

### *Deployment Parameters*

The initial stage of the experimental trial proposes operation from six sites, located on existing structures in Puerto Rico. Specific parameters of proposed operation are detailed in the chart below:

Location 1 - Cayey	
Coordinates	18-9-8.55 N/ 66-4-49.4W
Beam Width	90 °
Orientation in Horizontal Plane	0 °, 90°, 180°
Orientation in Vertical Plane	4°
Orientation in Horizontal Plane	270 °
Orientation in Vertical Plane	2 °

Location 2 - Guaynabo	
Coordinates	18-19-22.75 N / 66-6-44.56W
Beam Width	90 °
Orientation in Horizontal Plane	0 °, 90°, 180° and 270°
Orientation in Vertical Plane	2°

Location 3 – San Juan	
Coordinates	18-27-12.28N / 66-4-47.06W
Beam Width	90 °
Orientation in Horizontal Plane	0 °, 90°, 180° and 270°
Orientation in Vertical Plane	4°

Location 4 - Carolina	
Coordinates	18-20-3.59N / 65-58-11.51W
Beam Width	90 °
Orientation in Horizontal Plane	0 °, 90°, 180° and 270°
Orientation in Vertical Plane	2°

Location 5 - Bayamon	
Coordinates	18-17-7.58N / 66-10-46.69W
Beam Width	90 °
Orientation in Horizontal Plane	0 °
Orientation in Vertical Plane	4°
Orientation in Horizontal Plane	90°, 180° and 270°
Orientation in Vertical Plane	2°

Location 6 - Aibonito	
Coordinates	18-5-46.62N / 66-13-57.51W
Beam Width	90 °
Orientation in Horizontal Plane	0 ° and 90°
Orientation in Vertical Plane	2°
Orientation in Horizontal Plane	180° and 270°
Orientation in Vertical Plane	4°

## **VPNet, Inc.**

### **Statement in Support of Experimental License Application**

VPNet, Inc. (“VPNet”), pursuant to Section 5.63(c)(1) of the Commission’s Rules, provides this statement in support of its application for an experimental license to conduct a technology and market trial, as defined in Sections 5.5 and 5.602, using spectrum in the 3550-3650 MHz band transmitting from six locations in Puerto Rico to a limited number of end users. VPNet requests a license term equal to the shorter of (a) one (1) year from grant of this application, or (b) VPNet’s grant of authority from a Spectrum Access System (“SAS”) and Dynamic Protection Area (“DPA”)-enabled SAS software to operate the authorized equipment and facilities on a General Authorized Access (“GAA”) basis.

#### ***Background***

Founded in 2008 and based in Cidra, Puerto Rico, VPNet is a privately owned provider of fixed wireless broadband services in rural areas of Puerto Rico. It provides a variety of Information Technology and Telecommunication related services, with an emphasis on providing primary and redundant services to commercial and residential clients located in rural areas throughout the island.

VPNet’s operations, infrastructure, equipment and customer base were affected by the windstorms and damage caused by Hurricanes Irma and Maria. Over the last six months, VPNet has focused on rebuilding and returning to normal operating conditions. As of today, approximately 95% of VPNet’s customers have resumed their regular commercial services. VPNet has taken substantial strides and expended significant resources to resume operations.

To meet these objectives, VPNet intends to experiment with upgraded access point and customer premise equipment (“CPE”). Based on its research and understanding of the technical rules for the Citizens Broadband Radio Service (“CBRS”), VPNet believes that software-defined, LTE-based equipment manufactured by Telrad Networks can be a successful deployment option, and that in mid-band spectrum may offer consumers the best combination of throughput, propagation, cost and performance in areas where access to competitive broadband services is lacking. As it seeks to restore and improve fixed broadband service in Puerto Rico, VPNet expects to gain a better “real world” understanding of the benefits, challenges and costs associated with deployment of the equipment and how it functions with the SAS and DPA-enabled software. Understanding the trade-offs between cost and performance will significantly inform VPNet’s business decisions, for the benefit of its own financial modeling and consumers who would be offered better service. Many of these areas are still without primary internet service due to the rural environment in which they are located. Non-line-of-sight service provides a significant opportunity for service in these areas.

Recently, the Commission granted a blanket waiver of certain Part 96 rules to enable more rapid access to CBRS spectrum.<sup>1</sup> As a part of this trial, VPNet will use an alternative protection method based on DPAs to permit Federated Wireless' DPA-enabled SAS to authorize Category B CBSDs in Puerto Rico. Because the entirety of Puerto Rico is within an exclusion zone to protect Naval radar operations, a DPA-enabled SAS is the only way where, in the short term and perhaps longer, CBRS facilities could be deployed in Puerto Rico, an area where other spectrum resources are being congested as temporary wireless facilities are deployed and stand to replace wireline plant damaged in the 2017 hurricanes. A significant part of the trial will be to determine the level of use that Federated Wireless' DPA-enabled SAS will allow for commercial use.

The market trial aspect of this proposal involves up to 200 of VPNet's customers, which is about 15 percent of its customer base. VPNet plans to experiment with various speed and pricing plans to assess consumer acceptance of the service. If the trial is technologically successful and beneficial to consumers, VPNet will be able to determine whether the equipment can be efficiently and economically deployed with high quality performance under the control of the SAS and whether the band is suitable for large-scale restoration of broadband service that was uprooted by Hurricanes Irma and Marie. The trial has been designed to involve the minimum number of customers and towers to provide VPNet with the information it needs regarding customer demand and preferences and to determine the capabilities of the DPA-enabled SAS.

Overall, the trial will provide VPNet with information to help make its future equipment, expansion and network investment plans. Assuming the trial is successful and the CBRS rules are not changed in a manner that effectively prohibits participation by small broadband providers for Priority Access Licenses ("PALs"), VPNet plans to utilize a combination of PAL and GAA "license by rule" spectrum in the entire 150 megahertz of 3550-3700 MHz 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 under development.

VPNet believes that the *CBRS Order*<sup>2</sup> and the *Waiver Order* 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 higher power technologies for fixed wireless broadband in rural and underserved locations. As a small fixed wireless broadband provider, cost-effectiveness is an important factor in VPNet's future deployment and investment decisions.

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<sup>1</sup> See *Promoting Investment in the 3550-3700 MHz Band*, DA 18-538, GN Docket No. 17-258 (rel. May 22, 2018) ("*Waiver Order*")

<sup>2</sup> 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*").

In order to determine the financial and technical viability of the CBRS band and assess consumer acceptance at various speeds and price points, VPNet seeks an experimental license to use spectrum in the 3550-3650 MHz band, transmitting from the six locations identified in this application. VPNet plans to deploy LTE-based equipment and a DPA-enabled SAS on an experimental basis to determine equipment and technology performance and the market potential resulting from 150 megahertz of mid-band spectrum. In sum, this experiment will inform VPNet's business, investment, technology and deployment decisions as it plans to restore, expand and upgrade its fixed broadband network.

### *Description of Trial*

Because the Commission has not yet certified equipment for use with the SAS or the ESC in the CBRS band, VPNet plans to trial Telrad transmission equipment and the CPE certified by the FCC for use in the 3650-3700 MHz band that is re-tuned to the 3550-3650 MHz band for purposes of the trial. VPNet also plans to use Federated Wireless' DPA-enabled SAS to ensure that Navy vessels do not experience harmful interference. 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.<sup>3</sup>

VPNet will conduct the experiment in its existing area of operations in Puerto Rico. VPNet has access to and is transmitting from existing towers and operation in this area with personnel on site to monitor deployment and operation, which will ensure that there will be no harmful interference to Incumbent Access users, and to remedy harmful interference in the unlikely event it occurs. Commission records show that there are no Fixed Satellite earth stations in the 3600-3650 MHz band operating near the test area.<sup>4</sup> Likewise, there appear to be no ground-based radar facilities in or near the planned trial area that would require ESC or coordination with incumbents.<sup>5</sup>

Under the market trial aspect of the experiment, VPNet plans to test different broadband speeds and price points to about 15 percent of its subscriber base in order to determine the utility and value of the CBRS as it relates to consumer take rates, preferences and network performance. Consistent with the market trial requirements of Section 5.602(d), VPNet will own the access points and any CPE owned by customers will be re-tuned to operate only in the 3650-3700 MHz portion of the band at the conclusion of the trial, unless the equipment can be used to operate in compliance with Part 96 rules at that time.

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<sup>3</sup> See *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).

<sup>4</sup> See *Amendment of the Commission's Rules with Regard to the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, 27 FCC Rcd 15594 (2012), at Appendix A.

<sup>5</sup> See Letter dated from Paige R. Atkins, NTIA, to Julius P. Knapp, FCC, GN Docket No. 12-354 (dated March 24, 2015), at Enclosures 1 and 2.

As stated above, the trial will involve about 15 percent of VPNet' customer base, which it believes is the minimum quantity necessary to conduct the trial proposed in this application. There are a number of reasons why the trial has been designed in this manner. First, each tower has different topography and line-of-sight features, and VPNet would like to determine the best ratio of coverage and throughput in these disparate environments. Second, VPNet desires to trial with different numbers of customers at each location so it can compare performance and evaluate usage trends and congestion points, which are significant factors in network deployment and management that inform equipment purchasing decisions. Third, VPNet expects to receive feedback from trial participants at each of the diverse locations. That input also will inform VPNet on its decisions whether to deploy in CBRS and, if so, what equipment it should deploy, where the equipment should be deployed, and the services it should offer. Fourth, the trial will test the viability of the Federated Wireless DPA-enabled SAS which, if successful, can pave the way for more wide-scale deployment in areas where Navy vessels are protected. Finally, the trial will help VPNet determine whether and two what extend the 3550-3700 MHz band can be used to restore service to rural areas of Puerto Rico ravaged by Hurricanes Irma and Marie.

### ***Objectives of Experimental Program***

During the trial, and prior to the certification of a SAS and ESC, VPNet will comply with the power levels in Section 96.41 as they apply to Category B CBSDs and End User Devices. At the conclusion of the experimental license term, VPNet 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.

In addition to the technical objectives, VPNet will test to determine the value and utility of PALs, which necessitates charging for the service at varying price points and performance levels. The trial will also provide VPNet with information that will be useful in valuing and bidding on PALs.

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 model's ability to predict co-channel interference, blocking, and OOB to comply with protections of existing Incumbent Access users. This will also be useful to assess protection of PAL users by GAA users.

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

*Section 96.41* – Determine the appropriate power levels 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 CBSD and End User Device from other GAA and PAL users so it can be reported to the SAS and ESC.

### ***Contribution to the Radio Art***

In accordance with Section 5.63(c)(1), VPNet expects that the trial will contribute 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, VPNet expects to learn a significant amount of information about equipment capabilities and limitations, interference protection and mitigation, customer acceptance at various speeds and price points, and integration of its service and equipment with the SAS and ESC. Because VPNet will make test data available to Telrad and Federated Wireless, the manufacturer also will gain important information that can be used to improve equipment performance and development.

### ***Notice to Trial Participants***

As required by Section 5.602(e), all end user customers participating in the trial 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. VPNet further acknowledges that it will retrieve the end user devices from the 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, VPNet may be required at any time, without prior notice, to cease operations in the 3550-3650 MHz band. In addition, VPNet acknowledges and will notify users that all customer premise equipment authorized under the experimental license must be rendered inoperable in the 3550-3650 MHz band at the conclusion of the trial to the extent the equipment is not useable under Part 96 rules. At the end of the trial, VPNet will either: (1) shut off the service immediately, stop billing users for the service and post a public notice at [www.vpnet.net](http://www.vpnet.net), and collect or render all customer premise equipment inoperable, or (2) change the frequency and operating parameters of some or all of the 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.vpnet.net](http://www.vpnet.net), and allow users to opt out of the modified service offering with no further obligation to pay for the service.



July 6, 2018

Mr. Felipe J. Hernandez  
President and CEO  
VPNNet, Inc.  
P.O. Box 193780  
San Juan, Puerto Rico 0019-3780

Re: Letter in Support of VPNNet Experimental License Application

Dear Mr. Hernandez:

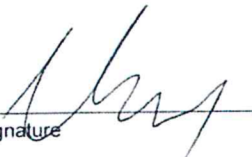
Telrad Networks supports your company's application to the Federal Communications Commission ("FCC") for an experimental license to conduct technology and market trial activities in Puerto Rico using Telrad's CBRS solution

We understand that VPNNet is applying to the FCC for an experimental license to trial spectrum in the 3550-3650 MHz band transmitting from six locations in Puerto Rico to a limited number of end users. We further understand that VPNNet proposes to use a Spectrum Access System ("SAS") and Dynamic Protection Area ("DPA")-enabled SAS software to operate the authorized equipment and facilities. The DPA-enabled protection system will be provided by Federated Wireless, one of the SAS administrators the FCC is certifying, to ensure that Navy vessels do not experience harmful interference. .

Telrad intends to participate in the trial by providing VPNNet with radio access network equipment. This letter confirms to the FCC that Telrad CBSD/Domain proxy solution can operate with Federated Wireless' DPA-Enabled SSA. Telrad's BreezeCOMPACT1000 and CPE9000 have both passed all part 96 tests in a CBRS Alliance accredited lab. Telrad is fully compliant with the WInnForum standard and can support spectrum grant allocation, suspension, termination as directed by Federated Wireless' SAS and its DPA-enabled software.

Sincerely,

Nick Dewar  
Vice President, Products and Systems Engineering  
Telrad Networks

  
Signature



June 29, 2018

Mr. Felipe J. Hernandez  
President and CEO  
VPNet, Inc.  
P.O. Box 193780  
San Juan, Puerto Rico 0019-3780

Re: Letter in Support of Notice of Experimental License Application

Dear Mr. Hernandez:

On behalf of Federated Wireless, Inc. ("Federated"), I write to you today for the purpose of setting forth Federated's support for your company's application to the Federal Communications Commission ("FCC") for an experimental license to conduct certain technology and market trial activities in Puerto Rico (the "Trial").

Our understanding is that your company, VPNet, Inc. ("VPNet") is applying to the FCC for an experimental license to conduct the Trial using spectrum in the 3550-3650 MHz band transmitting from six locations in Puerto Rico to a limited number of end users. We further understand that VPNet is requesting a license term equal to the shorter of (a) one (1) year from grant of this application, or (b) VPNet's grant of authority from a Spectrum Access System ("SAS") and Dynamic Protection Area ("DPA")-enabled SAS software to operate the authorized equipment and facilities on a General Authorized Access ("GAA") basis.

Federated has received conditional approval from the FCC to serve as a SAS administrator, and is currently readying its system for commercial deployment. Federated intends to participate in the Trial by serving as the SAS administrator and VPNet intends to use Federated Wireless' DPA-enabled SAS to ensure that Navy vessels do not experience harmful interference.

You have asked that Federated submit this letter in support of VPNet's application, specifically for the purpose of confirming to the FCC that Federated's SAS is DPA-enabled. Solely for the purposes of supporting VPNet's application, Federated hereby confirms that its SAS is DPA-enabled and assuming normal and proper operation it will ensure that Navy vessels do not experience harmful interference.

Sincerely,



Kurt Schaubach  
Chief Technology Officer  
Federated Wireless, Inc.