

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of the Commission’s Rules with Regard to Commercial Operations in the 1695- 1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands)	GN Docket No. 13-185
)	
Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band)	WT Docket No. 07-195 (Proceeding Terminated)
)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020- 2025 MHz, and 2175-2180 MHz Bands)	WT Docket No. 04-356 (Proceeding Terminated)
)	
Applications for License and Authority to Operate in the 2155-2175 MHz Band)	WT Docket No. 07-16 (Proceeding Terminated)
)	
Petitions for Forbearance Under 47 U.S.C. § 160)	WT Docket No. 07-30 (Proceeding Terminated)
)	

REPLY COMMENTS OF DISH NETWORK CORPORATION

I. INTRODUCTION AND SUMMARY

DISH Network Corporation (“DISH”) submits these reply comments in response to the Notice of Proposed Rulemaking (“*Notice* or *NPRM*”) in the above-captioned proceeding to adopt rules for the 1695-1710, 1755-1780, 2020-2025, and 2155-2180 MHz bands (collectively, “AWS-3”).¹ DISH supports the Commission’s goals of freeing additional spectrum to “help ensure that the speed, capacity, and ubiquity of the nation’s wireless networks keeps pace with the skyrocketing demand for mobile service.”² DISH believes that the Commission’s proposals,

¹ See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands, *Notice of Proposed Rulemaking*, GN Docket No. 13-185 (rel. July 23, 2013) (“AWS-3 *NPRM*”).

² *Id.* ¶ 1.

with the modifications described below and supported in the record, will help achieve the goals of clearing and allocating the AWS-3 bands to be auctioned for exclusive or shared commercial use.³

In particular, to mitigate interference and maximize spectrum utility, the Commission should designate the Lower J Block (2020-2025 MHz) for downlink use if the adjacent AWS-4 spectrum band at 2000-2020 MHz is also used for downlink. In addition, DISH supports pairing the 1755-1780 MHz band with the 2155-2180 MHz band,⁴ as well as the Commission's proposal to give the winner of 1755-1780 MHz the right to negotiate coordination agreements with affected Federal incumbent users of that band.⁵ Finally, DISH urges the Commission to adopt a power limit of 25 dBm EIRP (23 dBm \pm 2 dBm) for mobiles and portables in the 1695-1710 MHz and 1755-1780 MHz bands to maximize the utility of this spectrum for mobile broadband use.

II. THE COMMISSION SHOULD DESIGNATE THE LOWER J BLOCK (2020-2025 MHz) FOR DOWNLINK USE IF THE ADJACENT AWS-4 OPERATOR OPERATES IN DOWNLINK MODE

The Commission's current proposal to designate the Lower J Block for uplink use would leave Lower J Block operations vulnerable to significant interference from adjacent Federal government and Broadcast Auxiliary Service ("BAS") users. However, auctioning the Lower J Block as a stand-alone downlink band, consistent with DISH's recent proposal,⁶ presents a path forward to provide better harmonization with the adjacent BAS and AWS-4 bands, thus

³ *Id.*

⁴ *Id.* ¶ 33.

⁵ *Id.* ¶¶ 159-160.

⁶ See DISH Network Corporation, Petition for Waiver of Sections 27.5(j) and 27.53(h)(2)(ii) and Request for Extension of Time (filed Sept. 9, 2013) ("DISH Petition").

maximizing the use of this spectrum and incentivizing bidders to participate more robustly in the upcoming AWS-3 auction.

A. If Designated for Uplink Use, Lower J Block Operations Would Suffer Interference from Adjacent Federal Government and BAS Users, Undermining the Utility of the 2020-2025 MHz Band

If the J Block is auctioned for uplink use, consistent with the Commission's proposal in the *AWS-3 NPRM*, future J Block operations would be vulnerable to significant interference from BAS and Federal government users. DISH examined potential uplink operations in the Lower J Block in a previously-filed technical report (the "DISH Study").⁷ The DISH Study found that J Block base stations receiving transmissions from mobile devices will not be able to effectively filter out high power emissions from above 2025 MHz without an adequate frequency separation between the 2020-2025 and 2025-2110 MHz bands. The DISH Study concluded that a 5 MHz guard band is essential to protect an adjacent uplink operation from high power BAS and government transmitters above 2025 MHz.⁸ To achieve the necessary frequency separation, the J Block would be beyond efficient usability.

The DISH Study reached this conclusion despite aggressive assumptions with respect to filter design and the ability of base station vendors to surpass minimum 3GPP specifications for base station adjacent channel selectivity. Despite these assumptions, the high power emissions from the 2025-2110 MHz band would overwhelm base station receivers employing reasonable filtering technologies absent a 5 MHz separation between Lower J Block operations and those

⁷ See Letter from Jeffrey H. Blum, DISH Network Corporation, to Marlene H. Dortch, Secretary, FCC, WT Docket Nos. 12-70 and 04-356; ET Docket No. 10-142, Attachment: S Band Interference from 2025-2110 MHz (Sept. 17, 2012).

⁸ *Id.* at 16.

above 2025 MHz. Nor could physical coordination between the Lower J Block and BAS operators effectively address interference concerns.⁹

While the Engineers for the Integrity of Broadcast Auxiliary Service Spectrum (“EIBASS”) agree with the DISH Study’s conclusion that BAS operations pose an interference risk to the J Block if configured for uplink use,¹⁰ they assert that this interference risk is manageable. This is based on their observation that coordination and filtering solutions utilized to protect BAS receive sites from PCS/AWS base stations have been successful. However, the PCS/AWS to BAS interference scenario does not serve as an appropriate representation of the BAS to J Block interference scenario and EIBASS fails to consider several factors that make BAS transmissions into J Block base stations more problematic than the PCS/AWS to BAS interference scenario.

B. Designating the Lower J Block for Downlink Use Presents Potential Solutions to Mitigate Interference Issues, but Only if the Lower AWS-4 Band is also Harmonized for Downlink Use

1. If Designated for Downlink Use, the Lower J Block Could Be Coordinated to Protect Adjacent BAS Users

If the Lower J Block is designated for downlink use adjacent to the lower BAS band edge (2025 MHz), any potential interference to BAS operations could be managed using techniques analogous to the existing AWS-1 downlink and BAS arrangement (the AWS-1 downlink band is adjacent to the upper BAS band edge (2110 MHz) without any guard band).

T-Mobile, an AWS-1 licensee, has a successful track record on managing its AWS-1 deployment adjacent to the BAS band, and has reported that over 95% of BAS licensees have not

⁹ *Id.*

¹⁰ *See* EIBASS Comments at 9-10.

experienced any interference issues.¹¹ AWS-1 deployment was further coordinated with BAS licensees by other techniques, including a special blocking filter to protect BAS operation where necessary. Similar coordination and filtering solutions can be applied between the J Block and BAS bands if the J Block is designated for downlink use, effectively mitigating interference concerns.

2. Using the Lower J Block for Downlink Would Cause Interference to the Lower AWS-4 Band if the Lower AWS-4 Band is Used for Uplink

The Lower J Block should be auctioned as a downlink band only if the adjacent AWS-4 spectrum is also being used for downlink, consistent with DISH's recently filed waiver petition and extension of time (the "DISH Petition").¹² Using the Lower J Block as downlink would increase the risk of harmful interference to the AWS-4 band if that band is being used for uplink, resulting in the need for highly restrictive technical rules that will leave the J Block severely impaired.

In this scenario, the AWS-4 base station reception will be vulnerable to blocking and out-of-band emission ("OOBE") interference from J Block base station transmissions, and the J Block downlink transmit power and OOBE would need to be severely restricted to provide adequate isolation to the AWS-4 band.¹³ Interference issues arising from such uplink/downlink adjacency scenarios are chronicled in detail in the recent AWS-4 and H Block proceedings, including harsh technical remedies the Commission imposed to address the resulting interference

¹¹ See T-Mobile, AWS/BAS Frequency Coordination Technical Overview (March 12, 2012), available at <http://transition.fcc.gov/bureaus/oet/receiver-workshop1/Session4/SESSION-4-3-Wilson-TMobile.pdf>

¹² See DISH Petition.

¹³ See AWS-3 NPRM ¶ 44.

concerns.¹⁴ Given the fact that the J Block is allocated as a 5 MHz block, such transmit power and OOB restrictions will be overly burdensome and severely hamper the J Block's utility.

Therefore, if the lower AWS-4 band at 2000-2020 MHz is used for uplink operations, the Lower J Block should be designated for uplink in order to protect AWS-4.

3. Harmonizing the Lower J Block and the Lower AWS-4 Band to Both Operate as Downlink Best Resolves Potential Interference Challenges

If the lower AWS-4 band is operated as a downlink, then the Lower J Block should also be designated for downlink. The record reflects agreement that harmonizing the J Block and the Lower AWS-4 band for downlink use, consistent with the DISH Petition,¹⁵ would help resolve interference issues concerning the J Block and adjacent operations. T-Mobile acknowledged that “[t]he most appropriate use of the 2020-2025 MHz band is also contingent on the outcome of the waiver recently sought by DISH” noting that “[b]ecause this spectrum is immediately adjacent to 2020- 2025 MHz, reversing the direction of use [of the AWS-4 band] would generally require that 2020-2025 MHz also be used for downlink operations.”¹⁶ Similarly, Ericsson's concerns that “the Commission's proposed duplex direction of the 2020-2025 MHz band could create coexistence issues in the 2000-2020 MHz band depending on the outcome of the DISH waiver”¹⁷ would be resolved if the AWS-4 band and J Block were harmonized for downlink use.

¹⁴ See Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, *Report and Order and Order of Proposed Modification*, WT Docket Nos. 12-70, 04-356; ET Docket No. 10-142, 27 FCC Rcd. 16102, ¶¶ 57-97 (2012) (“*AWS-4 Order*”); Service Rules for Advanced Wireless Services H Block, *Report and Order*, WT Docket No. 12-357, 28 FCC Rcd. 9483, 9526 ¶¶ 49-74 (2013) (“*H Block Order*”).

¹⁵ See DISH Petition.

¹⁶ See T-Mobile comments at 27-28.

¹⁷ See Ericsson Comments at 24.

If the Commission grants the DISH Petition and if DISH elects to operate the lower AWS-4 band for downlink operations, this will provide a path forward for an AWS-3 auction that includes the Lower J Block for downlink use. By harmonizing the AWS-4 band with the adjacent Lower J Block for downlink use, the Commission can also provide increased protection and utility for both bands. The arrangement could spur substantial economic benefits resulting from harmonized operations, thereby enhancing the viability and value of the J Block at auction.

III. THE COMMISSION SHOULD PAIR THE 1755-1780 MHZ BAND WITH THE 2155-2180 MHZ BAND

The record overwhelmingly supports pairing the 1755-1780 MHz band with the 2155-2180 MHz band,¹⁸ as outlined in the *NPRM*.¹⁹ DISH agrees with the Commission's proposition that the 1755-1780 MHz spectrum "could be paired with the 2155-2180 MHz band to symmetrically extend the AWS-1 band."²⁰ In order to expeditiously repurpose the 1755-1780 MHz band for mobile broadband use, DISH further supports the *NPRM*'s proposal to give the winner of 1755-1780 MHz band the right to negotiate coordination agreements with affected Federal incumbent users of the band.²¹ As Commissioner Rosenworcel explained, the 1755-1780 MHz and 2155-2180 MHz bands "are a more valuable resource auctioned together. At the

¹⁸ See 4G Americas Comments at 1-5; AT&T Inc. Comments at 2; Competitive Carriers Association Comments at 3-5; CTIA Comments at 10-12; Mobile Future Comments at 8-9; Motorola Mobility LLC Comments at 4-5; Nokia Solutions Networks Comments at 20; T-Mobile USA, Inc. Comments at 13-14; Telecommunications Industry Association Comments at 10; United States Cellular Corporation Comments at 10-13; Verizon Wireless Comments at 15-17.

¹⁹ See *AWS-3 NPRM* ¶ 33.

²⁰ *Id.*

²¹ *Id.* ¶¶ 159-160.

same time, it is important for this agency to find a way to respect the existing federal uses in the band, including the national defense.”²²

IV. THE COMMISSION SHOULD ADOPT A POWER LIMIT FOR MOBILES AND PORTABLES OPERATING IN THE 1695-1710 MHZ AND 1755-1780 MHZ BANDS CONSISTENT WITH INDUSTRY STANDARDS

DISH urges the Commission to adopt a power limit of 25 dBm EIRP (23 dBm \pm 2 dBm) for mobiles and portables in the 1695-1710 MHz and 1755-1780 MHz bands, which is consistent with the current 3GPP User Equipment (“UE”) specifications. Commenting parties agree that the Commission’s proposed 20 dBm EIRP limit is too restrictive,²³ and further agree that a limit of 25 dBm EIRP is more consistent with industry standards and should be adopted.²⁴ The proposed 25 dBm EIRP mobile power limit should be adopted because this limit is required to meet 3GPP Class 3 UE power requirement (23 dBm) with the specified 2 dB tolerance. In addition, a 25 dBm mobile power limit in the 1695-1710 MHz and 1755-1780 MHz bands will allow future AWS-3 licensees to leverage the existing LTE device ecosystem and economies of scale.²⁵

²² *Id.* at p.99: Statement of Commissioner Jessica Rosenworcel.

²³ *See* AT&T Inc. Comments at 12; CTIA Comments at 26-27; Ericsson Comments at 7; Motorola Mobility LLC Comments at 6-9; Nokia Solutions Networks Comments at 20-21; T-Mobile USA Inc. Comments at 31-32.

²⁴ *See* AT&T Inc. Comments at 12; Ericsson Comments at 7; Motorola Mobility LLC Comments at 6-9; Nokia Solutions Networks Comments at 20-21; T-Mobile USA Inc. Comments at 31-32; Verizon Wireless Comments at 24.

²⁵ *See H Block Order* ¶ 110 (“Notably, in performing the testing and reaching the recommendations, the tests all were conducted assuming an LTE mobile device operating at the maximum power level indicated in the 3GPP LTE specifications—23 dBm. Consequently, adopting a power limit at 300 milliwatts (23 dBm, plus a 2 dBm tolerance) will enable the most likely H Block devices to operate without suffering any actual power restriction. That is, this power limit will permit mobile devices using LTE technology to operate at full power based on their design specifications.”).

A. The Record Reflects Agreement that the Commission’s Proposed Uplink Power Limit is Too Restrictive

The record reflects broad agreement that the Commission’s proposed 20 dBm EIRP is too restrictive, and therefore not appropriate for the AWS-3 band.²⁶ While the Commission noted its intent to adopt flexible-use service rules for the AWS-3 band and to not mandate the use of any industry standard,²⁷ it is clear that LTE is the leading candidate technology future AWS-3 licensees will utilize for the bands. However, the *NPRM*’s proposed EIRP power limit of 20 dBm for mobiles and portables operating in the 1695-1710 MHz and 1755-1780 MHz bands is 3 dB lower than the nominal 23 dBm limit 3GPP requires for Class 3 UEs.²⁸ When accounting for the ± 2 dB power tolerance 3GPP permits, the proposed 20 dBm level could be, in the worst case, as much as 5 dB lower than what the standard allows.²⁹ The uplink is the limiting link which determines the wireless coverage range and the proposed 20 dBm mobile power limit would severely limit the coverage the bands can afford. For example, a 3 dB mobile transmit power reduction in the 1695-1710 MHz band causes an 18% reduction in coverage range, corresponding to a 48% reduction in coverage area.³⁰ DISH’s proposed 25 dBm EIRP, on the other hand, will increase the utility and value of the bands by ensuring full power LTE device operations.

²⁶ See AT&T Inc. Comments at 12; CTIA Comments at 26-27; Ericsson Comments at 7; Motorola Mobility LLC Comments at 6-9; Nokia Solutions Networks Comments at 20-21; T-Mobile USA Inc. Comments at 31-32.

²⁷ See *AWS-3 NPRM* ¶ 102.

²⁸ *Id.*

²⁹ See 3GPP TS 36.101 v.12.0.0 Table 6.2.2-1, Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception, *available at* <http://www.3gpp.org/ftp/Specs/html-info/36101.htm> (3GPP assumes 0 dBi antenna gain).

³⁰ Simulated coverage range and area are obtained by applying COST123-Hata urban propagation model.

B. Protection Zones Will be Adequately Protected

In the *AWS-3 NPRM*, the Commission rationalized that the proposed 20 dBm mobile power limit in the 1695-1710 MHz and 1755-1780 MHz bands is necessary because NTIA-recommended Protection Zones are defined with an assumption that typical LTE devices operating at a maximum EIRP of 20 dBm.³¹ DISH believes, however, that applying the 20 dBm limit to all devices operating in the bands regardless their proximity to the designated Protection Zones is neither warranted nor necessary, and will negatively impact service to populations outside of the 27 enumerated Protection Zones.³²

DISH's proposed 25 dBm EIRP mobile power limit will benefit 90% of the US population base located outside the Protection Zones, while the network can impose a suitable mobile power limit around the Protection Zones to safeguard federal meteorological receive sites. DISH notes that individual LTE sites can limit the maximum device power level by signaling P-Max value directly to devices³³ and sites in the immediate vicinity of the Protection Zones can be programmed to enforce the limit accordingly. This way, AWS-3 devices operating outside the Protection Zones will be able to utilize their maximum power capability, while being limited to an acceptable maximum power level around the Protection Zones. The proposed scheme will not enlarge the Protection Zone sizes because devices around the Protection Zones

³¹ See *AWS-3 NPRM* ¶ 103.

³² See Commerce Spectrum Management Advisory Committee, Final Report Working Group 1 – 1695-1710 MHz Meteorological-Satellite Rev. 1, at Appendix 1.1: Table 2 (July 23, 2013), available at http://www.ntia.doc.gov/files/ntia/publications/wg1_report_07232013.pdf.

³³ See 3GPP TS 36.331 v11.4.0, Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, p. 171, available at <http://www.3gpp.org/ftp/Specs/html-info/36331.htm>.

will still be limited to the same maximum output power level on which the Protection Zone boundaries are based.

DISH also believes that applying the 3GPP nominal UE maximum output power to NTIA's Protection Zone analysis would not significantly impact the current Protection Zone sizes because, as the CSMAC report shows,³⁴ the mobile power level seldom reaches the maximum power level and the suggested increase in mobile maximum power would not skewer the result by much in such probabilistic analysis. DISH notes that the aggregate mobile power level, which determines the Interference Power Spectral Density level, can also be controlled by limiting the number of simultaneously transmitting mobiles around the Protection Zones, rather than limiting the mobile maximum power, in order to preserve the current Protection Zone boundaries. Limiting the number of simultaneous mobile transmissions has an added advantage of providing protection while preserving wireless coverage footprints typical LTE devices can support.

V. CONCLUSION

DISH shares the Commission's goals of freeing up additional spectrum for mobile broadband. The Commission's proposals, with the modifications proposed by DISH and supported in the record, will help ensure that interference from adjacent users is minimized and provides a path forward for efficiently utilizing the AWS-3 bands.

³⁴ Commerce Spectrum Management Advisory Committee, Final Report Working Group 1 – 1695-1710 MHz Meteorological-Satellite Rev. 1, at Appendix 3-4: Tabulated CDF Data (July 23, 2013), *available at* http://www.ntia.doc.gov/files/ntia/publications/wg1_report_07232013.pdf.

Respectfully submitted,

/s/

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