Corporation to Modify its Earth Stations Aboard Aircraft ("ESAA") Blanket License	)	Call Sign E100089
	)	File No. _____

APPLICATION TO MODIFY ESAA BLANKET LICENSE

By this application, Panasonic Avionics Corporation ("Panasonic") seeks modification of its existing earth stations aboard aircraft ("ESAA") blanket license, Call Sign E100089,[1] by adding authority to operate its previously authorized Single-Panel Antenna ("SPA") and Panasonic Phased Array ("PPA") terminals with satellites on the Commission's Permitted Space Station List ("Permitted List") and certain additional satellite points of communication. Panasonic also seeks authority to add 1,000 new ESAA terminals – the TECOM Ku-Stream 1000 ("TECOM"), which has been previously authorized by the Commission – for operation with Permitted List satellites and other U.S.-serving satellites currently authorized in Panasonic's *ESAA Blanket License.* Finally, Panasonic requests removal of certain satellite points of communication from its *ESAA Blanket License* and updates the frequency coordination, power level and emission designator information associated with its ESAA terminal operations.

The modifications sought herein will enhance Panasonic's operational flexibility and improve the in-flight broadband connectivity services available to U.S. passengers. Grant of the

[1] *See* Panasonic Avionics Corporation, File No. SES-LIC-20100805-00992 (Call Sign E100089) and subsequent filings and modifications ("*ESAA Blanket License*"); Panasonic Avionics Corporation Application for Authority to Operate Up to 50 Technically Identical Aeronautical Mobile-Satellite Service Aircraft Earth Stations in the 14.0-14.4 GHz and 11.7-12.2 GHz Frequency Bands, Order and Authorization, DA 11-1480 (rel. Aug. 31, 2011).

requested modifications also will extend the coverage and increase the capacity of the global eXConnect network. Additionally, grant will facilitate access to the eXConnect network by aircraft equipped with the previously licensed TECOM ESAA terminal.

Pursuant to Section 25.117(c) of the Commission's rules, 47 C.F.R. § 25.117(c), Panasonic provides information that is changing as a result of the requested modification in the FCC Form 312 Schedule B and Technical Appendix, including updating certain ESAA operational parameters. The remaining information in support of its *ESAA Blanket License* has not changed. The proposed operations are consistent with the Commission's rules and policies governing Ku-band ESAAs[2] and, for the reasons described herein, grant of the proposed modification would serve the public interest.

I. BACKGROUND

Panasonic's *ESAA Blanket License* was the subject of a recent authorization to add satellite points of communication for its previously licensed PPA terminal and add the SPA terminal for long-term commercial operations.[3] The Panasonic ESAA terminals are fully certified for operation on the subject commercial aircraft and operate in accordance with the terms of the *Panasonic Order*, the *ESAA Blanket License*, and Section 25.227 of the Commission's rules, 47 C.F.R. § 25.227, governing ESAA operations.

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[2] *See* 47 C.F.R. § 25.227; *see also Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands; Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed-Satellite Service,* IB Docket Nos. 12-376 & 05-20, Notice of Proposed Rulemaking and Report and Order, FCC 12- 161 (rel. Dec. 28, 2012) ("*ESAA Order*").

[3] *See* Panasonic Avionics Corporation, File No. SES-MFS-20160819-00730 (Call Sign E100089) (granted on Oct. 19, 2016).

Panasonic has fully described the eXConnect System in prior submissions and hereby incorporates by reference the technical showing regarding the control functionality and other operational characteristics submitted in connection with prior applications.[4] The additional operations proposed herein, including operation of the TECOM antenna and ESAA operations with new individual satellite points of communication and Permitted List satellites, will be consistent with the terms, conditions and operational parameters that are currently authorized under Panasonic's *ESAA Blanket License* and with the Commission's ESAA rules.

II. DISCUSSION

A. Satellite Points of Communication

1. Permitted List Operations

Panasonic is requesting authority to operate its ESAA terminals, as well as the TECOM terminal, with any satellite on the Commission's Permitted List pursuant to Section 25.227(a)(12) of the Commission's rules, which permits an ESAA system that complies with the off-axis EIRP spectral density ("ESD") limits in Section 25.227(a)(1)(i) to request such authority. Panasonic will operate the ESAA terminals with Permitted List satellites in permissible portions of the 14.0-14.5 GHz band consistent with these uplink off-axis ESD limits, and in the 10.95-11.2 GHz and 11.45-12.2 GHz downlink bands.

Panasonic's existing *ESAA Blanket License* generally authorizes operations pursuant to Section 25.227(a)(2) of the Commission's rules because, out of an abundance of caution, Panasonic sought satellite operator certification for all ESAA operations. In some cases, the ESAA terminals operate with off-axis ESD levels in excess of those specified in Section 25.227(a)(1), and in other cases operate consistent with the Commission's two-degree spacing

[4] *See, e.g.*, Panasonic Avionics Corporation, File No. SES-LIC-20100805-00992 (granted August 31, 2011) (Call Sign E100089) and subsequent amendment and modification applications.

policies embodied in those levels. The application dockets for all of the subject ESAA terminals include antenna performance information demonstrating compliance with applicable off-axis ESD levels and they are currently operating with two-degree spaced satellites without interference.[5] Of course, the general performance characteristics of these previously licensed ESAA terminals are well-understood and will not change.[6]

2. Additional Satellite Points of Communication

Panasonic seeks to add three individual satellites (AsiaSat-7, IS-33E and JCSAT-2B) as authorized points of communication for the PPA and SPA terminals and one (Galaxy 16) as an authorized point of communication for the SPA terminal only.

The following table provides an overview of the basic parameters of ESAA operations with each individual satellite point of communication.[7] A complete table reflecting all satellites in the eXConnect network is included in the Technical Appendix.

[5] *See* Panasonic Avionics Corporation, File No. SES-MFS-20120913-00818, Call Sign E100089 at Technical Appendix (providing off-axis ESD plots for the PPA terminal) and File No. SES-MFS-20160819-00730, Call Sign E100089 at Technical Appendix (providing off-axis ESD plots for the SPA terminal); *see also* Row44 Inc., File No. SES-MFS-20150928-00635, Call Sign E080100 ("*Row 44 ESAA Blanket License*").

[6] As the Commission is aware, Panasonic controls off-axis ESD emissions from the ESAA terminals through limitations on the transmit power spectral density and control of pointing error. At all times, Panasonic will operate the subject ESAA terminals with Permitted List satellites at two-degree compliant levels.

[7] The SPA and PPA terminals will operate in the uplink direction within the 14.0-14.5 GHz band consistent with satellite operator coordination agreements, the Commission's rules and applicable international requirements.

Table 1. Proposed Satellite Points of Communication

Satellite	Licensing Admin.[8]	Orbital Location	Downlink Freq. (GHz)	ITU Satellite Network[9]	ITU Region	Service To U.S.[10]
AsiaSat 7	China	105.5° E	12.25-12.75	ASIASAT-CKX	3	No
Galaxy 16	U.S.	99° W	11.7-12.2	U.S.-licensed	2	Yes
IS-33E	U.S.	60° E	10.95-11.2; 11.45-12.2; 12.5-12.6	INTELSAT9-60E	1, 3	No
JCSAT-2B	Japan	154° E	11.45-11.7	N-SAT-154E	3	No

Each of these proposed satellites has been previously authorized as points of communication for similar ESAA operations[11] or is a U.S.-licensed satellite.[12] Accordingly, the technical and operational parameters of each satellite are well known to the Commission, including each satellite's orbital debris mitigation and end-of-life plans, and no new showing regarding these issues is required. In the attached Technical Appendix and Form 312 Schedule

[8] Each foreign licensing administration is a member of the World Trade Organization for services covered under the World Trade Organization Basic Telecommunications Agreement. *See* FCC Form 312 at Item 42; 47 CFR § 25.137(a).

[9] Panasonic provides the ITU satellite network filing name for each non-U.S. licensed satellite.

[10] "Yes" indicates that the relevant satellite will be used for ESAA operations in U.S. territory. "No" indicates that ESAA operations will be conducted outside U.S. territory, even if the satellite may have some coverage of the United States.

[11] *See, e.g.*, Gogo LLC, File No. SES-MFS-20151022-00735 (Call Sign E120106) (granted authority to add AsiaSat-7 and JCSAT-2B as authorized points of communication under its ESAA blanket license).

[12] Galaxy 16 is a U.S.-licensed satellite and currently an authorized point of communication for the PPA terminal. IS-33E is a U.S.-licensed satellite that was recently authorized by the Commission (*see* Intelsat License LLC, File No. SAT-LOA-20150327-00016 (Call Sign S2939) (granted on Feb. 25, 2016)).

B, Panasonic provides information regarding the operational characteristics of the ESAA terminals with each satellite identified in Table 1.

Out of an abundance of caution, Panasonic requests a waiver of the U.S. Table of Allocation in Section II.A.3 to the extent necessary to permit its receive ESAA operations with IS-33E in the 12.5-12.6 GHz downlink band and AsiaSat-7 in the 12.25-12.75 GHz downlink band. In addition, although Panasonic has included satellite operator certifications for most individual satellite points of communication proposed herein confirming that ESAA operations are consistent with their coordination agreements and will not result in unacceptable interference to other satellites within +/- 6 degrees, it has not done so for JCSAT-2B. The absence of such a certification does not affect the request to communicate with this satellite because at all times Panasonic will operate the PPA and SPA terminals consistent with the off-axis ESD levels in Section 25.227(a)(1).[13] Depictions of the geographic areas in which its ESAA terminals will operate with each proposed satellite point of communication are also included.[14]

a. Ground Segment

The gateway earth stations for Panasonic's ESAA network are located in various countries around the world to provide global coverage and vary by satellite. Table 2, below, reflects the gateway earth stations for the satellite points of communication proposed herein. A complete table reflecting all satellites and gateways in the eXConnect network is included in the Technical Appendix.

[13] Although no satellite operator certification is necessary when an ESAA operates in accordance with the Section 25.227(a)(1) mask, Panasonic reserves the right to supplement the record with a certification for JCSAT-2B should it be deemed necessary or appropriate.

[14] *See* Technical Appendix, I.; *see also* 47 C.F.R. § 25.227(b)(4).

Table 2. Gateway Earth Stations Table

Satellite	Satellite Operator	Gateway Earth Station Location	Country	Gateway Operator	FCC Call Sign
AsiaSat-7	AsiaSat	Beijing	China	China Telecom Satellite	N/A
Galaxy 16	Intelsat	Brewster, WA	U.S.	U.S. Electrodynamics	E120043
IS-33E	Intelsat	Cologne	Germany	Stellar	N/A
IS-33E[15]	Intelsat	Moscow	Russia	Gazprom	N/A
JCSAT-2B	SKY Perfect JSAT	Kapolei, HI	U.S.	Hawaii Pacific Teleport LP	E010016

Network control and monitoring of the earth stations and the eXConnect System will continue to be provided by a Panasonic Mission Control Center ("MCC") in Lake Forest, California on a 24/7 basis. The MCC makes use of the Network Management System ("NMS") to provide complete control and visibility to all components the eXConnect network. The NMS system has the capability of shutting down any component in the system that is malfunctioning. The primary points of contact at Panasonic's MCC facility has been previously provided to the Commission by Panasonic.[16]

[15] Effective November 2017, the gateway earth station in Moscow, Russia will no longer support IS-33E satellite operations. Panasonic includes representative link budgets for IS-33E with both gateway earth station locations.

[16] *See* Panasonic Avionics Corporation, File No. SES-MFS-20160819-00730 (Call Sign E100089), Technical Appendix.

3. Waiver Request

Although Panasonic has previously been granted a waiver of Section 2.106 of the Commission's rules, 47 C.F.R. § 2.106, to operate ESAA terminals in the 12.25-12.75 GHz downlink band, out of an abundance of caution, Panasonic respectfully requests a similar waiver here. Specifically, Panasonic's ESAA terminals will communicate with IS-33E in the 12.5-12.6 GHz downlink band and with AsiaSat-7 in the 12.25-12.75 GHz downlink band.

The FCC's Table of Allocations permits use of the 10.95-11.2 GHz and 11.45-11.7 GHz bands (on an unprotected basis) and the 11.7-12.2 GHz and 14.0-14.5 GHz bands (on a primary basis) for ESAA operations.[17] Panasonic seeks to utilize FSS satellite capacity available in the 12.25-12.75 GHz band for ESAA receive operations on an unprotected, non-harmful interference basis outside the United States (principally in Regions 1 and 3).[18] The Commission previously waived Section 2.106 with respect to operation of Panasonic's eXConnect System and other in-flight connectivity providers in this additional Ku-band downlink spectrum.[19] The requested waiver would serve the public interest because use of this downlink (receive) spectrum is essential to offering in-flight broadband connectivity in Ku-band spectrum and presents a negligible risk of interference to other spectrum users.[20]

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[17] *See* 47 C.F.R. § 2.106 and n. NG52 and NG55; 47 C.F.R. § 25.227.

[18] The 12.5-12.75 GHz band is allocated for FSS downlinks in Region 1 and the 12.2-12.75 is allocated for FSS downlinks in Region 3.

[19] *See, e.g.*, Panasonic Avionics Corporation, SES-MFS-20150609-00349 (Call Sign E100089).

[20] *See id.*

B. TECOM ESAA Terminal

1. Addition of TECOM ESAA Terminal

Panasonic seeks to add the TECOM ESAA terminal to is *ESAA Blanket License* for operations on aircraft equipped with this terminal, including those installed on Southwest Airlines aircraft. The TECOM ESAA terminal is designed for aeronautical applications and has been previously licensed by the Commission for similar operations.[21]

As previously demonstrated to the Commission, the TECOM terminal complies with the requirements set forth in Section 25.227 of the Commission's rules, 47 C.F.R. § 25.227, to facilitate Ku-band ESAA operations in a two-degree spacing environment.[22] In the interest of administrative convenient and to avoid providing substantial amounts of duplicative information, Panasonic incorporates by reference the technical demonstration, including off-axis ESD plots and related operational characteristics of the TECOM ESAA terminal, into the record of this proceeding.

Panasonic will operate the TECOM in accordance with the off-axis ESD masks in Section 25.227(a)(1)(i) of the Commission's rules designed to protect co-frequency operations from harmful interference, as well as all other applicable ESAA requirements. To the extent that the Commission wishes to review additional technical information for the TECOM terminal, Panasonic will provide such information in due course.

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[21] *See Row 44 ESAA Blanket License*.

[22] *Id.* Technical Annex (Panasonic will operate the TECOM at the same maximum EIRP level authorized in the *Row 44 ESAA Blanket License* (43.8 dBW). Row44 requested a cautionary waiver of 25.227(a)(1)(i)(B) because it exceeded the off-axis ESD mask in the plane perpendicular to the GSO arc and, out of an abundance of caution, Panasonic requests a similar waiver here.

The TECOM ESAA terminal has operated in the United States pursuant to Commission authority without any reported interference and in compliance with the ESAA rules embodied in Section 25.227. In addition to being two-degree spacing compliant, the TECOM terminal has a pointing accuracy of 0.2º or greater and will automatically cease transmissions if point offset exceeds 0.5º or greater, and otherwise will operate in compliance with the Commission's ESAA rules and policies. Panasonic will also ensure that the terminal is operated consistent with existing coordination agreements with the National Science Foundation and NASA, or impose an exclusion zone around radio astronomy and TDRSS sites (as contemplated in Section 25.227) until such agreements can be appropriately modified. Thus, addition of this terminal to the Panasonic's *ESAA Blanket License* will not increase the potential for interference from the eXConnect System operations in the United States.

2. Permitted List Operations

Panasonic proposes to operate the TECOM in permissible portions of the 14.0-14.5 GHz band (Earth-to-space), the 10.95-11.2 GHz band (space-to-Earth) and the 11.45-12.2 GHz band (space-to-Earth) with Permitted List satellites pursuant to Section 25.227(a)(12) of the Commission's rules. As discussed above, Panasonic has incorporated by reference the extensive technical showing upon which the Commission granted authority for the TECOM terminal to operate in the U.S. two-degree spacing environment. In addition, Panasonic will operate the terminal at the same power levels at which it operates with two-degree spaced satellites today, which are necessarily compliant with the off-axis ESD limits in Section 25.227(a)(1)(i). Accordingly, Panasonic respectfully requests that the Commission included Permitted List authority for the TECOM antenna in its *ESAA Blanket License.*

3. Additional Satellite Points of Communication

In addition to requesting Permitted List authority, Panasonic also seeks authority for the TECOM terminal to communicate with certain individual U.S. and non-U.S.-licensed satellites. Table 3, below, provides an overview of the basic parameters of TECOM terminal operations with each such satellite.[23]

Table 3. Proposed Satellite Points of Communication (TECOM)

Satellite	Licensing Admin.[24]	Orbital Location	Downlink Freq. (GHz)	ITU Satellite Network[25]	ITU Region
Anik G1	Canada	107.3° W	11.7-12.2	CANSAT-34	2
Galaxy 16	U.S.	99° W	11.7-12.2	U.S.-licensed	2
Eutelsat 172A	U.S.	172° E	10.95-11.2; 11.45-11.7	U.S.-licensed	2
IS-29E	U.S.	50° W	10.95-11.2; 11.45-11.7	U.S.-licensed	1, 2
Telstar 11N	U.S.	37.5° W	11.45-12.2	U.S.-licensed	1, 2
Yamal 300K	Netherlands	183° E	10.95-11.2; 11.45-11.7	NSS-19	1, 2

These proposed satellites have been previously authorized in Panasonic's *ESAA Blanket License*. Accordingly, the technical and operational parameters of the satellites are well known to the Commission and no new showing regarding these issues is required. In addition, Panasonic will operate the TECOM terminal with each satellite at power levels below levels

[23] The TECOM terminal will operate in the uplink direction within the 14.0-14.5 GHz band consistent with satellite operator coordination agreements, the Commission's rules and applicable international requirements.

[24] Each foreign licensing administration is a member of the World Trade Organization for services covered under the World Trade Organization Basic Telecommunications Agreement. *See* FCC Form 312 at Item 42; 47 CFR § 25.137(a).

[25] Panasonic provides the ITU satellite network filing name for each non-U.S. licensed satellite.

currently permitted in its license. The attached Technical Appendix and Form 312 Schedule B provide information regarding the operational characteristics of the TECOM terminal with each satellite identified in Table 3. Panasonic also provides representative link budgets in the Technical Appendix.

4. Waiver Request

The TECOM ESAA terminal has been authorized by the Commission for operation by Row 44 and is currently in use on Southwest Airlines aircraft.[26] Like most ESAA terminals, including Panasonic's PPA and SPA terminals, the TECOM terminal utilizes a low-profile antenna that is narrower in the elevation plane than in the azimuth plane. As a result, although they operate can in compliance with Section 25.227 off-axis ESD limits or coordinated ESAA values to prevent adjacent satellite interference, the TECOM and other low-profile antennas may exceed specified off-axis ESD limits in directions other than the GSO arc at certain power levels and skew angles.

Row 44 sought a waiver of the Commission's rules in its ESAA blanket license application for the TECOM terminal, and Panasonic sought a similar waiver for its low-profile ESAA terminals.[27] Although Panasonic has already been granted a waiver of the relevant Commission rule in connection with its existing ESAA blanket license, to the extent necessary and out of an abundance of caution, it hereby requests a waiver for the TECOM terminal and incorporates by reference the prior waiver requests noted above.

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[26] *See Row 44 ESAA Blanket License*.

[27] *See* Panasonic Avionics Corporation, File No. SES-MFS-20120913-00818, Call Sign E100089, Narrative Statement.

Because Panasonic will operate the TECOM terminal in the same manner at the same power levels at which it is authorized to operate today, the same public interest considerations that supported prior grant of ESAA operating authority apply here. To the extent any rule waiver may be necessary, grant of such a waiver would serve the public interest by enhancing competition, expanding use of a currently authorized ESAA terminal and not otherwise undermining the policies underlying the rule.

C. Revisions to *ESAA Blanket License*

Panasonic seeks the removal of certain currently authorized satellite points of communication from its *ESAA Blanket License*. Specifically, Panasonics seeks to remove the following PPA satellite points of communications from its license: AMC-16, Anik-F1, Amazonas-2, Galaxy 17 and SES-6. Panasonic also seeks to remove the following MELCO satellite points of communication from its license: Galaxy 16, Galaxy 17, SES-6, AMC-16, Eutelsat 115WB and IS-29E. Due to changes in Panasonic's satellite network configuration, these satellites no longer support MELCO or PPA terminal operators or are no longer part of the eXConnect network. Accordingly, Panasonic respectfully requests the removal of the identified satellites from the *ESAA Blanket License* as authorized points of communication to accurately reflects its existing ESAA operations.

Additionally, Panasonic seeks to revise certain emission designators associated with various frequency bands authorized for the MELCO, PPA and SPA ESAA terminals. Specifically, Panasonic inadvertently included an extra character ("K") in several emission designators. Panasonic has provided an updated emission designator exhibit in the Technical Appendix which accuracy reflects its ESAA terminal operations under its *ESAA Blanket*

License.[28] In addition, FCC Form 312 Schedule B associated with this application reflects the correct emissions designators.

The *ESAA Blanket License* also includes ESAA terminal frequency coordination limits over identified satellite arc ranges rather than individual locations of satellite points of communication. Given the different operational characteristics associated with each satellite, however, Panasonic updates the frequency coordination information to show orbital location-specific information for ESAA terminal operations. The updated information will harmonize Panasonic's *ESAA Blanket License* with other ESAA licensees, and effectively replaces the information currently set forth in Section C of the license. The ESAA terminals will continue to operate in accordance with the terms of the *Panasonic Order*, the *ESAA Blanket License*, and Section 25.227 of the Commission's rules governing ESAA operations.

Finally, Panasonic seeks to correct the power levels for the MELCO terminal to reflect those proposed in a prior modification application. It appears that Panasonic's prior request to increase the maximum EIRP value for the MELCO antenna, which was included in the Form 312 Schedule B and accompanied by an appropriate satellite operator certification,[29] was neither reflected in the license grant nor a decision denying that portion of the prior application. In the absence of such a denial, Panasonic believes the omission to be a minor administrative oversight and respectfully requests that the Commission address this issue in the context of the present application. The updated information regarding MELCO operations set forth in this modification application effectively replace currently authorized MELCO parameters in the *ESAA Blanket License.*

[28] *See* Technical Appendix, IV.

[29] *See* File No. SES-MFS-20130930-00845 (Call Sign E100089) at FCC Form 312, Schedule B and Technical Appendix (Telesat certification letter).

D. Public Interest Statement

Grant of the requested modification to add a new terminal type and expand the satellites which Panasonic may use to support its eXConnect System will serve the public interest by extending the coverage and increasing the capacity and operational flexibility of Panasonic's global ESAA network for U.S. airlines and their passengers. This will provide a direct benefit to U.S. consumers that will be able to access new in-flight broadband applications and will further enhance U.S. leadership in mobile broadband services.

The additional satellites will provide added bandwidth for the eXConnect System and ensure that Panasonic has sufficient bandwidth to meet increasing demand and enhance the in-flight user experience globally. Moreover, adding the TECOM antenna will enable aircraft equipped with the terminal to access Panasonic's ESAA network, enhancing competition and airline choice in providing in-flight broadband connectivity to U.S. passengers. Removal of the identified satellite points of communication and updating other technical parameters in the *ESAA Blanket License* will ensure that Panasonic's authorization accurately reflects its global ESAA operations.

III. CONCLUSION

Based on the foregoing, Panasonic respectfully requests that the Commission modify its *ESAA Blanket License*, Call Sign E100089, by (i) granting Permitted List authority and adding satellites as authorized points of communications for its previously authorized PPA and SPA terminals; (ii) adding the TECOM ESAA terminal for U.S. operations with Permitted List satellites and other previously licensed U.S.-serving satellites; (iii) removing certain authorized points of communication for the PPA and MELCO terminals; and (iv) updating the frequency coordination and emission designators for the MELCO, PPA and SPA terminals.