

SkyWerx Industries, LLC Narrative Statement

Pursuant to Section 5.63(c)(1) of the Commission's Rules, SkyWerx Industries, LLC ("SkyWerx") hereby provides this narrative statement in support of its application for an experimental license to conduct a market trial, as defined in Sections 5.5 and 5.602, using spectrum in the 3550-3650 MHz in La Plata and Archuleta counties in Colorado. SkyWerx requests a license term of the shorter of (a) two (2) years from grant of the application, or (b) SkyWerx's grant of authority from a Spectrum Access System ("SAS") and Environmental Sensing Capability ("ESC") to operate the authorized equipment and facilities on a General Authorized Access ("GAA") basis.

Overview

SkyWerx is a fixed wireless broadband provider that holds a nationwide non-exclusive 3650-3700 MHz service license (Call Sign WQIS540). SkyWerx delivers service to approximately 3,000 residential and business subscribers in Colorado, including portions of La Plata and Archuleta counties, with a focus on rural and previously underserved locations. SkyWerx uses a wide array of unlicensed spectrum, licensed spectrum in the 2.5 GHz band and "lightly licensed" spectrum in the 3650-3700 MHz band. SkyWerx has determined that Broadband Radio Service and Educational Broadband Service spectrum in the 2.5 GHz band is not available in La Plata and Archuleta counties. Over time, SkyWerx has determined that, in many areas, the 3650-3700 MHz band offers the best combination of throughput, propagation, cost and equipment solutions to deliver high-quality broadband service to its subscribers and others in the target markets that lack access to competitive broadband services.

SkyWerx, through its membership in the Wireless Internet Service Providers Association ("WISPA"), has supported the creation of the Citizens Broadband Radio Service ("CBRS"), including the inclusion of the 3650-3700 MHz band, with the hopes that adequate protections and policy would be adopted to facilitate a smooth transition from the Part 90 to the Part 96 rule framework. SkyWerx believes that the *CBRS Order*,¹ along with the ongoing development of the SAS and ESC, represents a positive change in spectrum management policy, and will eventually result in extremely efficient and widespread use of this 150 megahertz of spectrum for both small cell technologies for mobile wireless broadband and low power macro cell technologies for fixed wireless broadband in rural and underserved locations.

In addition, the equipment market is evolving to a standards-based LTE platform that relies on software-defined base station radios and encompasses a large, rapidly developing global equipment and technology ecosystem. Because of these attributes and the future ability to operate within the 150 megahertz between 3550-3700 MHz, SkyWerx intends to deploy in the 3650-3700 MHz band for new areas and to upgrade existing unlicensed operations to the 3650-3700 MHz band to improve customer experience and better compete. When permissible, SkyWerx expects to utilize a combination of Priority Access Licenses ("PAL") and GAA "license

¹ See *Amendment of the Commission's Rules with Regard to the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015) ("*CBRS Order*").

by rule” spectrum across the entire 150 megahertz of spectrum. However, to date, there is no Part 90 certified equipment that incorporates the functionality needed to comply with new Part 96 requirements, partially due to the fact that there is no certified SAS and ESC, and the technical specifications for the SAS and ESC are still under development.

In order to determine the financial and technical viability of the CBRS band and assess consumer acceptance at various speeds and price points, SkyWerx seeks an experimental license to use spectrum in the 3550-3650 MHz band in La Plata and Archuleta counties in Colorado. These counties are extremely rural, and coverage and deployment are severely restricted by rugged terrain and dense foliage that makes line-of-sight propagation impossible over the distances from existing towers. Moreover, Skywerx is using all available 3650-3700 MHz spectrum such that further deployment in that band would result in harmful self-interference. SkyWerx plans to use Telrad LTE equipment on an experimental basis to determine whether and to what extent such deployment can resolve the line-of-sight propagation issues. In sum, this experiment will inform SkyWerx’s business, investment, technology and deployment decisions as it plans for expansion and densification of its broadband networks.

Description of Program

Because the Commission has not yet certified equipment for use with the SAS or the Environmental Sensing Capability (“ESC”) in the CBRS band, SkyWerx plans to use Telrad equipment certified by the FCC for use in the 3650-3700 MHz band that is re-tuned to the 3550-3650 MHz band. Power limits and out-of-band emission limits will conform to the Part 96 rules for Category B CBSDs that the Commission adopted in the *CBRS Order* and the Order on Reconsideration and Second Report and Order.²

SkyWerx has identified La Plata and Archuleta counties in Colorado as the optimum place to conduct the market trial experiment. SkyWerx has access to and is transmitting on other frequencies from existing towers and operation in these counties with personnel on site to monitor construction and operation, to ensure that there will no harmful interference to Incumbent Access users and to remedy harmful interference in the unlikely event it occurs. Further, there appears to be no ground-based radar within 130 miles of the planned trial area that would require ESC or coordination with incumbents, and the proposed areas of operation are outside the coastal protection zone. Commission records also show that there are no Fixed Satellite earth stations in the 3600-3650 MHz band operating anywhere in the vicinity of the trial location.³

Pursuant to this market trial, SkyWerx plans to test different broadband speeds and price points to determine the utility and value of the CBRS as it relates to consumer take rates and network performance. Over time, SkyWerx may test with different equipment as it becomes available. Consistent with the market trial requirements of Section 5.602(d), SkyWerx will own

² See *Amendment of the Commission’s Rules with Regard to the 3550-3650 MHz Band*, Order on Reconsideration and Second Report and Order, GN Docket No. 12-354, FCC 16-55 (rel. May 2, 2016).

³ See *Amendment of the Commission’s Rules with Regard to the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, GB Docket No. 12-354, 27 FCC Rcd15594 (2012), at Appendix A.

the CBSD and End User Device equipment, and will not transfer ownership to trial participants. SkyWerx seeks authority to deploy up to 20 base stations consisting of 3 to 4 CBSD sectors each and up to 500 End User Devices, which it believes is the minimum quantity necessary to conduct the two-year trial proposed in this application due to the need to measure aggregate signal levels at the edge of a Census Tract or Wireless Protection Zone.

As required by Section 5.602(e), all end users will be advised at the commencement of the trial that service is being provided on a trial basis, that any non-approved devices are for testing only and that all equipment must be returned at the end of the trial period. SkyWerx further acknowledges that it will need to retrieve the devices from the users at the end of the trial. In particular, all users will be notified that the service they will be receiving is being provided in part or in whole under experimental authority, and that as a condition of the experimental license, SkyWerx may be required at any time, without prior notice, to cease operations in the spectrum between 3550 and 3650 MHz. In addition, SkyWerx acknowledges and will notify users that all customer premise equipment authorized under the experimental license remains the property of SkyWerx, and must be collected or rendered inoperable at the conclusion of the trial. At the end of the trial, SkyWerx will either: (1) shut off the service immediately, stop billing users for the service and post a public notice at www.skywerx.com, and collect or render all customer premise equipment inoperable, or (2) change the frequency and operating parameters of some or all of the customer premise equipment that is part of the trial to parameters authorized under Part 90, Subpart Z of the FCC rules (which may materially impact network capacity, performance, and quality of service), post a public notice to www.skywerx.com, and allow users to opt out of the modified service offering with no further obligation to pay for the service.

SkyWerx plans to conduct its trial in two phases. In the first phase, SkyWerx will deploy with equipment certified for use in the 3650-3700 MHz band, and operating in 3550-3650 MHz band at various architectures and speeds. In the second phase, which will begin when SAS and ESC alpha and beta testing is viable with at least one party, SkyWerx will incorporate experimental SAS/ESC integration of equipment into the trial.

Objectives of Experimental Program

During the trial, and prior to the certification of a SAS and ESC, SkyWerx will comply with the power levels in Section 96.41 as they apply to End User Devices and Category B CBSDs. At the conclusion of the requested experimental license term, SkyWerx will either transition to Part 96 GAA if equipment is certified and authorized under GAA rules or, if not, cease operation in 3550-3650 MHz. SkyWerx hopes that the equipment and SAS/ESC development can be accelerated through the information generated by the market trial.

In addition to the technical objectives, the objective of determining the value and utility of PALs exists, which necessitates charging for the service at varying price points and performance levels.

The experiment will examine the impact of the following rules on potential future commercial deployments.

Section 96.15 - Validate ability to comply through dynamic frequency changes across a geographically clustered collection of CBSDs, planned and executed within 300 seconds of a simulated command to vacate an occupied channel.

Section 96.17 – Validate propagation models ability to predict co-channel interference, blocking, and OOB to comply with protections of existing FSS Earth Stations.

Section 96.21 - Validate propagation models ability to predict co-channel interference, blocking, and OOB to comply with protections of Grandfathered Wireless Broadband Licensees.

Section 96.25 – Validate propagation model’s ability to predict compliance with PAL Protection Areas.

Section 96.39(a) – Develop a method for determining CBSD locations with sufficient accuracy to comply with this section.

Section 96.39(d), (e) – Develop methods for collecting Signal Level and Frequency information from the CBSD so it can be reported to the SAS.

Section 96.41 – Determine the appropriate power levels for CBSD and End User Devices to both comply with this section and achieve desired coverage and performance. The aggregate RMS power level RSS and PAPR requires measurement validations in a real world environment where CBSD and End User Device density is consistent with intended long term use of the band. Propagation models must be tuned and validated to accurately predict compliance. Power level control of the equipment must be tuned so that the CBSD and End User Device transmit at the lowest power levels possible to meet performance objectives, while complying with the prescribed limits.

Section 96.53 – Develop methods to detect interference at the CBDS and End User Device from other GAA and PAL users so it can be reported to the SAS.

Contribution to the Radio Art

In accordance with Section 5.63(c)(1), SkyWerx expects that its market trial will contribute greatly to the radio art. The CBRS is a new service in which commercial and Federal uses will share a spectrum band, with use governed by an SAS and ESC. It has been characterized as a test-bed for innovation and as a paradigm shift in spectrum management. In connection with its market trial, SkyWerx expects to learn a significant amount of information about equipment capabilities and limitations, customer acceptance at various speeds and price points, and integration of its service and equipment with the SAS and ESC. To the extent permitted by SAS and ESC administrators and equipment providers, SkyWerx will share the results of its market trial with the Commission.