

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

In the Matter of)
)
Amendment of Parts 2 and 25 of the)
Commission's Rules to Allocate Spectrum and)
Adopt Service Rules and Procedures to Govern)
the Use of Vehicle-Mounted Earth Stations in)
Certain Frequency Bands Allocated to the Fixed-)
Satellite Service)

IB Docket No. 07-101

To: The Commission

**PETITION FOR RECONSIDERATION OF
THE BOEING COMPANY**

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SUMMARY

In the Commission's order authorizing the operation of Vehicle-Mounted Earth Stations ("VMES"), the Commission failed to address Boeing's argument that the authorization of VMES as a primary application of the Fixed-Satellite Service ("FSS"), without a concurrent elevation of Aircraft-Mounted Earth Stations ("AMES") to a primary application of the FSS could result in harmful interference to, or cessation of, critically important Aeronautical-Mobile Satellite Services ("AMSS"). This failure was a procedural violation of the notice-and-comment requirements of the Administrative Procedure Act ("APA"), as well as an important substantive oversight.

The Commission should therefore suspend its rules for VMES until it adequately addresses Boeing's concerns, which were threefold. First, Boeing argued that some VMES applications may not function as anticipated in all operational environments, which could result in harmful interference to other Ku-band spectrum users, specifically secondary AMSS operations that have no recourse. Second, Boeing argued that VMES networks could also cause harmful interference to primary FSS transmissions, which could result in such FSS operators requesting that AMSS operations shut down in order to determine if they are contributing to the interference conditions. Third, Boeing argued that, if ultra-small VMES terminals prove more susceptible to harmful interference than existing FSS terminals, VMES operators may seek cessation of adjacent AMSS networks to protect their higher status services.

Any of these scenarios could result in cessation of the critical aeronautical broadband services that Boeing currently provides to important U.S. Government officials. The appropriate way to address these concerns is to either broaden the definition of VMES to include AMES, or elevate AMSS to primary status in the Ku-

band. Such action would be technically neutral and serve the Commission's public interest goal of expanding mobile broadband services to underserved customers.

The Commission can also serve the goal of expanding mobile broadband services to underserved customers by modifying its new VMES rules governing the aggregate operations of code-division multiple access ("CDMA")-based VMES networks. CDMA technology allows more than one transmitter to use the same frequency channel at the same time, thereby more efficiently using spectrum. In the VMES Order, however, the Commission disadvantaged networks using such technologies by imposing the $10 \cdot \log(N)$ rule for networks with multiple simultaneously transmitting terminals, by requiring a 1 dB reduction in power or coordination with target and adjacent satellite operators and by precluding ALSAT authority.

Once the regulatory status of earth stations on aircraft is elevated to primary status in the Ku-band, the Commission should revise its rules for VMES networks to remove these unnecessary prophylactic measures that provide no additional interference protection to other users of Ku-band FSS spectrum. Alternatively, the Commission should clarify the appropriate application of the $10 \cdot \log(N)$ rule to variable power VMES networks.

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The Boeing Company (“Boeing”), by its attorneys and pursuant to Section 1.429(i) of the Commission’s Rules, 47 C.F.R. § 1.429(i), hereby submits the following petition for reconsideration of the Commission’s Report and Order released in the above-referenced docket.¹ In the VMES Order, the Commission arbitrarily and capriciously failed to address Boeing’s argument that licensing Vehicle-Mounted Earth Stations (“VMES”) as a primary application of the Fixed Satellite Service (“FSS”) without a concurrent elevation of Aircraft-Mounted Earth Stations (“AMES”) to a primary application of the FSS could result in harmful interference to important Aeronautical-Mobile Satellite Services (“AMSS”) operations. The Commission should elevate the

¹ See *Amendment of Parts 2 and 25 of the Commission’s Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service*, IB Docket No. 07-101, Report and Order, 24 FCC Rcd 10369, FCC 09-64 (rel. July 31, 2009) (“VMES Order”). The VMES Order was published in the Federal Register on November 4, 2009, 54 Fed. Reg. 57092.

regulatory status of satellite earth stations on aircraft to primary status in the Ku-band in order to promote technical neutrality and protect important aeronautical mobile broadband services.

Further, the Commission should reconsider and revise its licensing rules for VMES networks to authorize them on an ALSAT basis to operate at power levels up to the aggregate off-axis EIRP mask without the $10 \cdot \log(N)$ rule or an arbitrary 1 dB reduction in power, and without requiring coordination. Such a change would promote technical neutrality and serve the public interest by allowing operators of such networks to provide broadband services to the mass transportation market in the most spectrally efficient manner. Alternatively, the Commission should clarify the value of N for purposes of the $10 \cdot \log(N)$ rule for VMES networks that use variable power and code division multiple access (“CDMA”) technologies.

I. THE COMMISSION VIOLATED THE APA BY FAILING TO ADDRESS BOEING’S ARGUMENT THAT ESTABLISHING A PRIMARY ALLOCATION FOR VMES WITHOUT A CONCURRENT PRIMARY ALLOCATION FOR CO-FREQUENCY AMES WOULD RESULT IN HARMFUL INTERFERENCE TO IMPORTANT SERVICES

In its comments, Boeing argued that the Commission should not establish a primary allocation for VMES without concurrently elevating AMES to primary status in the band in part because failure to do so could result in harmful interference to important AMSS operations or potentially result in requests to cease AMSS operations. In violation of the APA, the Commission arbitrarily and capriciously failed to address in the VMES Order Boeing’s important concerns.

A. The Commission Should Provide Primary Status to Satellite Earth Stations on Aircraft to Avoid the Harmful Interference That Could Occur to Secondary AMSS As a Result of Primary VMES Operations

In its comments in response to the VMES Notice of Proposed Rulemaking, Boeing identified a number of interference concerns regarding the potential co-frequency operation of proposed VMES services and existing AMSS services. Boeing also made specific recommendations to address these concerns.

In the VMES Order, the Commission briefly addressed one of Boeing's proposals, but failed to address, or even acknowledge, Boeing's other concerns or proposals. Specifically, Boeing argued that, in order to promote the public interest and facilitate the widespread availability of mobile broadband services, the Commission should adopt technically-neutral regulations that do not discriminate against any particular technology or service based on mounting vehicle.² Boeing recommended that this be accomplished by modifying the definition of VMES to include both aeronautical-mounted and vehicle-mounted earth stations as primary applications of the FSS.³

In the VMES Order, the Commission acknowledged this proposal, but refused to adopt it. The Commission stated that the regulatory classification of satellite earth stations on aircraft is the subject of a separate proceeding that has "ongoing status" and

² See Comments of The Boeing Company, IB Docket No. 07-101 at 8-10 (August 17, 2007) ("Boeing Comments").

³ See Reply Comments of The Boeing Company, IB Docket No. 07-101 at 3-4 (September 4, 2007). Boeing recommended that aeronautical-mounted earth stations be included in the definition of VMES by modifying the definition so that it is no longer confined to vehicles that "travel primarily on land" and, as a result, Section 25.201 would read: "[a] VMES is an earth station, operating from a motorized vehicle that receives from and transmits to fixed-satellite space stations and operates pursuant to the requirements set out in § 25.XXX of this part." *Id.* at 4.

the use of earth stations on aircraft “may implicate technical and policy considerations not relevant to VMES.”⁴ In relying on these justifications, the Commission conveniently overlooked the fact that it has taken no public action on the AMSS proceeding since February 18, 2005 and therefore the Commission’s claim that the proceeding is “ongoing” is tenuous at best.⁵

In stark contrast to the Commission’s summary dismissal of Boeing’s technical neutrality argument, however, the Commission provided no response to, or acknowledgement of, Boeing’s more important arguments and proposal. Specifically, Boeing argued that, because of the multiple interference conditions that could result from the co-frequency operation of primary VMES and secondary AMSS networks, the Commission should refrain from authorizing VMES as a primary application of the FSS in the Ku-band until the regulatory status of earth stations on aircraft can be concurrently addressed (either in the VMES proceeding, or in the AMSS proceeding).⁶

The first harmful interference concern raised by Boeing was that, despite the best efforts of all involved, some VMES applications may not function as anticipated in all operational environments, raising the possibility of harmful interference to other Ku-band spectrum users. If such interference did occur, Boeing observed that operators of adjacent satellites and VSAT networks would presumably have adequate recourse under

⁴ VMES Order, 24 FCC Rcd at 10436-7, ¶ 74.

⁵ On February 18, 2005, the Commission released an erratum correcting minor errors in the Notice of Proposed Rulemaking in the AMSS proceeding that was released on February 9, 2005. *See Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Erratum, IB Docket 05-20 (Feb. 18, 2005).

⁶ *See* Boeing Comments at 9-10.

the Commission's rules to require cessation of the offending signals, but AMSS network operators would lack adequate administrative recourse to demand such corrective measures.⁷ Due to the classification of AMSS as a secondary allocation, incumbent AMSS network operators lack any right to protection from harmful interference from later-coming primary services.⁸

The second interference concern raised by Boeing also related to the possibility that VMES networks may cause harmful interference not just to secondary AMSS operations, but also to primary FSS transmissions. Due to the mobile nature of VMES terminals, the origins of such interference may often be difficult to determine. In such instances, operators of primary FSS networks, anxious to curtail harmful interference to their customers, may demand that co-frequency AMSS networks shut down in order to determine if they are contributing to the interference conditions.⁹

The third interference concern raised by Boeing was that, if ultra-small VMES terminals prove more susceptible to harmful interference than FSS terminals, VMES operators may seek cessation of adjacent AMSS networks to protect their higher status services.¹⁰ VMES operators that require elevated protection could also seek revocation or modification of coordination agreements between adjacent satellite operators that currently enable AMSS networks to operate on an effective and interference-free basis.

⁷ See Boeing Comments at 9.

⁸ *Id.*

⁹ See Ex Parte Notice From Bruce A. Olcott, Counsel to The Boeing Company, to Marlene H. Dortch, Secretary, Federal Communications Commission, IB Docket No. 07-101, at 2 (June 26, 2009).

¹⁰ See Boeing Comments at 10.

Each of these interference scenarios would result in cessation of critical services that Boeing provides to important U.S. Government officials. Boeing provides in-flight broadband connectivity to important U.S. Government aircraft transporting senior U.S. Government leadership.¹¹ Pursuant to a contract with the U.S. Air Force Materiel Command, Boeing provides advanced broadband services to more than a dozen Very Important Personnel/Special Air Mission aircraft operated by the U.S. Air Force Air Mobility Command to transport senior leadership of the U.S. Government and Department of Defense.¹² In short, Boeing explained that without a concurrent elevation to primary status for AMES, establishing a primary allocation for VMES could result in harmful interference to critical aeronautical broadband services.

Boeing's interference concerns are far from frivolous. The Commission itself raised interference concerns in the VMES NPRM, observing that primary VMES operations could cause harmful interference to other services in the Ku-band.¹³ The

¹¹ Boeing initially provided its aeronautical broadband service pursuant to a blanket earth station license issued by the Commission's International Bureau in December, 2001. *See The Boeing Company Application for Blanket Authority to Operate Up to Eight Hundred Technically Identical Transmit and Receive Mobile Earth Stations Aboard Aircraft in the 14.0-14.5 GHz and 11.7-12.2 GHz Frequency Bands*, Order and Authorization, 16 FCC Rcd 22645 (2001).

¹² *See* Call Sign WC2XVE. Typical applications for this contract include Internet, e-mail, video teleconferencing, server access, and access to Direct Broadcast Satellite television service compatible with the Boeing system.

¹³ *See Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service*, IB Docket No. 07-101, Notice of Proposed Rulemaking, 22 FCC Rcd 9649, 9657, 9672, 9681, FCC 07-86, ¶¶ 15, 50 and 72 (released May 15, 2007) ("VMES NPRM"). The Commission observed that "[w]hatever the design specifications of a VMES antenna tracking mechanism, the possibility exists that prevailing off-road conditions will cause design specifications to be exceeded." *Id.* at 9672, ¶ 50.

Commission's failure to address in the VMES Order these critically important interference concerns as they implicate existing AMSS operations was therefore not just a procedural error, but constituted a significant substantive oversight that must be corrected before the Commission permits its VMES rules to take effect.

The appropriate way to address the potential harmful interference to secondary AMSS operations is to either broaden the definition of VMES to include AMES, or elevate AMSS to primary status in the Ku-band – changes that could be made either in this proceeding or in the AMSS proceeding. Such changes would not only protect critically-important broadband communications services used by senior members of the U.S. government, but they would also have the added advantages of being technically-neutral and serving the Commission's public interest goal of expanding mobile broadband services to underserved customers, in this case providing broadband Internet and other communications services to customers in airplanes.

B. The Commission's Failure to Address Boeing's Argument Regarding Potential Harmful Interference to Secondary AMSS From Primary VMES in the VMES Order Was Arbitrary and Capricious and a Violation of the APA

The Commission's failure to address the affects of VMES on secondary AMSS networks was arbitrary and capricious in violation of the Administrative Procedure Act ("APA"). The Commission failed to address Boeing's argument raised in its comments that VMES operations could cause harmful interference to important AMSS services if AMES networks are not concurrently elevated to primary status. The Courts have consistently required that agencies consider all "relevant factors" when engaging in notice-and-comment rulemaking pursuant to section 553 of the APA. The Court of Appeals for the District of Columbia Circuit ("D.C. Circuit") has specifically overturned

Commission decisions for failing to address arguments in comments filed by parties and has clearly held that a petition for reconsideration is the appropriate forum to raise the fact that the Commission failed to address a party's comments.

The VMES Order was adopted after a notice-and-comment rulemaking pursuant to section 553 of the APA. Section 553 requires that an agency "give interested persons an opportunity to participate in the rule making through submission of written data..."¹⁴ It further requires that "[a]fter consideration of the relevant matter presented, the agency shall incorporate in the rules adopted a concise general statement of their basis and purpose."¹⁵ The Courts have given substantial deference to agencies and "will not intervene unless the Commission failed to consider relevant factors or made a manifest error in judgment."¹⁶

The D.C. Circuit has interpreted these requirements to mandate that the Commission address arguments raised by the parties. In one case, the D.C. Circuit overturned a Commission decision to retain the national television station ownership rule and the cable/broadcast cross-ownership rule as arbitrary and capricious in part because the Commission made "no response to Time Warner's argument that the concern with diversity cannot support an across-the-board prohibition of cross-ownership in light of the Commission's conclusions in the TV Ownership Order that common ownership of

¹⁴ 5 U.S.C. § 553(c).

¹⁵ *Id.*

¹⁶ See *American Radio League, Inc. v. FCC*, 524 F.2d 227, 233 (D.C. Cir. 2008) (quoting *Consumer Electronics Association v. FCC*, 347 F.3d 291, 300 (D.C. Cir. 2003) (citing *Office of Communications Inc. of the United Church of Christ v. FCC*, 327 F.3d 1222, 1224 (D.C. Cir. 2003)).

two broadcast stations in the same local market need not unduly compromise diversity.”¹⁷ The Commission’s argument was that Time Warner had failed to raise the issue. The Court found that Time Warner had raised the argument in supplemental comments, “but the Commission declined to consider them.”¹⁸ The Court determined that “the Commission simply failed to respond to the objections put before it.”¹⁹ The D.C. Circuit has also held that the appropriate remedial avenue for a Commission failure to address an argument raised in comments is a petition for reconsideration.²⁰

In this case, Boeing raised important interference concerns that would result if VMES systems were elevated to a primary application of the FSS without currently providing the same regulatory treatment to AMES operations. Regardless of the existence of a separate proceeding addressing service rules for earth stations on aircraft, the Commission’s failure to address the harmful interference conditions that could occur to important AMSS operations resulting from the designation of VMES as a primary application of the FSS was arbitrary and capricious in violation of the APA. The Commission should therefore promptly correct its oversight by suspending its rules for

¹⁷ Fox Television Stations, Inc. v. FCC, 280 F.3d 1027, 1052 (D.C. Cir. 2002).

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ See *Time Warner Entertainment Co. v. FCC*, 144 F.3d 75, 80 (D.C. Cir. 1998) (finding that the Court has required that a party first present its concerns to the Commission where the petitioners claimed the FCC violated the APA by failing to address comments in its rulemaking proceeding) (citing *Action for Children’s Television v. FCC*, 906 F.2d 752, 754-5 (D.C. Cir. 1990) (finding that although the parties agree that the Commission did not address the comments of ACT/UCC regarding programming, ACT/UCC was foreclosed from raising the issue before the Court because ACT/UCC did not bring the issue to the Commission’s attention in a petition for reconsideration)).

VMES operations in the Ku-band until comparable rules are adopted authorizing aircraft-mounted satellite earth stations to operate on a primary basis in the Ku-band.

II. THE COMMISSION SHOULD MODIFY ITS RULES GOVERNING THE AGGREGATE OPERATIONS OF CDMA-BASED VMES NETWORKS TO ENABLE THE MORE EFFICIENT USE OF SPECTRUM TO PROVIDE BROADBAND SERVICES

As discussed in Boeing's recent petition for reconsideration of the Earth Stations on Board Vessels ("ESV") Order on Reconsideration,²¹ the Commission recently released a Public Notice on Spectrum for Broadband requesting comment regarding, among other things, ways to use spectrum more efficiently to provide mobile wireless broadband service to unserved and underserved markets.²² The Spectrum for Broadband Public Notice requested comment on the spectrum bands that are best positioned to support mobile wireless broadband, and specifically sought comment on spectrum assigned to satellite services.²³ The Commission further sought comment regarding whether spectrum bands are being used in the most efficient and productive way to serve the public interest.²⁴

One of the spectrum bands that has long been used to provide wireless broadband services to underserved areas is the FSS spectrum allocation in the 11.7-12.2 GHz and 14.0-14.5 GHz bands ("Ku-band"). The Ku-band FSS allocation is currently used to

²¹ See Petition for Reconsideration of The Boeing Company, IB Docket No. 02-10 (filed Oct. 15, 2009).

²² See Comment Sought on Spectrum for Broadband, Public Notice, DA 09-2100 (Sept. 23, 2009) ("Spectrum for Broadband Public Notice").

²³ See *id.* at 5.

²⁴ See *id.* at 6.

provide broadband services to fixed receivers, including two-way broadband Internet access services to homes, businesses, and public institutions in remote locations. The broadband services provided by Ku-band FSS networks serve important public interest goals in part because they are available to consumers anywhere in the country, including inaccessible locations that are unserved by terrestrial wireline and wireless networks.

Ku-band FSS networks are also increasingly being used to provide broadband wireless services to *mobile* receivers in order to serve additional underserved market segments such as ships at sea, aircraft and mass transportation vehicles, all of which Boeing has served. The Commission's new VMES rules, however, do not permit VMES network operators to use this spectrum in the most efficient manner.

In the VMES Order, the Commission adopted a new aggregate power-density rule for VMES systems that use co-frequency dynamic power transmissions. Consistent with its ESV rules, the Commission imposed the $10 \cdot \log(N)$ rule for VMES systems where multiple co-frequency earth stations are simultaneously transmitting. Because it determined that "VMES is a new service that does not yet have as extensive a track record as VSAT and ESV earth stations in meeting the two-degree spacing interference avoidance requirements of the Ku-band FSS," the Commission required that applicants demonstrate that the VMES network will operate at 1 dB below the EIRP density mask.²⁵ VMES networks, however, are permitted to operate in excess of the EIRP spectral density mask if they coordinate with the target satellite operator and operators of satellites within six degrees longitude of the target satellite.²⁶ The Commission also

²⁵ VMES Order, 24 FCC Rcd at 10450, ¶ 116.

²⁶ *See id.*, at 10451, ¶ 118.

determined that such dynamic power-density system applicants are precluded from seeking ALSAT authority.²⁷

Although the Commission is correct in concluding that VMES is a new service that is relatively untested, this conclusion cannot be made regarding the use of CDMA-based technologies and variable power control to provide broadband satellite services to mobile platforms. Proven technologies are in use today in mobile Ku-band FSS networks that ensure that dynamic power CDMA-based mobile networks do not exceed the off-axis EIRP density limits specified in the Commission's rules. Boeing has successfully provided dynamic power CDMA-based mobile broadband service to aircraft for many years without resulting in complaints of harmful interference to other users of Ku-band FSS spectrum. The use of these same CDMA-based variable power control technologies to provide satellite services to other types of mobile platforms raises no additional technical challenges.

Therefore, in order to promote technical neutrality and the most efficient use of Ku-band spectrum for mobile broadband services, the Commission should reconsider and revise its VMES rules to specifically authorize variable power CDMA systems to operate on an ALSAT basis up to the aggregate off-axis EIRP spectral density mask without the $10 \cdot \log(N)$ rule or a 1 dB reduction in power, and without requiring target or adjacent satellite coordination. No public interest justification exists for such restrictions. Such prophylactic measures provide no additional interference protection to other users of Ku-band FSS spectrum, and instead inhibit the ability of dynamic power CDMA-based

²⁷ See *id.* at 10451, ¶ 117.

VMES networks to use spectrum in its most efficient manner to provide mobile broadband services to consumers.

Obviously, such changes to the recently-adopted VMES rules should not be implemented unless and until the regulatory status of important AMSS networks is addressed in the manner requested in the opening sections of this Petition. Such changes to the operating rules for VMES and AMES networks would allow the Commission to serve its goal of technical neutrality and the public interest by promoting the most efficient use of spectrum for the provision of mobile broadband services to the underserved aeronautical and vehicular mass transportation markets.

III. ALTERNATIVELY, THE COMMISSION SHOULD CLARIFY SECTION 25.226 OF ITS RULES TO DEFINE THE VALUE OF N FOR PURPOSES OF THE $10 \cdot \log(N)$ RULE FOR CDMA-BASED VARIABLE POWER VMES NETWORKS

As discussed above, the VMES rules adopted by the Commission state that the effective aggregate EIRP density from all VMES terminals shall be at least 1 dB below the off-axis EIRP-density limits defined in 25.226(a)(1)(i)(A)-(C), unless the system is certified for higher power levels by the target satellite operator.²⁸ Section 25.226(a)(1)(i)(A) defines N for FDMA and TDMA systems as one, and defines N for VMES networks using multiple co-frequency transmitters *that have the same EIRP*, as the maximum expected number of co-frequency simultaneously transmitting VMES earth stations in the same satellite receiving beam.²⁹ The rule, however, does not define N for

²⁸ See VMES Order, 24 FCC Rcd at 10493, Appendix B, Section 25.226(a)(3)(i),(ii).

²⁹ See *id.* at 10491-2, Appendix B, Section 25.226(a)(1)(i)(A).

CDMA systems with variable power transmitters, *i.e.*, multiple transmitters that do not have the same EIRP.

In order to correct this omission, Section 25.226(a)(3)(i) should be clarified to state that “the effective aggregate EIRP-density from all terminals shall be at least 1 dB below the off-axis EIRP-density limits defined in (a)(1)(i)(A)-(C), assuming N equals one.”³⁰ Granted, such a solution would not promote the same level of spectral efficiency for the provision of mobile broadband services as the changes requested by Boeing in the immediately preceding section of this Petition. Such a change, however, would provide needed clarity to current and future providers of mobile broadband wireless services to the currently underserved vehicular mass transportation market.

IV. CONCLUSION

The Commission should suspend its rules for VMES until the Commission adequately addresses concerns raised by Boeing regarding harmful interference that could occur to existing AMSS networks in the Ku-band. Specifically, the Commission should either modify the definition of VMES to include AMES, or elevate AMSS to primary status in the Ku-band. Such action is necessary in order to ensure that AMSS networks are adequately protected and have adequate recourse to address possible interference from newly deployed VMES systems.

In the VMES Order, the Commission failed to address Boeing’s argument that, without a primary allocation for AMES, critically important AMSS operations could receive harmful interference or be required to cease operations. The Commission’s

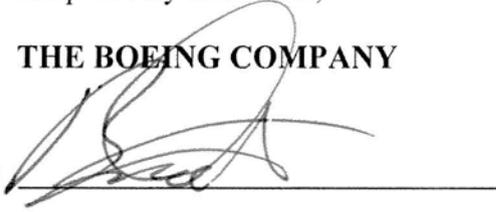
³⁰ A corresponding clarification would be necessary for Section 25.226(b)(3)(i).

failure to address this important concern was a violation of the notice-and-comment requirements of the APA.

In addition, in order to promote the Commission's mobile wireless broadband goals and most efficiently use allocated spectrum, the Commission should concurrently revise its VMES rules to further facilitate the use of Ku-band FSS spectrum to provide mobile broadband service to underserved markets. Specifically, the Commission should modify its VMES rules to authorize CDMA-based variable power VMES networks to provide broadband service at power levels up to the aggregate off-axis EIRP limits without imposing the $10 \cdot \log(N)$ rule or a 1 dB reduction in power, and without requiring coordination. Alternatively, the Commission should clarify the appropriate application of the $10 \cdot \log(N)$ rule to variable power VMES networks.

Respectfully submitted,

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