

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

<b>In the Matter of</b>	)	
	)	
<b>Amendment of Part 15 of the</b>	)	<b>ET Docket No. 14-165</b>
<b>Commission's Rules for Unlicensed</b>	)	
<b>Operations in the Television Bands,</b>	)	<b>RM-11840</b>
<b>Repurposed 600 MHz Band, 600 MHz</b>	)	
<b>Guard Bands and Duplex Gap, and</b>	)	
<b>Channel 37</b>	)	

**EVOLVE CELLULAR, INC. AND SKYLARK WIRELESS LLC COMMENTS  
SUPPORTING MICROSOFT CORPORATION'S PETITION FOR RULEMAKING**

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## **I. INTRODUCTION**

Evolve Cellular, Inc. (“Evolve”) and Skylark Wireless LLC (“Skylark Wireless”) submit these comments in support of Microsoft’s Petition for Rulemaking (“Petition”).

Evolve is the 700 MHz B-Block licensee for CMA 667. This is the area within the triangle formed by the Austin, Houston and San Antonio, Texas urban areas but does not contain any major population centers. CMA 667 contains over 11,000 square miles, has a population of fewer than 400,000 people, and covers all or part of 13 “rural” counties..

Skylark Wireless is a wireless networking hardware startup headquartered in Houston, Texas. Skylark Wireless specializes in Television White Space (TVWS) systems and wireless beamforming or “Massive-MIMO” technologies for 5G wireless. The company was founded in 2012 by Ph.D. colleagues in order to provide custom software-defined radio equipment for research and development. Today they design and manufacture customized radio solutions addressing the needs of the rural broadband market.

The high cost of fiber and satellite communications, as well as the poor range and capacity of cellular wireless technologies leaves over 20 million Americans and over half of the world without high-speed broadband communications. High-speed internet access is a great equalizer, providing citizens with vital education, access to commercial opportunities, and entertainment in an increasingly global world.

Granting the Petition and adopting the proposed rule changes would substantially improve access to broadband in rural areas and thereby advance the Commission’s goal of extending broadband connectivity to all Americans. The contemplated rules provide specific and well-defined interference prevention mechanisms. The Commission should move forward with an NPRM that proposes incorporating these changes into the existing rules.

## **II. DISCUSSION**

### **A. Join and Agree With “Rural Partners” Comments in Support.**

Evolve and Skylark Wireless are signatories to the Comments in Support submitted by the “Rural Partners.” We will not repeat what is said in those Comments, and write separately to add to them.

### **B. The Commission Should Ensure its “Interference” Policies and Rules Allow Rural Deployment of New Radio Technologies That Do Not Cause Harmful Interference.**

5G, Massive MIMO and beamforming did not exist when the existing rules were promulgated. The rules were written with other technologies in mind. A Massive MIMO system deployed and operated properly using lower MHz frequency like TVWS, directs the increased signal strength only at the targeted micro service area. It will not create additional interference beyond the targeted micro service area.

Nonetheless, the current rules could be interpreted to prohibit the use of 5G technology precisely because the signal strength to the intended micro service area is strong enough to carry a signal tens of miles and support bandwidth speeds in rural areas comparable to terrestrial speeds currently provided in major markets.

The FCC should increase the allowed maximum EIRP of a 5G Massive MIMO beamforming system under the condition that operation of the system does not create harmful interference within the primary user protection contours already identified by Part 15 rules. This would enable the introduction of beamforming technologies and techniques that greatly increase the range and capacity of Part 15 TVWS systems while having no impact on incumbent primary users.

Similarly, the FCC should allow increased HAAT for rural deployments of 5G Massive MIMO beamforming systems under the condition that that operation of the system does not

create harmful interference within the primary user protection contours already identified by Part 15 rules.

Evolve Cellular has deployed the Massive MIMO technology invented by Skylark Wireless in its licensed area. Evolve and Skylark are in the early stages of their market trial, and are currently focused on measuring the exact micro service areas and speeds achieved using Skylark radios operating only within Evolve's licensed frequency. Evolve and Skylark plan to add Part 15 TVWS operations to their on-going market trial, when they can do so under the rules. Skylark presently intends to apply for an FCC Innovation Zone designation overlapping the Evolve CMA so it can further test the impact of adding TVWS frequency to the current deployed solution. Skylark will also collaborate with wireless researchers at Universities in the region in order to characterize and quantify performance in a rigorous way. When Skylark's equipment is ready to move from trial to a broader market roll-out, will the Commission's TVWS rules be a regulatory barrier preventing deployment?

For example, does the deliberate correlation of multiple signals from individual radios in a Massive MIMO array (a staple of 5G networks), which creates a strong signal only to the targeted area, violate the TVWS rules even if there is no additional interference outside of the targeted area beyond that which is already permitted? The purpose of the rules is to prevent harmful interference but if there is none because of technological advancement they will only serve as an unintended barrier to expanded rural broadband access and technological innovation in 5G.

If radio technology advancement extends range and bandwidth while avoiding unwanted interference the rules should not stand in the way. The Commission should allow for more flexibility to allow deployment of new, non-interfering technology in rural areas. The

Commission should interpret its existing rules in a way that serves the intended purpose (no harmful interference) and does not lead to other unintended consequences. It can, and should, also amend its rules where known issues exist, as here, by initiating the rulemaking process as requested by Microsoft.

### **III. CONCLUSION**

Evolve Cellular, Inc. and Skylark Wireless LLC support Microsoft's Petition. The rule changes proposed by Microsoft will encourage innovation in new radio technologies and vastly improve rural broadband performance while maintaining stringent requirements of non-interference. The proposed changes will improve rural network operators' ability to connect currently unconnected rural communities without imposing any burden of threat to licensees.

The Petition does not completely address all the technical barriers imposed by current TVWS rules, but it is a welcome first step that allows wireless equipment to reach further into rural areas and provide higher broadband speeds at lower prices without introducing additional interference.

The Commission should grant the Petition and initiate the rulemaking.

Respectfully submitted,



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### **CERTIFICATE OF SERVICE**

Undersigned counsel certifies that, as required by 47 C.F.R. §1.405(a) a true and correct copy of these Comments in Support have been served on Petitioner by serving Petitioner's counsel of record via email and regular mail.

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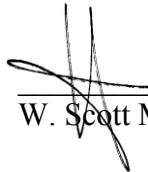
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