



PUBLIC NOTICE

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Wireless Telecommunications Bureau and Office of Engineering and Technology Establish Procedure and Deadline for Filing Spectrum Access System (SAS) Administrator(s) and Environmental Sensing Capability (ESC) Operator(s) Applications

GN Docket No. 15-319

Proposals will be accepted beginning on January 15, 2016
“First Wave” proposal deadline: April 15, 2016

The Wireless Telecommunications Bureau (WTB) and the Office of Engineering and Technology (OET) (collectively, WTB/OET) seek proposals for future Spectrum Access System (SAS) Administrator(s) and Environmental Sensing Capability (ESC) operator(s) in the 3550-3700 MHz band (3.5 GHz Band), as directed by the *Second Report and Order and Further Notice of Proposed Rulemaking*, GN Docket 12-354 (*3.5 GHz Order*).¹ This *Public Notice* summarizes the requirements for both SAS Administrators and ESC operators, as established in the *3.5 GHz Order*, and describes the process for submitting proposals. It also briefly describes the process that WTB/OET will use to evaluate prospective SAS Administrators and ESC operators.

SASs and ESCs are essential components necessary for future operations in the 3.5 GHz Band. SASs will serve as advanced, highly automated frequency coordinators across the band, protecting higher tier users from harmful interference from lower tier users and optimizing frequency use to facilitate coexistence among all users in the band. The ESCs will consist of networks of sensors that will detect the presence of signals from federal systems in the band and communicate that information to one or more SASs to facilitate protection of federal operations in the band.

As described in detail in the *3.5 GHz Order*, WTB/OET will oversee a process by which multiple entities can seek approval to operate as SAS Administrators and ESC operators. Through this process, prospective SAS Administrators and ESC operators will demonstrate their ability to perform the functions required of them pursuant to the Commission’s new rules. The opening of the application window is the next stage in this process, which we anticipate will involve extensive coordination with all necessary stakeholders and iterative updates to the applications to ensure compliance with all requirements.

Proposals may be submitted on or after January 15, 2016. The deadline for submission of “first wave” proposals is April 15, 2016. No fewer than 30 days prior to the “first wave” proposal deadline, WTB/OET will hold a public meeting to discuss the proposal submission process and address questions

¹ Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, *Report and Order and Second Further Notice of Proposed Rulemaking*, 30 FCC Rcd 3959 (2015) (*3.5 GHz Order*). See *3.5 GHz Order*, 30 FCC Rcd 3959, 4070-4071, ¶ 386; 47 C.F.R. §§ 96.1 *et seq.*

from prospective SAS Administrators and ESC operators.

WTB/OET will review all proposals submitted prior to April 15, 2016 concurrently and with equal priority. WTB/OET will continue to consider proposals and amendments thereto submitted after this date, but they may not be considered concurrently with “first wave” proposals. After review of the “first wave” proposals, WTB/OET will release a list of the conditionally approved SAS Administrators and ESC operators that submitted proposals during that time. WTB/OET will notify the public if any proposals are conditionally approved after the “first wave.” Proposals will not be considered mutually exclusive and WTB/OET will conditionally approve as many proposals as are found to satisfy all applicable requirements.

Once an SAS Administrator or ESC operator is conditionally approved, WTB/OET may again seek additional information from such entities. At a minimum, WTB/OET will assess and test each SAS and ESC controlled by a conditionally approved entity.² There will also be a public testing period - including testing of protections for non-federal incumbent systems and field trials. WTB/OET may also require prospective SAS Administrators and ESC operators to attend workshops and meetings as part of the assessment process. Prospective SAS Administrators and ESC operators must comply with all instructions from WTB/OET and provide any requested information in a timely manner. All stages of the process, including review of proposals and system compliance testing, will be overseen by WTB/OET, in close consultation with the National Telecommunications and Information Administration (NTIA) and the Department of Defense (DoD).³ WTB/OET will publicly announce SAS Administrators and ESC operators that receive final approval on a rolling basis.

I. BACKGROUND

On April 17, 2015, the Commission adopted the *3.5 GHz Order* that established a new Citizens Broadband Radio Service in the 3.5 GHz Band.⁴ Prior to the *3.5 GHz Order*, the 3550-3650 MHz band segment was reserved for use by DoD radar systems and commercial fixed satellite service (FSS) earth stations.⁵ The 3650-3700 MHz portion of the band was used by a limited number of DoD radar systems and FSS earth stations as well as wireless radio services authorized under Part 90, subpart Z of the Commission’s rules.⁶ The *3.5 GHz Order* implements a three-tier spectrum authorization framework that will make the 3.5 GHz Band available for commercial use on a shared basis with existing federal and non-federal incumbents. Access to the band will be coordinated by one or more SASs, which will serve as advanced, automated frequency coordinators across the band.⁷

The three tiers of users in the 3.5 GHz Band are: Incumbent Access, Priority Access, and General Authorized Access (GAA). Incumbent users include authorized federal users and grandfathered FSS

² See *3.5 GHz Order*, 30 FCC Rcd 3959, 4067, ¶ 372.

³ Prospective SAS Administrators and ESC operators may be required to meet additional requirements necessary to address the security concerns of federal agencies.

⁴ See generally, *3.5 GHz Order*.

⁵ FSS earth stations use the 3600-3650 MHz portion of the band.

⁶ See 47 C.F.R. § 2.106; 47 C.F.R. §§ 90.1301, *et seq.*

⁷ See *3.5 GHz Order*, 30 FCC Rcd 3959, 3962, ¶ 4; 47 C.F.R. § 96.53.

users.⁸ These users will be protected from harmful interference from Priority Access and GAA users. The Commission adopted a two-phase approach to federal incumbent protection. In phase 1, federal radar systems will be protected by “exclusion zones.” In phase 2, these radar systems will be protected by the SAS using information provided by an ESC that will detect the presence of radar transmissions and report that information to the SAS.⁹

The Citizens Broadband Radio Service itself consists of two tiers - Priority Access and GAA. Priority Access will be protected from interference from GAA users.¹⁰ Users in both tiers will operate fixed Citizens Broadband Radio Service Devices (CBSDs), such as access points, which they must register with an SAS (end user devices are not CBSDs, and users are not required to register them with the SAS).¹¹

SASs and their associated ESCs will function together to coordinate frequency use and prevent interference in the 3.5 GHz Band. Specifically, SASs - operated by Commission-approved SAS Administrators - will coordinate the three tiers of authorized users by assigning frequencies,¹² establishing registration processes and registering users,¹³ and storing information,¹⁴ among other functions.¹⁵ The ESC, operated by a Commission-approved ESC operator, will detect and communicate information about the presence of signals from federal systems to one or more approved SASs so that the SAS(s) can direct commercial users to vacate occupied channels, if necessary. The SASs must be capable of communicating with each other and their associated ESCs and the ESCs must be capable of communicating with their associated SASs. The private sector will design and operate both the SASs and ESCs, subject to Commission approval and oversight. An SAS Administrator may also operate an ESC and vice versa.

II. SAS ADMINISTRATOR(S) REQUIREMENTS AND FUNCTIONS

As set forth in the *3.5 GHz Order*, SASs will serve as advanced, highly automated frequency coordinators for users of the 3.5 GHz Band. SASs will protect higher tier users from harmful interference from lower tier users and optimize frequency use to facilitate coexistence between all users in the band. Each SAS will be operated by an SAS Administrator. In the *3.5 GHz Order*, we adopted high-level

⁸ See *3.5 GHz Order*, 30 FCC Rcd 3959, 3962, ¶ 4; 47 C.F.R. §§ 96.15(a)(1); 96.17(a) and (b); 96.21. Grandfathered 3650-3700 MHz band licensees will also be treated as Incumbent Access users during their assigned transition period. See *3.5 GHz Order*, 30 FCC Rcd 3959, 4075-4076, ¶ 400.

⁹ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4038, ¶ 261.

¹⁰ See *id.*, 30 FCC Rcd 3959, 3962, ¶ 4; 47 C.F.R. § 96.35(d).

¹¹ See 47 C.F.R. §§ 96.23(b); 96.3; 96.33; 96.39(c).

¹² See *3.5 GHz Order*, 30 FCC Rcd 3959, 3985-3987, ¶¶ 80-86; 47 C.F.R. §§ 96.53(j); 96.59.

¹³ GAA users, Priority Access Licensees, and incumbent users must register with the SAS. See *3.5 GHz Order*, 30 FCC Rcd 3959, 4012, 4032, 4046, ¶¶ 162, 231-234, 290; 47 C.F.R. § 96.57. CBSDs must report information on their technical specifications, location, and identity of their authorized operators or licensees to the SAS and the SAS must verify this information. See *3.5 GHz Order*, 30 FCC Rcd 3959, 4058, ¶ 333.

¹⁴ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4056-4058, ¶¶ 326-330; 47 C.F.R. § 96.55.

¹⁵ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4067, ¶¶ 369-373; 47 C.F.R. § 96.53; 96.63.

requirements for SAS Administrators to govern the authorization and operation of SASs.¹⁶ The primary function of the SAS Administrator(s) will be to follow protocols and procedures that implement the core functions of an SAS,¹⁷ including maintaining secure and reliable communication between SASs and CBSDs and ensuring that incumbent operations – including federal radar systems and non-federal FSS earth stations – are protected from harmful interference.

Further, SAS Administrator(s) will be subject to certain information gathering and retention requirements in order to securely maintain accurate registration information, investigate sources of interference, effectively prevent interference, and immediately respond to requests from Commission personnel for information stored or maintained by the SAS.¹⁸ SAS Administrators are permitted to charge Priority Access Licensees and GAA users reasonable fees, and the Commission may, upon request, review the fees and require changes if the fees are unreasonable.¹⁹

III. ESC OPERATOR(S) REQUIREMENTS AND FUNCTIONS

An ESC will include a system of sensors to detect federal frequency use in the 3.5 GHz Band. The technology-neutral approach adopted by the Commission will accommodate infrastructure-based, device-based, or hybrid sensing systems that meet the requirements enumerated in the Commission's rules. Sensors shall be deployed in the vicinity of Exclusion Zones and may not store, retain, transmit, or disclose information on the locations or movements of any federal systems.²⁰ In addition, the ESC must be developed, managed, and maintained by a non-governmental entity and should not require oversight or day-to-day input from NTIA or DoD. ESC operators must comply with all Commission rules governing the construction, operation, and approval of ESCs and all of the core functions described in the *3.5 GHz Order*, including the following:

- accurately detect the presence of a federal system in the 3550-3700 MHz band and adjacent frequencies;
- communicate information about the presence of a signal from a federal system to one or more approved SASs;
- maintain security of detected and communicated signal information;
- be available at all times to immediately respond to requests from authorized Commission personnel for any information collected or communicated by the ESC;
- ensure that the ESC operates without any connectivity to any military or other sensitive federal database or system; and

¹⁶ See 47 C.F.R. §§ 96.53 – 96.65.

¹⁷ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4054-4055, ¶ 320; 47 C.F.R. § 96.63.

¹⁸ See *3.5 GHz Order*, 30 FCC Rcd 4056-58, 4062, ¶¶ 326-330, 351-52; 47 C.F.R. §§ 96.55, 96.63(k).

¹⁹ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4068-4069, ¶¶ 376-378; See § 47 C.F.R. § 96.65.

²⁰ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4070, ¶ 383; 47 C.F.R. § 96.67(a)(7).

- ensure that the ESC does not store, retain, transmit, or disclose operational information on the movement or position of any federal system or any information that reveals other operational information of any federal system that is not required to effectively operate the ESC by Part 96.²¹

The determination of whether an ESC adequately performs these functions will be made through the approval process described below.

IV. SAS ADMINISTRATOR AND ESC OPERATOR PROPOSAL AND APPROVAL PROCESS

SAS Administrator proposals must describe in detail how the prospective SAS Administrator will comply with the requirements and core functions described in Part 96, subpart F of the Commission’s rules.²² ESC operator proposals must describe in detail how the prospective operator will comply with the requirements and core functions described in Part 96, subpart G of the Commission’s rules.²³ All prospective SAS Administrators and ESC operators must, at a minimum, demonstrate their intent and ability to comply with Commission rules and demonstrate their technical qualifications.²⁴ Parties may submit one filing for both SAS Administrator and ESC operator but the filing must clearly delineate how the system will comply with the requirements for each separate role, and how to address any potential conflicts of interest between the two functions.²⁵ In addition, we note that the Commission expects that “stakeholders will work collaboratively to develop standards, procedures, and industry best practices in several key areas, including SAS coordination and information exchange, communications between CBSDs and SASs, and information security.”²⁶ As such, we will give due consideration to responses that reflect the type of collaboration endorsed by the Commission.

All proposals must at a minimum include the following information:

1. A detailed description of the scope of the functions that the SAS and/or ESC would perform.
2. A demonstration that the prospective SAS Administrator or ESC operator possesses sufficient technical expertise to operate an SAS and/or ESC, including the qualifications of key personnel who will be responsible for operating and maintaining the SAS and/or ESC.
3. The prospective SAS Administrator or ESC operator must demonstrate that it is financially capable of operating an SAS and/or ESC for a five year term. The proposal must include a description of the prospective SAS Administrator or ESC operator’s business structure including ownership information. To the extent that the proponent will rely on fees to support its operations, the proposal should also describe the fee collection process and the entities from which the fees will be collected.

²¹ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4070-4071, ¶ 386; 47 C.F.R. §§ 96.1 *et seq.*

²² 47 C.F.R. §§ 96.53-96.65.

²³ 47 C.F.R. § 96.67.

²⁴ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4067, ¶ 371; 47 C.F.R. § 1.115.

²⁵ The Commission may approve the proposal in full, deny in full, or grant, in part, if the Commission finds that the prospective SAS Administrator has demonstrated its ability to act in one capacity but not the other.

²⁶ See *3.5 GHz Order*, 30 FCC Rcd 3959, 4067, ¶ 373.

4. A description of how data will be securely communicated between the SAS and its associated ESC and how quickly and reliably these communications will be accomplished.
5. Technical diagrams showing the architecture of the SAS and/or ESC and a detailed description of how each function operates and how each function interacts with the other functions.
6. A description of the propagation model and any other assumptions that the prospective SAS Administrator or ESC operator proposes to use to model operations and facilitate coordination in the band.
7. A description of the methods that will be used to update software and firmware and to expeditiously identify and address security vulnerabilities.
8. An affirmation that the prospective SAS Administrator and/or ESC operator (and its respective SAS and/or ESC) will comply with all of the applicable rules as well as applicable enforcement mechanisms and procedures.

SAS proposals must also provide the following information:

1. A detailed description of how the SAS will retain, secure, and verify information from CBSDs (including location data), licensees, associated ESCs, and other SASs.
2. A demonstration that the SAS will be capable of resolving various sources of interference between and among Citizens Broadband Radio Service users and/or Incumbent users.
3. A description of how the SAS will ensure that non-federal FSS earth stations and grandfathered 3650-3700 MHz licensees are protected from harmful interference consistent with the rules.
4. A description of how coordination will be effectuated (*e.g.*, through data synchronization) between multiple SASs, if multiple SASs are authorized, and how quickly this synchronization of data will be accomplished.²⁷
5. If the prospective SAS Administrator will not be performing all SAS functions, it must provide information on the entities operating other functions and the relationship between itself and these other entities. In particular, it must address how the Commission can ensure that all of the requirements for SAS Administrators in Part 96, subpart F are satisfied when SAS functions are divided among multiple entities, including a description of how data will be transferred among these various related entities and SASs, if multiple SASs are authorized, and the expected schedule of such data transfers (*i.e.*, real-time, once an hour, etc.).
6. A description of the methods (*e.g.*, interfaces, protocols) that will be used by: (1) CBSDs to communicate with the SAS; (2) the SAS to communicate with CBSDs; (3) the SAS to communicate with other SASs; and, if applicable, (4) the SAS to communicate with one or more ESCs. The prospective SAS Administrator must also describe the procedures, if any, which it plans to use to verify that a CBSD can properly communicate with the SAS.
7. An affirmation that, consistent with section 96.55 of the Commission's rules, the SAS will only retain records and information or instructions received regarding federal transmissions from the ESC in accordance with information retention policies established as part of the ESC approval process.
8. A description of the security methods that the prospective SAS Administrator plans to use to ensure that unauthorized parties cannot access or alter the SAS or otherwise corrupt the operation of the SAS in performing its intended functions, consistent with the Commission's rules.
9. Descriptions of dynamic use-case scenarios for how the SAS will manage and assign spectrum

²⁷ We recognize that some details of the SAS to SAS coordination process may depend on the specific architecture and system design of the various conditionally approved SASs.

resources to ensure that geographically and spectrally adjacent operations are coordinated consistent with the Commission's rules. Use case scenarios should include the methodology and protection approach for cases of radio interference due to adjacent blocking, out-of-band emissions, and aggregate co-channel interference. Describe how multiple SASs will coordinate the calculation of aggregate interference for protecting Incumbent users and Priority Access licensees.

10. A description of the methods that the SAS will use to make information stored or retained by the SAS available in response to a request from authorized Commission personnel.

ESC proposals must also include the following information:

1. A description of the methods (*e.g.*, interfaces, protocols) that will be used by the ESC to communicate with the SAS. It must include a description of the security methods or protocols that will be used to ensure that unauthorized parties cannot access or alter the ESC or otherwise corrupt the operation of the ESC in performing its intended functions.
2. A description of the sensing methodology it will use to detect federal transmissions and determine that the spectrum needs to be evacuated. This description must include a detailed description of the type of sensors to be used (*i.e.*, infrastructure or device based), the sensing architecture to be employed, the sensing thresholds, any processing of sensor data, sensor sensitivity, and sensor resiliency to receiver front-end saturation and burn-out. The prospective ESC operator must also provide a description of the safeguards that will be used to “ensure that the ESC does not store, retain, transmit, or disclose operational information on the movement or position of any federal system or any information that reveals other operational information of any federal system that is not required to effectively operate the ESC by Part 96.”²⁸
3. A description of the methods (*e.g.*, interfaces, protocols) that will be used by sensors to communicate with the ESC and the procedures, if any, that it plans to use to verify that all sensors can communicate with the ESC in a timely and secure manner. It must include a description of the security methods or protocols that will be used to ensure that unauthorized parties cannot access or alter the ESC or individual sensors or otherwise corrupt the operation of the ESC in performing its intended functions.

After April 15, 2016, WTB/OET will evaluate all of the “first wave” proposals. A complete proposal must include the information requested by this *Public Notice*. We note that some issues in this proceeding are subject to petitions for reconsideration. The proposals should address these issues as they are presented in the current rules. However, if a prospective SAS Administrator or ESC operator believes that it cannot effectively respond to a particular inquiry related to an issue subject to reconsideration, it should note that position in its proposal. If the Commission updates the rules governing the SAS, SAS Administrators, the ESC, ESC operator requirements, or the approval process, approved or prospective SAS Administrators and ESC operators will be required to amend their filings to address the new rules. WTB/OET may also request additional information to clarify or supplement the initial filings.

After review of the “first wave” proposals, WTB/OET will release a list of the conditionally approved SAS Administrators and ESC operators that submitted proposals during that time. WTB/OET will also notify the public if any additional proposals are conditionally approved in the future.

²⁸ See 3.5 GHz Order, 30 FCC Rcd 3959, 4071, ¶ 386.

Once an SAS Administrator or ESC operator is conditionally approved, WTB/OET may seek additional information from prospective SAS Administrators and ESC operators. At a minimum, WTB/OET will assess and test each conditionally approved SAS and ESC.²⁹ These assessments will also include a public testing period, including assessment of incumbent protection capabilities. WTB/OET may also require prospective SAS Administrators and ESC operators to attend workshops and meetings. Prospective SAS Administrators and ESC operators must comply with all instructions from WTB/OET and provide any requested information in a timely manner. All stages of the process, including review of proposals and system compliance testing, will be overseen by WTB/OET, in close consultation with NTIA and DoD.³⁰

WTB/OET will review all of the proposals and any subsequent information submitted by prospective SAS Administrators and ESC operators prior to selecting such Administrators and operators. WTB/OET will publicly announce final approvals on a rolling basis.

If WTB/OET receive reports of a deployed SAS or ESC functioning in a manner that is inconsistent with the Commission's rules or their authorization, WTB/OET may direct an SAS Administrator or ESC operator to suspend operations, cure the problem, and refile for permission to resume operations or, in coordination with the Enforcement Bureau, WTB/OET may take appropriate enforcement action.³¹

Prospective SAS Administrators and ESC operators must file proposals, and any supplements thereto, with the Commission using the Commission's Electronic Filing System (ECFS).³² *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998). In order to be considered in the "first wave," proposals must be filed on or before the date indicated on the first page of this *Public Notice*. Prospective SAS Administrators and ESC operators may request confidential treatment of information contained in their proposals consistent with section 0.459 of the Commission's rules.³³ All such filings should refer to **GN Docket 15-319**.

Questions regarding this *Public Notice* may be directed to Paul Powell, Attorney Advisor, Wireless Telecommunications Bureau, Mobility Division at (202) 418-1613 or paul.powell@fcc.gov, or Navid Golshahi, Electronics Engineer, Office of Engineering and Technology, Policy and Rules Division at (202) 418-2422 or navid.golshahi@fcc.gov.

By the Chief, Wireless Telecommunications Bureau, and the Chief, Office of Engineering and Technology.

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²⁹ *See id.*, 30 FCC Rcd 3959, 4067, ¶ 372.

³⁰ *See id.*, 30 FCC Rcd 3959, 4067, ¶ 372.

³¹ *See id.*, 30 FCC Rcd 3959, 4062, ¶ 351.

³² While we will accept proposals via ECFS, we are not requesting public comment on the proposals at this time.

³³ *See* 47 C.F.R. § 0.459.