



PUBLIC NOTICE

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WIRELESS TELECOMMUNICATIONS BUREAU AND OFFICE OF ENGINEERING AND TECHNOLOGY APPROVE SPECTRUM ACCESS SYSTEM ADMINISTRATOR NOKIA FOR FULL SCALE COMMERCIAL DEPLOYMENT IN THE 3.5 GHZ BAND AND TO SUPPORT SPECTRUM MANAGER LEASING

GN Docket No. 15-319

I. INTRODUCTION

1. With this *Public Notice*, the Wireless Telecommunications Bureau (WTB) and the Office of Engineering and Technology (OET) (collectively, WTB/OET) of the Federal Communications Commission certify Nokia Innovations LLC (Nokia) as a Spectrum Access System (SAS) Administrator in the 3.55–3.7 GHz band (3.5 GHz band). WTB/OET, in consultation with the Department of War (DoW) and the National Telecommunications and Information Administration (NTIA), have reviewed Nokia's Initial Commercial Deployment (ICD) report. They each have attested that Nokia has met the requirements in part 96 of the Commission's rules and is authorized to make its SAS available for commercial use for a five-year term.¹ WTB/OET also approve Nokia to support spectrum manager leasing for Priority Access Licenses (PALs).²

II. BACKGROUND

2. In the *2015 Report and Order*, the Commission directed WTB/OET, in consultation with the DoW and NTIA, to oversee the review, certification, and approval of SASs in the 3.5 GHz band.³ The *2015 Report and Order* required all prospective SAS Administrators to complete a two-stage review process prior to final certification.⁴ In the first stage, a prospective SAS Administrator must submit a proposal describing how its system will comply with all Commission rules governing the construction, operation, and approval of SASs and perform all core functions described in the *2015 Report and Order*.⁵

¹ See 47 CFR 96.63(e).

² See 47 CFR §§ 1.9046, 96.32, and 96.66; *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550- 3650 MHz Band*, GN Docket No. 15-319, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011, 5014 (2016 WTB/OET) (*Second Report and Order*).

³ See generally *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, 4067, paras. 369–373 (2015) (*2015 Report and Order* and *2015 FNPRM*, respectively); see also 47 CFR §§ 0.241(j), 0.331(f).

⁴ See *Wireless Telecommunications Bureau and Office of Engineering and Technology Establish Procedure and Deadline for Filing Spectrum Access System (SAS) Administrators(s) and Environmental Sensing Capability (ESC) Operator(s) Applications*, GN Docket No. 15-319, Public Notice, 30 FCC Rcd 14170, 14174–77 (WTB/OET 2015) (*First Wave Proposal Public Notice*).

⁵ See *2015 Report and Order*, 30 FCC Rcd at 4054–55, para. 320 (listing SAS core functions); see also *First Wave Proposal Public Notice*, 30 FCC Rcd 14170; *Wireless Telecommunications Bureau and Office of Engineering and*

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The second stage involves SAS testing both in a controlled lab environment and in a real-world setting.⁶ On May 7, 2021, WTB/OET conditionally approved Nokia as a SAS administrator, thus concluding the first stage of the review process.⁷

3. As part of the second stage testing process, Nokia elected to collaborate with the Institute for Telecommunication Sciences (ITS), NTIA's research and development arm, to complete the laboratory testing requirement.⁸ ITS completed its laboratory testing in December 2022 and subsequently provided Nokia with a SAS laboratory test report, which Nokia submitted for the Commission's review in January 2023.⁹

4. In order to comply with the field-testing requirement, Nokia filed an ICD proposal with the Commission, which described its proposed short-term, limited geographic commercial deployment, and Nokia later supplemented its proposal.¹⁰ Nokia also submitted documentation—including reports on system testing in a non-operational environment—demonstrating its ability to successfully implement the modified aggregate interference model described in a WTB/OET Public Notice and related NTIA letter.¹¹

Technology Conditionally Approve Three Spectrum Access System Administrators for the 3.5 GHz Band, GN Docket Nos. 17-258, 15-319, Public Notice, 36 FCC Rcd 8255 (WTB/OET 2021) (*Second Wave SAS Conditional Approval Public Notice*).

⁶ See *2015 Report and Order*, 30 FCC Rcd at 4067, para. 372 (noting that the final compliance testing phase can include a public testing period, testing of protections for incumbent systems, and field trials). On July 27, 2018, WTB/OET released a Public Notice that described the procedure and deadline for filing ICD proposals. See *Wireless Telecommunications Bureau and Office of Engineering and Technology Establish Procedure and Deadline for Filing Spectrum Access System Initial Commercial Deployment Proposals*, Public Notice, 33 FCC Rcd 7390 (WTB/OET 2018) (*ICD Proposals Public Notice*). ICD is meant to fulfill the Commission's requirement that applicants conduct a public testing period and field trials prior to final certification. *2015 Report and Order*, 30 FCC Rcd at 4067, para. 372.

⁷ See generally *Second Wave SAS Conditional Approval Public Notice* (conditionally approving three SAS Administrators: Nokia, RED Technologies, and Fairspectrum LLC).

⁸ While lab testing of individual SASs is required before final certification, participation in either the process of verifying and validating the test harness or the subsequent lab testing of an individual SAS with ITS is optional and is not a prerequisite to submitting an ICD proposal or to obtaining final certification. *ICD Proposals Public Notice*, 33 FCC Rcd at 7392, para. 4.

⁹ Nokia filed its laboratory testing report with the Commission and requested confidential treatment. See Letter from Meredith Singer, Counsel to Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (filed Jan. 17, 2023); see also *ICD Proposals Public Notice*, 33 FCC Rcd at 7390, para. 1. Conditionally approved SAS Administrators were permitted to file their laboratory testing reports in GN Docket No. 15-319. *ICD Proposals Public Notice*, 33 FCC Rcd at 7392, para. 5.

¹⁰ Nokia requested confidential treatment for its ICD filings. See Letter from Meredith Singer, Counsel to Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (filed July 21, 2023) (ICD proposal); Letter from Meredith Singer, Counsel to Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (filed May 8, 2024) (supplement); see also *ICD Proposals Public Notice*, 33 FCC Rcd at 7390, para. 1. ICD proposals and any supplements were filed in GN Docket No. 15-319 consistent with the Commission's instructions. *ICD Proposals Public Notice*, 33 FCC Rcd at 7394-95, para. 11.

¹¹ See Letter from Dr. Milind Buddhikot, Head of Nokia Spectrum Controller, Nokia, and David Bartlett, Vice President—Federal Regulatory and Government Affairs North America, Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (July 2, 2024); *Wireless Telecommunications Bureau and Office of Engineering and Technology Announce Modified Aggregate Interference Model Used by Spectrum Access System Administrators*, GN Docket Nos 15-319 and 17-258, Public Notice, 39 FCC Rcd 6493 (WTB/OET 2024) (*Aggregate Interference Model Public Notice*); Letter from Charles Cooper, Associate Administrator, Office of Spectrum Management, NTIA, to Ronald T. Repasi, Chief, OET, FCC, and Joel Taubenblatt, Chief, Wireless Telecommunications Bureau, FCC, GN Docket Nos. 15-319 and 17-258 (June 11, 2024) (NTIA June 11, 2024 Letter); see also *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Certified SAS Administrators to*

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On July 18, 2024, WTB/OET found that Nokia had satisfied the Commission's SAS laboratory testing requirements and approved Nokia to begin ICD as described in its ICD proposal.¹² In accordance with the *Nokia ICD Approval PN*, Nokia notified the Commission of commencement of its ICD.¹³ After the requisite 30-day ICD period, and consistent with the *ICD Proposals Public Notice*, Nokia filed its ICD report with the Commission in GN Docket 15-319, later supplemented that report, and requested confidential treatment of both submissions.¹⁴ WTB/OET, in coordination with NTIA and DoW, reviewed Nokia's ICD report and supplement in detail.

III. DISCUSSION

A. Full Scale Commercial Deployment

5. Based on our review of the information contained in Nokia's ICD report, in addition to all relevant additional information Nokia filed in this proceeding, we certify that Nokia's SAS complies with our rules, and we approve Nokia for commercial operation subject to ongoing compliance with the Commission's rules, including the specific compliance obligations set forth below. Specifically, Nokia may operate as a SAS administrator on a commercial basis subject to the following compliance obligations, which are consistent with those described in the *Second Wave SAS Conditional Approval Public Notice*, our rules, and the conditions required of other SAS administrators approved for full scale commercial deployment:¹⁵

- Nokia must comply with all current and future Commission rules and policies, as well as all instructions issued by WTB, OET, or the Enforcement Bureau (EB), including any processes for interference reporting, consistent with Sections 0.241(j) and 0.331(f) of the Commission's

use Modified Aggregate Interference Model, GN Docket Nos 15-319 and 17-258, Public Notice, 39 FCC Rcd 7007 (WTB/OET 2024) (*Aggregate Interference Model Approval Public Notice*) (July 3, 2024) (approving five SAS administrators to use the modified criteria).

¹² *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Nokia Innovations LLC to Begin Initial Commercial Deployment in the 3.5 GHz Band*, GN Docket 15-319, Public Notice, 39 FCC Rcd 7516 (WTB/OET 2024) (*Nokia ICD Approval PN*).

¹³ See Letter from Dr. Milind Buddhikot, Head of Nokia Spectrum Controller, Nokia, and David Bartlett, Vice President—Federal Regulatory and Government Affairs North America, Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (March 7, 2025).

¹⁴ See Letter from Dr. Milind Buddhikot, Head of Nokia Spectrum Controller, Nokia, and David Bartlett, Vice President—Federal Regulatory and Government Affairs North America, Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (June 17, 2025) (ICD report); Letter from Dr. Milind Buddhikot, Head of Nokia Spectrum Controller, Nokia, and David Bartlett, Vice President—Federal Regulatory and Government Affairs North America, Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319 (Sept. 10, 2025) (supplement).

¹⁵ See *Wireless Telecommunications Bureau and Office of Engineering and Technology Conditionally Approve Seven Spectrum Access System Administrators for the 3.5 GHz Band*, GN Docket No. 15-319, Public Notice, 31 FCC Rcd 13355, 13356-58, para. 7 (WTB/OET 2016); *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Four Spectrum Access System Administrators for Full Scale Commercial Deployment in the 3.5 GHz Band and Emphasize Licensee Compliance Obligations in the 3650–3700 MHz Band Under Part 96*, GN Docket No. 15-319, Public Notice, 35 FCC Rcd 117, 118-20, para. 5 (WTB/OET 2020); *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Spectrum Access System Administrator Amdocs for Full Scale Commercial Deployment in the 3.5 GHz Band*, GN Docket No. 15-319, Public Notice, 35 FCC Rcd 3687, 3688–89, para. 5 (WTB/OET 2020); *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Spectrum Access System Administrator Key Bridge Wireless for Full Scale Commercial Deployment in the 3.5 GHz Band*, GN Docket No. 15-319, Public Notice, 36 FCC Rcd 4880 (WTB/OET 2021); *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Spectrum Access System Administrator RED Technologies for Full Scale Commercial Deployment in the 3.5 GHz Band, to Support Spectrum Manager Leasing, and to Use Key Bridge Wireless LLC's Environmental Sensing Capability*, GN Docket No. 15-319, Public Notice, 38 FCC Rcd 8549 (WTB/OET 2023).

rules and procedures¹⁶ applicable to SASs on an ongoing basis.¹⁷ Nokia must also comply with requests for additional information from the Commission, WTB, OET, or EB.

- As commercial deployments expand, Nokia must demonstrate continued compliance with all current and future Commission rules and policies, which may include working with commercial and non-commercial users to demonstrate compliance with protection criteria. For example, Nokia may be required to demonstrate proper interoperation with an associated ESC to demonstrate effective protection of federal incumbents from actual commercial deployments.
- Nokia must protect current and future federal incumbent operations in and near the 3.5 GHz band, as set forth in the Commission's rules.¹⁸ Nokia must be attentive to changes in protection criteria, such as those NTIA identified in January 2020 for Category B CBRS base stations, and to modifications to the list of sites identified by NTIA.¹⁹ Nokia must be able to receive and address reports of interference from federal Incumbent Access tier users. In addition, Nokia must work with the Commission, NTIA, and DoW to address interference issues expeditiously and to implement any new reporting processes as they are developed.²⁰
- Nokia is certified to operate in the continental United States, Alaska, Hawaii, Puerto Rico, and Guam. If Nokia intends to operate in additional U.S. Territories and Possessions, it must submit a filing in GN Docket No. 15-319 detailing the additional territories that it plans to cover. These supplemental filings must include all information necessary for WTB/OET to make a determination regarding Nokia's ability to provide service to each territory, including terrain maps and associated ESC sensor coverage information (where applicable).
- If Nokia plans to make substantive changes to its system, for example, to comply with new releases of industry standards, Nokia must supplement or amend its filings in GN Docket No. 15-319 to reflect these changes. Before WTB/OET approves the use of new or modified SAS features, Nokia must demonstrate that the modified SAS will continue to comply with the Commission's rules, and it may be required to submit its systems for additional testing. Upon request, Nokia must provide external testing interfaces to enable WTB/OET, in collaboration with NTIA and DoW, to verify that the proposed modifications comply with the relevant rules as specified by the Commission.

6. WTB and OET, in close collaboration with NTIA and DoW, have reviewed Nokia's submissions and find that it has demonstrated the capability to effectively implement the modified aggregate interference model parameters, consistent with the *Aggregate Interference Model Public Notice*

¹⁶ See 47 CFR §§ 0.241(j), 0.1331(f) (delegating authority to WTB/OET to oversee the SAS approval process and facilitate the testing and development of multiple SAS operators).

¹⁷ See, e.g., 47 CFR §§ 96.53–96.65.

¹⁸ See 47 CFR § 96.15.

¹⁹ See Letter from Charles Cooper, Assoc. Admin., Office of Spectrum Mgt., NTIA, to Ronald T. Repasi, Chief (Acting) OET, and Donald Stockdale, Jr., Chief, WTB, FCC, GN Docket No. 17-258 (Jan. 22, 2020). See also Letter from Charles Cooper, Assoc. Admin., Office of Spectrum Mgt., NTIA, to Ronald T. Repasi, Chief, OET, and Joel Taubenblatt, Chief, WTB, FCC, GN Docket Nos. 15-319 and 17-258 (Sept. 21, 2023); Letter from Charles Cooper, Associate Administrator, Office of Spectrum Management, NTIA to Ronald T. Repasi, Acting Chief, OET, FCC and Joel Taubenblatt, Acting Chief, WTB, FCC, GN Docket Nos. 15-319 and 17-258 (Aug. 14, 2023); *Promoting Investment in the 3550-3700 MHz Band*, GN Docket Nos. 17-258 and 15-319, Order, 38 FCC Rcd 7628 (WTB/OET 2023); and *Wireless Telecommunications Bureau and Office of Engineering and Technology Announce Deployment of a New Federal Portal System and Revision to the List of Protected Facilities in the 3.5 GHz Band*, GN Docket Nos. 17-258 and 15-319, Public Notice, 38 FCC Rcd 7626 (WTB/OET 2023).

²⁰ See, e.g., 47 CFR §§ 96.53, 96.55.

and the NTIA June 11, 2024 Letter.²¹ Therefore, WTB and OET authorize Nokia to apply the revised aggregate interference model used to protect federal operations in the 3.5 GHz band:

- Nokia may assume an 80% TDD activity factor and 20% network loading factor for each CBSD in the aggregate interference calculation. The total impact will reduce, by 8 dB, the equivalent isotopically radiated power (EIRP) used in the aggregate interference calculations for each CBSD.
- Nokia may use median Irregular Terrain Model (ITM) terrain dependent propagation loss (in dB)—using reliability and confidence factors of 0.5—to calculate the aggregate received power levels within a DPA.
- Nokia may apply median clutter loss—calculated using the methodology described in Recommendation ITU-R P.2108,²² section 3.2—for any CBSD with an antenna height Above Ground Level (AGL) of less than or equal to six meters, that is operating at a distance of at least 250 meters from a DPA boundary.²³

7. The above conditions will ensure that Nokia will continue to comply with the Commission's rules. Nokia's certification may be revoked at any time Nokia fails to comply with the Commission's rules and guidance on an ongoing basis.

B. Spectrum Manager Leasing

8. Nokia has also chosen to support PAL leasing and has submitted additional information in GN Docket No. 15-319 to demonstrate the functionality of its leasing system so that it may offer PAL leasing services.²⁴ The Commission has established minimum standards that SAS administrators must meet if they choose to accept and support spectrum manager leasing arrangements.²⁵ These minimum requirements establish that for a SAS administrator to support leasing arrangements, it must: (a) accept and store the information required in a licensee's notification; (b) verify whether the lessee has made the required certification with the Commission; (c) verify that the lease will not result in the lessee holding more than the 40 megahertz of Priority Access spectrum in a given License Area, and that lessee operation will not extend beyond the licensee's Service Area or within its PAL Protection Area; (d) inform the licensee as to whether the notification has been received and verified; and (e) provide the Commission with electronic reports of the leasing notifications it received on a daily basis.²⁶

²¹ See *Aggregate Interference Model Public Notice* and NTIA June 11, 2024 Letter; see also *Aggregate Interference Model Approval Public Notice*.

²² ITU, Recommendations, Rec. P.2108, "Prediction of Clutter Loss" (Sept. 2021), <https://www.itu.int/rec/R-REC-P.2108/en>.

²³ *Aggregate Interference Model Public Notice*, 39 FCC Rcd at 6494; NTIA June 11, 2024 Letter at 2.

²⁴ See 47 CFR § 96.66; see also Nokia ICD Report.

²⁵ See 47 CFR §§ 1.9046, 96.32, and 96.66. Other types of leases, including *de facto* transfer leases, are governed by the standard processes described in part 1 of the Commission's rules. See 47 CFR §§ 1.9001, *et seq* and 96.32.

²⁶ The Commission implemented a "light-touch" leasing notification framework to replace the immediate processing procedures of spectrum manager leases under section 1.9020(e)(2) of our existing rules. Priority Access Licensees and lessees may also enter into spectrum manager leases using the general 21-day notification procedure in section 1.9020(e)(1) of our current rules. See 47 C.F.R. §§ 1.9020 and 1.9046; *Second Report and Order*, 31 FCC Rcd at 5071, para. 213 & n.485. Regardless of whether the Priority Access Licensee and lessee enter into a spectrum manager lease via the light-touch notification process or the 21-day notification process, the Priority Access Licensee must notify a SAS administrator before the lessee is permitted to operate. See 47 C.F.R. § 1.9046(c); *Second Report and Order*, 31 FCC Rcd at 5074, para. 220. SAS administrators are required to comply with all applicable Commission rules regardless of the notification made.

9. Nokia has provided all required information regarding its ability to interact with Commission systems to acquire and submit all required lease information.²⁷ Nokia has also agreed to support PAL spectrum manager lease agreements in compliance with sections 96.32 and 96.66 of the Commission's rules, certified that it will satisfy the requirements outlined in the *Second Report and Order*, and demonstrated the ability to successfully interact with the requisite Commission systems.²⁸ Accordingly, Nokia is approved to support spectrum manager leasing of PALs subject to the conditions set forth below and ongoing compliance with the Commission's rules and instructions.²⁹

10. This approval is conditioned on ongoing compliance with technical limitations governing use of the ULS API.³⁰ Specifically, leasing information may only be entered into the API Monday through Friday between the hours of 9:00 am and 5:00 pm eastern.³¹ Although SAS administrators may enter information into the API only during the identified hours and days, this does not affect their ability to accept leases at other times. We also remind SAS administrators that they are permitted to execute leases only between Priority Access Licensees and qualified lessees.³²

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

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²⁷ See 47 CFR § 96.66(a)(2). The Commission developed a dedicated application programming interface (API) within the Universal Licensing System (ULS) to support notifications from the SASs regarding spectrum manager lease notifications submitted under the immediate processing rules. See 47 C.F.R. §§ 1.9020(e) and 1.9046.

²⁸ See Nokia ICD Report; see also Nokia Response to Commission Request for Supplemental Information, GN Docket No. 15-319 (filed March 14, 2018).

²⁹ See *SAS Certification Public Notice*, 35 FCC Rcd at 118-120, para. 5.

³⁰ See note 26.

³¹ Each SAS administrator is permitted to submit a maximum of five leases per minute during this window.

³² See 47 CFR § 1.9046(b). A list of Priority Access Licensees and other qualified lessees can be found at: <https://www.fcc.gov/35-ghz-band-overview> ("Secondary Markets for Priority Access Licenses" tab).