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

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Application of:))
AST & Science, LLC) File No. 0284-EX-CN-2025
Application for Experimental Authority to Launch and Operate the FM1 NGSO Satellite)))

APPLICATION FOR EXPERIMENTAL AUTHORITY TO LAUNCH AND OPERATE THE FM1 NGSO SATELLITE

I. INTRODUCTION

Pursuant to Part 5 of the rules¹ of the Federal Communications Commission ("FCC" or "Commission"), AST & Science, LLC ("AST SpaceMobile") hereby respectfully requests authority to launch and operate a single satellite ("FM1") in non-geostationary ("NGSO"), low-Earth orbit ("LEO") for a period of two (2) years utilizing V-band frequencies (specifically, 47.2-50.2 GHz (Earth-to-space), 50.4-51.4 GHz (Earth-to-space), and 37.5-42.0 GHz (space-to-Earth)). As is explained in more detail, below, FM1 will conduct a testing and demonstration mission critical to initiating services for the company's commercial and Department of Defense customers as part of AST SpaceMobile's planned constellation.² AST SpaceMobile is planning

¹ 47 CFR § 5.1 *et seq*.

² See 47 CFR § 5.3 ("Stations operating in the Experimental Radio Service will be permitted to conduct the following types of operations: ... (e) Technical demonstrations of equipment or techniques.... (h) Testing of equipment in connection with production or regulatory approval of such equipment.... (j) Development of radio technique, equipment, operational data or engineering data, including field or factory testing or calibration of equipment, related to an existing or proposed radio service."); 47 CFR § 5.51(a) ("Authorizations for stations in the Experimental Radio Service will be issued only to persons qualified to conduct the types of operations permitted in § 5.3, including testing laboratories recognized by the Commission for radio frequency device testing.")

to launch FM1 before the end of Q2. Accordingly, AST SpaceMobile respectfully requests expedited action on this application no later than April 21, 2025.

In support of this request, AST SpaceMobile is submitting herewith a completed Form 442, Technical Annex, Interference Analysis, and Orbital Debris Assessment Report ("ODAR").

A. Background

AST SpaceMobile is building an innovative, space-based cellular LEO broadband network ("SpaceMobile System") that will be used to provide partner mobile service provider end users with direct-to-device ("D2D") services on unmodified 4G LTE and 5G mobile devices using partners' terrestrial spectrum.

AST SpaceMobile is headquartered in Midland, Texas where it operates a state-of-theart, vertically-integrated, 185,000 square foot manufacturing facility.³ Approximately ninety-five percent of the company's satellite manufacturing is done in Texas, including the full integration of all satellite components. In addition, AST SpaceMobile is increasing its staff, the overwhelmingly majority of which is located in the United States. Having partnered with numerous mobile network operators and telecommunications companies, including investors AT&T Mobility LLC ("AT&T") and Verizon Communications, Inc. ("Verizon"); secured strategic investments from U.S. companies; and entered into contracts with key U.S. agencies for its services, AST SpaceMobile is well-positioned to bring D2D services to users across the United States and globally.⁴

³ AST SpaceMobile also has a network operations facility in Lanham, Maryland.

⁴ See Strategic Partners, AST SpaceMobile, https://ast-science.com/company/strategic-partners/ (last visited Mar. 13, 2025); AST SpaceMobile Secures \$43 Million Contract in Support of U.S. Space Development Agency Through Prime Contractor, AST SPACEMOBILE (Feb. 26, 2025), https://feeds.issuerdirect.com/news-release.html?newsid=6000563534925192.

In 2022, AST SpaceMobile successfully launched its innovative satellite BlueWalker 3 ("BW3") to test and demonstrate D2D technology. BW3 deployed the largest commercial phased array antenna in LEO.⁵ Using its BW3 satellite, AST SpaceMobile achieved multiple historical breakthroughs in testing, including completing the first-ever space-based calls to unmodified smartphones⁶ and connectivity speeds of more than 20 megabits per second per 5 MHz.⁷

AST SpaceMobile built on the success of BW3 with the successful launch and operation of its first five commercial "Bluebird" satellites ("BB1s"), which will be used to provide D2D services to Americans across the country, pursuant to the Order and Authorization issued by the Commission in August 2024 ("V-Band Grant").⁸ The V-Band Grant provided a critical first step to realizing AST SpaceMobile's planned SpaceMobile System by permitting deployment of the first five commercial BB1 satellites, of the overall anticipated 248-satellite constellation. The V-Band Grant authorized operation of feeder links and nominal telemetry, tracking, and command ("TT&C") operations using frequencies in the 37.5-42 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space), and 50.4-51.4 GHz (Earth-to-space) bands.⁹ The Commission deferred consideration of AST SpaceMobile's request to deploy and operate the remaining 243 satellites

⁶ AST SpaceMobile Makes History in Cellular Connectivity, Completing the First-Ever Space-Based Voice Call Using Everyday Unmodified Smartphones, AST SPACEMOBILE (Apr. 25, 2023), https://ast-science.com/2023/04/25/ast-spacemobile-makes-history-in-cellular-connectivity-completing-the-first-ever-space-based-voice-call-using-everyday-unmodified-smartphones/.

⁵ David Todd, *BlueWalker 3 Satellite Unfurls Largest Ever Commercial Phased Array In Orbit*, SERADATA (Nov. 15, 2022), https://www.seradata.com/bluewalker-3-satellite-unfurls-largest-ever-commercial-phased-array-in-orbit/.

⁷ Rachel Jewett, *AST SpaceMobile Reports 5G Broadband Speeds Via Satellite*, VIASATELLITE (Sept. 19, 2023), https://www.satellitetoday.com/connectivity/2023/09/19/ast-spacemobile-reports-5g-broadband-speeds-via-satellite/.

⁸ In re AST & Science LLC, Application to Launch and Operate a Non-Geostationary Orbit V-band System, Order and Authorization, DA 24-756 (rel. Aug. 2, 2024) ("V-band Grant"). See also AST SpaceMobile Successfully Completes Unfolding of First five Commercial Satellites in Low Earth Orbit, BUSINESSWIRE (Oct. 25, 2024), https://www.businesswire.com/news/home/20241025345390/en/AST-SpaceMobile-Successfully-Completes-Unfolding-of-First-Five-Commercial-Satellites-in-Low-Earth-Orbit.

⁹ V-band Grant at ¶1. The V-Band Grant also authorized AST SpaceMobile to conduct TT&C with the BB1s in the 430-440 MHz (space-to-Earth and Earth-to-space), 2025-2110 MHz (Earth-to-space), and 2200-2290 MHz (space-to-Earth) bands. *Id.*

in its proposed constellation as well as its request to operate on additional frequencies, including any bands allocated to terrestrial services that it would ultimately seek to utilize for the provision of Supplemental Coverage from Space ("SCS").¹⁰

Since the V-Band Grant, and pursuant to experimental authorizations issued by the Commission,¹¹ AST SpaceMobile has further successfully demonstrated its planned services. Recently, AT&T and AST SpaceMobile successfully completed a video call by satellite over AT&T spectrum using an unmodified smartphone and the BB1s.¹²

As discussed below, AST SpaceMobile now seeks to build on the success of its earlier deployments by launching and operating an additional NGSO satellite in LEO – FM1 – for a testing and demonstration mission.

II. SYSTEM AND MISSION DESCRIPTION

With this application, AST SpaceMobile seeks authority, under Part 5 of the

Commission's rules, to launch and operate an additional NGSO satellite in LEO that will

conduct a testing and demonstration mission utilizing V-band frequencies.¹³ Specifically, FM1

¹² True Blue Connection: AT&T and AST SpaceMobile Take Connectivity to New Heights, AT&T (Feb. 24, 2025), https://about.att.com/story/2025/ast-spacemobile-video-call.html. See also Verizon Completes Its First Satellite to Cellular Enabled Video Call with AST SpaceMobile BlueBird 2, VERIZON (Feb. 24, 2025), https://www.verizon.com/about/news/verizon-ast-spacemobile-bluebird-2; Mella McEwen, AST SpaceMobile, Vodafone Make First-Ever Space Mobile Video Call, MIDLAND REPORTER-TELEGRAM (Jan. 30, 2025), https://www.mrt.com/business/article/vodafone-space-mobile-video-call-20066046.php.

¹⁰ Id.

¹¹ See, e.g., OET File No. 2053-EX-ST-2024. See also AST SpaceMobile Announces FCC Grant of Special Temporary Authority (STA) In the United States with Strategic Partners AT&T and Verizon, BUSINESSWIRE (Jan. 30, 2025), https://www.businesswire.com/news/home/20250130886840/en/ ("During 2024, AST SpaceMobile secured additional strategic investment from AT&T, Verizon, Google and Vodafone, and new contract awards with the United States Government.").

¹³ Grant of the instant application would not run counter to the V-band Grant, which specifies that the grant "is limited to five satellites only" and that no further grant-in-part will be considered. *See* V-band Grant at ¶ 27, nn. AST SpaceMobile is not seeking here a partial grant of its Part 25 constellation. Instead, AST SpaceMobile is seeking authority to conduct a limited testing and demonstration mission for a period of two years under Part 5 authority. Regardless, AST SpaceMobile intends to file a further modification to its Part 25 authorization while FM1's mission is on-going seeking authorization to provide SCS under the framework adopted by the Commission

will allow AST SpaceMobile to test the satellite's architecture and function of its mechanical systems. FM1 will be physically larger than the BB1s and deploy via an unfolding process that will enable the spacecraft to extend its solar arrays and antenna. The instant test will evaluate various mechanical components and subsystems of the new platform, including mechanisms and firmware employed to unfold the FM1's phased array antenna. FM1's mission is critical to ensuring the planned SpaceMobile System will function as expected, linking millions of Americans to satellite-enable communications utilizing unmodified smartphones.

AST SpaceMobile also plans to utilize FM1 to further demonstrate the feasibility of its planned SpaceMobile System. Using FM1, AST SpaceMobile intends to complete video calls over terrestrial spectrum provided by its partners using unmodified smartphones. FM1 will allow AST SpaceMobile to showcase its technology to the public and investors alike. Should FM1 fail to operate as expected, AST SpaceMobile will have the ability to safely de-orbit the satellite quickly.

Before conclusion of FM1's mission, AST SpaceMobile plans to file a further modification application for its entire 248-satellite constellation that will, among other technical modifications, seek approval to provide SCS utilizing 700 MHz and 850 MHz spectrum. In that modification application, AST SpaceMobile also will request that FM1 be re-authorized under Part 25 of the Commission's rules as the sixth satellite in the constellation. FM1's testing and demonstration mission is a further, critical step in achieving the SpaceMobile System.

in the SCS Report and Order. See In re Single Network Future: Supplemental Coverage from Space, Report and Order and Further Notice of Proposed Rulemaking, 39 FCC Rcd 2622, FCC 24-28 (2024) ("SCS R&O").

A. FM1 Spacecraft Overview

FM-1 is an evolution of the BB1s with a larger phased array, higher throughput, and an enhanced satellite bus (ControlSat). The ControlSat consists of a cylindrical main body that hosts all satellite subsystems required for TT&C, attitude determination and control, and propulsion. After separation from the launch vehicle, activation, detumble, and checkout, the ControlSat deploys solar panels of approximately 30 m² area from the zenith cylinder face in the anti-velocity direction and a phased array antenna of approximately 199 m² in the velocity direction.

B. Frequency Information

The frequency bands in the following table reflect all frequencies for which AST SpaceMobile intends to operate FM1 pursuant to the instant authorization:

Frequencies	Use
47.2-50.2 GHz	Gateway/Feeder Links,
50.4-51.4 GHz	Routine TT&C (Earth-to-
	space)
37.5-42.0 GHz	Gateway/Feeder Links,
	Routine TT&C (space-to-
	Earth)
2025-2110 MHz	Off-Nominal TT&C and Orbit-
	Raising Maneuvers (Earth-to-
	space)
2200-2290 MHz	Off-Nominal TT&C and Orbit-
	Raising Maneuvers (space-to-
	Earth)
430-440 MHz	Emergency TT&C
	Communications (space-to-
	Earth and Earth-to-space)

In the V-band Grant, the FCC concluded that AST SpaceMobile's feeder links and nominal TT&C operations in the V-band could be classified as a fixed satellite service.

Accordingly, AST SpaceMobile's proposed use of V-band frequencies is consistent with the U.S. Table of Allocations.¹⁴

TT&C operations will be conducted in the S- and UHF bands outside the United States through third-party ground station service providers. Further information is provided in the Technical Appendix.

C. Launch Schedule

FM1 is scheduled to launch from India during Q2 2025.

D. Ground Segment

Provided in the Technical Annex is a table identifying the ground stations that AST SpaceMobile intends to use with the FM1 satellite.

III. GRANT OF THE APPLICATION WILL SERVE THE PUBLIC INTEREST

The public interest will be served by prompt grant of this application. As the Commission has acknowledged, "SCS is a crucial component of the Commission's vision for a 'single network future' in which satellite and terrestrial networks work seamlessly together to provide coverage that neither network can achieve on its own."¹⁵ Hybrid satellite-terrestrial networks are able to connect everyone, everywhere by providing coverage that neither could achieve alone. When fully deployed, AST SpaceMobile's planned SCS services will expand the reach of critical

¹⁴ The 40-42 GHz portion of the V-band is currently allocated both in the U.S. Table of Allocations (the "Table") and internationally for fixed satellite service ("FSS"), and parts of the band are shared with fixed service, mobile service, mobile-satellite service ("MSS"), broadcasting service, and broadcasting-satellite service. AST SpaceMobile confirms that it will take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference. The 47.2-48.2 GHz portion of the V-band is currently allocated in the Table for FSS, fixed service, and mobile service, limited to non-Federal stations, and the 48.2-50.2 GHz portion is allocated for these same services for both Federal and non-Federal stations. The 50.4-51.4 GHz (Earth-to-space) band is allocated to FSS, fixed service, and mobile service, and MSS for both Federal and non-Federal stations in the United States and for those same services internationally, with MSS allocated on a secondary basis.

¹⁵ SCS R&O, 39 FCC Rcd at 2623, ¶1.

communications services, including during emergencies and natural disasters, and help bridge the digital divide by facilitating connectivity for more people in more places collectively enabling SCS coverage over most of the contiguous United States. AST SpaceMobile's SCS services will also advance the position of the United States as a global leader in communications and promote the innovative and efficient use of our nation's spectrum resources in ways that foster creative collaborations among users.¹⁶ Not only will AST SpaceMobile's first-of-its kind satellite-to-mobile services advance these goals, but it will also serve the public interest by helping to ensure that spectrum is used collaboratively and efficiently.

Launch, deployment, and testing of FM1 will advance AST SpaceMobile's plans for SCS by allowing it to assess the satellite architecture and functionality that will provide the service. SCS, and specifically AST SpaceMobile's planned D2D service, is a new, technologicallyadvanced means to connect everyone, everywhere. The public interest is served by authorizing the requested testing and demonstration mission that will ensure the service works as expected. Should tweaks be necessary, AST SpaceMobile can build-in lessons learned from FM1 into future satellites, thereby further improving the planned service.

To facilitate a prompt, on-budget launch, AST SpaceMobile respectfully requests that the Commission act on this application as soon as possible, and in no event later than April 21, 2025. Importantly, prompt action by the Commission will help ensure that the public interest benefits discussed above accrue to the American public expeditiously, and that the United States retains its leadership in space.

¹⁶ *Id.* $\P 2$.

V. ITU AND OWNERSHIP REQUIREMENTS

AST SpaceMobile accepts responsibility to pay any ITU cost recovery fees associated with this Application. Invoices for such fees may be sent to the contact noted in the FCC Form 442.¹⁷ Included herewith as exhibits are a signed ITU cost-recovery letter and updated ownership information.

VI. CONCLUSION

For the reasons articulated herein, AST SpaceMobile submits that the public interest would be served by grant of the instant application. In addition, AST SpaceMobile requests for expedited action by April 21, 2025 to ensure that it is able to ship and launch the FM1 satellite on a timely basis.

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AST SpaceMobile, Inc. 2901 Enterprise Lane Midland, TX 79706 Respectfully Submitted,

/s/

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¹⁷ 47 CFR § 25.111.