Windfield Enterprises LLC dba Kellin Communications
Statement in Support of Experimental License Application

Pursuant to Section 5.63(c)(1) of the Commission's Rules, Windfield Enterprises LLC dba Kellin Communications ("Kellin Communications") hereby demonstrates support for its application for an experimental license to conduct technology and market trials, as defined in Sections 5.5 and 5.602, using spectrum in the 3550-3650 MHz band from specified locations in rural Colorado in accordance with the technical and operating parameters described in the accompanying FCC Form 442. Kellin Communications requests a license term of the shorter of (a) two (2) years from grant of the application, or (b) Kellin Communications' grant of authority from a Spectrum Access System ("SAS") and Environmental Sensing Capability ("ESC") to operate in this band on a General Authorized Access ("GAA") basis.

Overview

Kellin Communications provides fixed wireless broadband service to the public in the rural area between Denver and Colorado Springs. Kellin Communications uses a wide array of unlicensed spectrum and "lightly licensed" spectrum in the 3650-3700 MHz band (Call Sign WQJX418). Over time, Kellin Communications 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. At present, Kellin Communications serves approximately 1,500 customers from its registered 3650-3700 MHz locations.

In anticipation of the full-scale roll-out of services in the Citizens Broadband Radio Service ("CBRS") band, the equipment market is becoming more competitive. Some manufacturers are continuing to develop and market proprietary non-standard-based equipment while others are evolving to an LTE-based environment that relies on software-defined base station radios and encompasses a large, rapidly developing global equipment and technology ecosystem. Because of the propagation attributes and the future ability to operate within the 150 megahertz between 3550-3700 MHz, Kellin Communications is considering making a substantial financial commitment to deploy in the 3550-3700 MHz band for new areas and to upgrade existing unlicensed operations to improve customer experience and better compete. Over time, Kellin Communications expects to utilize a combination of Priority Access Licenses ("PAL") and GAA "license by rule" spectrum across the entire 150 megahertz of spectrum.

Kellin Communications requests an experimental license to use spectrum in the 3550-3650 MHz band in rural Colorado from the sites identified in the accompanying FCC Form 442 so that it can determine the financial and technical viability of the CBRS band and assess consumer acceptance at various speeds and price points. These locations are the same locations from which Kellin Communications provides its 3650-3700 MHz service. This experiment will inform Kellin Communications' business, investment, technology and deployment decisions as it plans for expansion and densification of its broadband network. For instance, the trial will help Kellin Communications determine the best equipment and technology platform to purchase and employ for given topographic environments, the network architecture that will most efficiently

allocate limited resources, the level of capital investment justified by the real-world performance of equipment in this band, and the service levels and price points consumers will accept. Over time, as manufacturers develop such capability, Kellin Communications plans to test carrier aggregation and channel bonding to improve speed and throughput. The experiment will also provide Kellin Communications with real world data on which to determine whether, and at what valuations, to participate in the upcoming auction for PAL spectrum.

Description of Program

The Commission has not yet certified equipment for use with the SAS or the ESC in the CBRS band. Accordingly, Kellin Communications plans to use 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 Orders*.[1]

Kellin Communications has identified rural Colorado as the optimum place to conduct the market trial experiment. Kellin Communications has commercial operations in this area, and thus has access to existing vertical assets and in-market personnel to monitor deployment and operations, to ensure that there will be no harmful interference to Incumbent Access users and to promptly remedy harmful interference in the unlikely event it occurs.

Based on its research, Kellin Communications has determined that the geographic area designated for the trial lies outside the coastal exclusion zone[2] and a significant distance from any ground-based radar facilities.[3] 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.[4] To the extent there are any existing or subsequent experimental operations authorized in the area, Kellin Communications will work in good faith with other experimental licensees to coordinate operations to enable the objectives of all experimental operations to be realized.

Pursuant to this market trial, Kellin Communications plans to test and compare different manufacturers' equipment, different equipment (proprietary and LTE-based), different network architectures (including channel sizes, power levels and antenna orientations), different broadband speeds and different price points to determine the utility and value of the CBRS as it relates to the addressable market for wireless broadband, consumer take rates and network

[1] *See Amendment of the Commission's Rules with Regard to the 3550-3650 MHz Band,* First Report and Order and Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015); *Amendment of the Commission's Rules with Regard to the 3550-3650 MHz Band,* Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011 (2016) (collectively, "*CBRS Orders*").

[2] *See* Letter dated from Paige R. Atkins, NTIA, to Julius P. Knapp, FCC, GN Docket No. 12-354 (dated March 24, 2015), at Enclosure 1.

[3] *See id.* at Enclosure 2. The closest ground-based radar facility appears to be at Fort Carson, Colorado, which is more than 50 kilometers from the trial area. To the extent necessary, Kellin Communications will accept a condition on its experimental license that restricts operations in those frequencies that might cause harmful interference to such military radar facilities.

[4] *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.

performance. Kellin Communications will primarily test CBRS equipment operating in channel sizes of up to 40 megahertz, but will also experiment with channels of different sizes to evaluate the optimal network architecture for commercial operations in various deployment scenarios. Kellin Communications also will compare real-world performance to the operating specifications provided by manufacturers. Kellin Communications seeks authority to provide service to as many as 1,500 end users, which it believes is the minimum quantity of devices necessary to conduct the two-year trial proposed in this application.

Kellin Communications intends to initially test equipment from Cambium Networks. Going forward, Kellin Communications may also deploy and test equipment from other manufacturers. In such case, Kellin Communications will seek modification of its experimental authorization.

Kellin Communications plans to conduct its trial in two phases. In the first phase, Kellin Communications 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 testing is viable with at least one party, Kellin Communications will incorporate experimental SAS/ESC integration of equipment into the trial.

Consistent with the market trial requirements of Section 5.602(d), Kellin Communications will own the CBSD and CPE, and will not transfer ownership to trial participants. 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. Kellin Communications further acknowledges that it will retrieve the CPE from end users at the end of the trial. In particular, all end 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, Kellin Communications may be required at any time, without prior notice, to cease operations in the 3550-3650 MHz band. In addition, Kellin Communications acknowledges and will notify users that all CPE authorized under the experimental license remains the property of Kellin Communications, and must be collected or rendered inoperable at the conclusion of the trial. At the end of the trial, Kellin Communications will either: (1) shut off the service immediately, stop billing users for the service, post a public notice at allpointsbroadband.com, and collect or render all CPE inoperable, or (2) change the frequency and operating parameters of some or all of the CPE 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 allpointsbroadband.com, and allow users to opt out of the modified service offering with no further obligation to pay for the service.

Objectives of Experimental Program

Kellin Communications anticipates working with more than one equipment vendor and more than one SAS/ESC administrator. During the trial, and prior to the certification of a SAS and ESC, Kellin Communications 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, Kellin Communications 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. Kellin Communications hopes that the equipment and SAS/ESC development can be accelerated through the information generated by the market trial.

By comparing equipment and technology performance with existing operations, Kellin Communications can gain important information to assess network architecture, appropriate channel widths, antenna capabilities and deployment costs. This will enable Kellin Communications to make informed decisions on commercial deployment options and enhance its ability to quickly deploy commercial service under Part 96 when the SAS/ESC authorizes GAA use.

In addition to the above-described objectives, the experiment will examine the impact of the following rules on potential future commercial deployments.

Section 96.15 – Compliance with 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 OOBE.

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

Section 96.25 – Validate propagation models' 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.

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. Form this information, Kellin Communications can better determine deployment costs, equipment costs and expected revenues that will inform its CBRS bidding strategy.

Contribution to the Radio Art

In accordance with Section 5.63(c)(1), Kellin Communications expects that its market trial will contribute greatly to the radio art. 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, Kellin Communications 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. Kellin Communications plans to provide feedback to the manufacturers participating in the trial to encourage improvements to equipment and technology that will contribute to better performance and enhance competition.