

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

In the Matter of	)	
	)	
Allocation and Service Rules for the 1675–1680	)	WT Docket No. 19-116
MHz Band	)	

**COMMENTS OF SNR WIRELESS LICENSECO, LLC**

**I. INTRODUCTION**

SNR Wireless LicenseCo, LLC (“SNR”) respectfully submits these comments in response to the notice of proposed rulemaking in the above-captioned proceeding proposing to add co-primary non-federal, fixed and mobile service allocations to the 1675–1680 MHz (“1.6 GHz”) band.<sup>1</sup> SNR supports the general effort of the Federal Communications Commission (“FCC” or the “Commission”) “to spur innovation and investment in new wireless technologies,”<sup>2</sup> but reallocation here would be counterproductive unless the FCC ensures that any technical and service rules the FCC adopts protect the reasonable investment-backed expectations of AWS-3 licensees operating in the nearby 1695–1710 MHz band.<sup>3</sup>

Specifically, the FCC should require that 1.6 GHz licensees coordinate with federal operators in the adjacent 1675–1695 MHz band to establish an interference budget and monitoring process that does not negatively impact the interference budget and monitoring process for AWS-3 operators protecting federal operations in the same band. The 1.6 GHz licensees also should bear the costs of any additional compliance or monitoring obligations and operational burdens imposed on AWS-3 licensees or federal operators.

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<sup>1</sup> *Allocation and Service Rules for the 1675–1680 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 19-116, FCC 19-43 (rel. May 13, 2019); *see also* 84 FR 23498.

<sup>2</sup> *Id.* at ¶ 4.

<sup>3</sup> AWS-3 is allocated for 1695–1710 MHz (uplink), 1755–1780 MHz (uplink), 2155–2180 MHz (downlink). *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610 ¶ 2 (2014) (“AWS-3 R&O”).

## II. DISCUSSION

**a. The FCC should ensure that any technical and service rules it adopts protect the reasonable investment-backed expectations of AWS-3 licensees.**

The frequencies surrounding the 1.6 GHz band are or will soon be heavily used by other operators and services. The 1675–1695 MHz band is allocated for federal meteorological satellite and radiosonde operations.<sup>4</sup> The 1695–1710 MHz band, one of the AWS-3 bands auctioned a few years ago by the Commission, is allocated for fixed and mobile services.<sup>5</sup> In 2014, recognizing the importance of federal operations in the 1675–1695 MHz band, the FCC took action in advance of the auction of the adjacent AWS-3 spectrum to protect federal users from potential interference from AWS-3 out-of-band emissions.<sup>6</sup> Specifically, the Commerce Spectrum Management Advisory Committee (“CSMAC”) Working Group 1 analyzed coexistence between the AWS-3 and federal operations, and developed protection criteria, including an interference budget, to ensure that commercial AWS-3 licensees can coexist with federal users in the adjacent 1675–1695 MHz band without “loss of capability” for the federal users.<sup>7</sup> CSMAC’s analysis, however, did not consider in those calculations or in the interference budget additional interference resulting from commercial downlink operations in the 1.6 GHz band.

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<sup>4</sup> 47 C.F.R. § 2.106.

<sup>5</sup> See *supra* note 3.

<sup>6</sup> For example, the National Oceanic and Atmospheric Administration, Department of Defense, and Department of Interior receive data from Geostationary Operational Environmental Satellites using frequencies between 1673 and 1694.5 MHz. Non-federal users also receive this data. Federal users also receive data from Polar-orbiting Operational Environmental Satellites using the 1695–1710 MHz band. See *Transition Plans and Transition Data for the 1695-1710 MHz Band*, NTIA (Oct. 29, 2015), available at <https://bit.ly/2WHdQbO>.

<sup>7</sup> The report also addressed the impact to federal operations in the 1695–1710 MHz band. See *Final Report: Working Group 1 – 1695-1710 MHz Meteorological-Satellite*, App. 1: A Framework for Federal Spectrum Sharing Rules for the 1695-1710 MHz Band, Commerce Spectrum Management Advisory Committee, at 1 (Jan. 22, 2013), available at <https://bit.ly/31yYyti> (“CSMAC Report”). The protection requirement and method of coordination were adopted prior to Auction 97 as section 27.1134(c) of the FCC’s rules. 47 C.F.R. § 27.1134(c); see also *AWS-3 R&O*.

The CSMAC Working Group 1 developed protection distances around each identified meteorological earth station within which commercial AWS-3 operators in the 1695–1710 MHz band must coordinate with federal users.<sup>8</sup> This coordination must be based on a recommended interference threshold, which CSMAC Working Group 1 calculated for each earth station based on the specific technical characteristics of each receiver.<sup>9</sup> This created a coordination zone around each earth station based on maximum aggregate interference within which commercial AWS-3 operations in the 1695–1710 MHz band must be coordinated. The CSMAC process, which had broad wireless industry participation, was critical for the protection of federal users and the delineation of operational parameters for AWS-3 licenses.

This discussion and the CSMAC report and conclusions formed the basis of AWS-3 auction participants' expectations for use of the band. Accordingly, the FCC should ensure that technical and service rules adopted for the 1.6 GHz band protect the reasonable investment-backed expectations of adjacent-band mobile licensees.

**b. The FCC should require 1.6 GHz stakeholders to engage in frequency coordination with federal operators and establish an interference budget and monitoring process.**

To protect the interests of both AWS-3 licensees and the federal users, 1.6 GHz stakeholders, including potential 1.6 GHz auction bidders, should engage in coordination with federal operators to establish an interference budget and monitoring process. Such coordination and monitoring can be based on processes and requirements already established for AWS-3 licensees.

If the Commission does not consider the indirect impact to AWS-3 licensees in this rulemaking proceeding, reallocation of the 1.6 GHz band would result in significant and

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<sup>8</sup> Coordination is required within the protection zones for devices with a maximum Effective Isotropic Radiated Power ("EIRP") of 20 dBm or less. For devices with an EIRP of more than 20 dBm up to the maximum 30 dBm, coordination is required nationwide. *See* CSMAC Report.

<sup>9</sup> *See* CSMAC Report, App. 7, Table 4 at 9–10 (showing the interference protection criteria for each earth station).

unanticipated negative impact to AWS-3 operations. Widespread deployment in the 1.6 GHz band would increase interference to federal users' earth stations in the 1675–1695 MHz band and reduce the interference budget available for AWS-3 licensees. Because the protection zones for federal users' earth stations must take into account the reduction in the interference budget available to AWS-3 licensees, any such reduction would limit the number of AWS-3 mobile devices that could operate within the coordination zones, degrading the AWS-3 service and upsetting the reasonable investment-backed expectations of Auction 97 licensees. For example, a 50-50 split of the AWS-3 interference budget between 1.6 GHz licensees and AWS-3 licensees would require AWS-3 licensees to deploy twice as many base stations in affected areas, dramatically increasing the cost of deploying an AWS-3 network in those areas.<sup>10</sup>

To ensure accountability, 1.6 GHz stakeholders should undertake a three-step process. First, they should engage with the federal users to establish an interference budget for 1.6 GHz band operations. Second, they should go through the CSMAC process to determine protection criteria and coordination zones, taking into account the interference budget determined in the first step described immediately above.<sup>11</sup> Third, the eventual 1.6 GHz licensees should participate in the RF monitoring process that is being established by federal operators and AWS-3 licensees.<sup>12</sup> This three-step process would ensure the same rigor in the allocation and

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<sup>10</sup> A 50-50 split in the operational interference budget would result in a 3 dB reduction of allowed operational interference into federal earth stations from AWS-3 licensees. To meet the lower interference budget and support the same number of mobiles as without the 3 dB decrease, AWS-3 mobile devices would need to transmit with an average of 3 dB less power. This reduction in power would result in a 29% decrease in site radius and a 50% decrease in each site's coverage area. Thus, twice as many base stations would be required to cover the same area. *See* Reply Comments of SNR, RM-11681, at 6-7 (filed Aug. 11, 2016).

<sup>11</sup> In addition to protecting other users of the spectrum, the CSMAC process has the added benefit of allowing broad industry participation.

<sup>12</sup> *Amendment to the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610 ¶ 19 (2014) ("Federal incumbents plan to develop and deploy real-time spectrum monitoring systems for the 1695-1710 MHz band.").

assignment of commercial licensees in the 1.6 GHz band as was applied to nearby bands, and fairly protect the operations of affected spectrum users.

**c. The 1.6 GHz licensees should bear all costs associated with the increased burdens on AWS-3 licensees and federal operators.**

To protect the interests of federal operators and the reasonable investment-backed expectations of AWS-3 licensees,<sup>13</sup> the 1.6 GHz licensees should bear the costs associated with the coordination processes discussed above.<sup>14</sup> Such costs would include expanding the currently proposed RF monitoring system to include the monitoring of base station transmissions from the 1.6 GHz band and to distinguish 1.6 GHz transmissions from AWS-3 uplink transmissions and ensure that the respective interference budgets can be independently enforced.

Additionally, 1.6 GHz licensees should be responsible for operational expenses incurred by AWS-3 licensees to address base station to base station interference issues. Base station transmissions at 1.6 GHz, which are separated from 1695–1710 MHz commercial uplink operations by only 15 megahertz, could cause interference to AWS-3 base stations through in-band power receiver overload and/or out-of-band emissions.<sup>15</sup> If AWS-3 and 1.6 GHz base stations are co-located, the potential interference could be mitigated by implementing vertical separation between the base stations. If the required vertical separation is not possible, or if the 1.6 GHz and AWS-3 sites are in close geographic proximity but not co-located, the operators could install external filters 1) at the 1.6 GHz base station if the interference is caused by out-of-band emissions or 2) at the victim AWS-3 base stations if the interference is receiver overload

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<sup>13</sup> At the time of the AWS-3 auction, the Commission had not proposed adding co-primary fixed and mobile services in the 1.6 GHz band.

<sup>14</sup> A portion of the proceeds from Auction 97 was allocated to fund certain costs for facilitating sharing of the 1695–1710 MHz band between AWS-3 and federal users, such as the cost of relocating radiosondes and adding RF monitoring equipment to federal users' earth stations. *See National Weather Service Radiosonde Program Breakdown of Costs*, NTIA (July 2014), available at <https://bit.ly/2Kf4gv2> (\$80 million allocated for relocating radiosondes and \$443 million allocated for RF monitoring).

<sup>15</sup> Comments of SNR, RM-11681, at 12 (filed June 21, 2016).

caused by the in-band power of 1.6 GHz base stations. Installation of external filters on AWS-3 base stations would add cost to and reduce the performance of AWS-3 operations, and in fairness should be borne by 1.6 GHz licensees.<sup>16</sup>

Licensees in the 1.6 GHz band also should be responsible for the costs to AWS-3 licensees associated with any changes in 3GPP mobile coexistence requirements for coexistence between any newly created 1.6 GHz downlink band and Band 70.<sup>17</sup> The international standards body, 3GPP, typically imposes standard coexistence criteria for both base stations and mobile devices<sup>18</sup> so that new 3GPP band classes protect each other from harmful interference.<sup>19</sup>

With just 15 megahertz of separation between the 1.6 GHz and AWS-3 bands, the standard 3GPP coexistence criteria could not be met without additional filtering. Because filters

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<sup>16</sup> The issue is of particular concern in urban areas where site spacing is densest and the site grids of operators do not always align, increasing the probability that the sites of different operators will be in close geographical proximity to one another.

<sup>17</sup> See, e.g., *Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, et al.*, Third Report and Order and Third Memorandum Opinion and Order, 18 FCC Rcd 23638 ¶ 9 (2003) (requiring new licensees in a band that benefitted from the relocation of incumbent licensees out of the band to share the incumbents' relocation costs).

<sup>18</sup> As discussed above, 1.6 GHz base stations can cause interference to AWS-3 base station receivers. Similarly, AWS-3 mobile devices can cause interference to 1.6 GHz mobile devices in close geographic proximity. However, any potential interference to 1.6 GHz devices from AWS-3 devices would be transitory, whereas the interference to AWS-3 base stations from 1.6 GHz base stations would be persistent.

<sup>19</sup> The standard value for mobile device transmissions into a neighboring band is -50 dBm/MHz, while the standard value for base stations transmissions into a neighboring band is -49 dBm/MHz. See 3GPP TS 36.101 v15.4.0, *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception*, § 6.6.3.2 (Jan. 2019); 3GPP TS 36.104 v15.6.0, *Base Station (BS) radio transmission and reception*, § 6.6.4.3.1 (May 2019); 3GPP TS 38.101-1 v15.5.0, *User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone*, § 6.5.3.2 (May 2019); 3GPP TS 38.104 v15.5.0, *Base Station (BS) radio transmission and reception*, §§ 6.6.5.2.3, 9.7.5.2.4 (May 2019).

require power and space, filtering transmissions from a base station is much less costly<sup>20</sup> and operationally simpler than filtering transmissions from handheld devices.<sup>21</sup>

The technical specifications for Band 70 do not contemplate mobile operations in the 1.6 GHz band, and therefore, the current 3GPP specifications do not include a coexistence requirement for AWS-3 mobile devices to protect operations in 1675–1680 MHz.<sup>22</sup> The potential for mobile operations in the 1.6 GHz band sets the stage for future discussion in the 3GPP standards process in which 1.6 GHz licensees could insist upon the standard 3GPP coexistence protection from Band 70 mobile devices. Relaxation of the 3GPP mobile coexistence requirement would be an industry decision, and there is risk to AWS-3 licensees that the standard coexistence requirement would be adopted.<sup>23</sup> Requiring 1.6 GHz licensees to be responsible for the costs associated with the adoption of the standard 3GPP coexistence requirement with respect to Band 70 would protect the reasonable investment-backed expectations of AWS-3 licensees.

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<sup>20</sup> The number of base stations in a nationwide network is several orders of magnitude smaller than the number of handheld devices.

<sup>21</sup> For example, using filters reduces battery life in handheld devices, but has a minimal operational impact on base stations. Moreover, when bands are very close spectrally, achieving the required emission levels from mobile devices into a neighboring band is often not possible with filtering alone. In those instances, another method called Additional Maximum Power Reduction (“A-MPR”) must be used. A-MPR is enabled in software, but can severely reduce the performance of a network’s uplink operations, which would require the operator to deploy (and pay for) more base stations.

<sup>22</sup> Band 70 was ratified by 3GPP in 2016 and pairs the 1695–1710 MHz uplink band with the 1995–2020 MHz downlink band.

<sup>23</sup> In contrast, the FCC could specify out-of-band emissions from base stations to be consistent with 3GPP coexistence specifications by requiring transmissions in the 1.6 GHz band to meet  $79+10*\log_{10}(P)$  at the AWS-3 band edge (measured in a one megahertz bandwidth). In the past the FCC has taken similar steps to protect uplink bands from out-of-band emissions from neighboring downlink bands. See, e.g., *Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands*, Report and Order, 28 FCC Rcd 9483 ¶ 60 (2013) (requiring base station transmissions in the H block (1995–2000 MHz) to be attenuated by  $70+10*\log_{10}(P)$  into the 2005–2020 MHz band to protect the AWS-4 uplink).

### III. CONCLUSION

The Commission should ensure that reallocation of the 1.6 GHz band for flexible use includes technical and service rules that protect the reasonable investment-backed expectations of AWS-3 licensees. The Commission should require that 1.6 GHz licensees coordinate with federal operators in the 1675–1695 MHz band to establish an interference budget and monitoring process that does not negatively impact the interference budget and monitoring process for AWS-3 operators protecting federal operations in the same band. Further, 1.6 GHz licensees should bear the costs of any additional compliance or monitoring obligations and operational burdens imposed on AWS-3 licensees or federal operators.

Respectfully submitted,

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