

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Expanding Flexible Use in Mid-Band Spectrum)	GN Docket No. 17-183
Between 3.7 and 24 GHz)	

COMMENTS OF CENTURYLINK¹

CenturyLink, Inc. (CenturyLink) submits these comments in response to the Federal Communications Commission's (Commission) request for comment on expanding the use of certain mid-band spectrum, particularly for wireless broadband service.² The Commission seeks comments generally regarding flexible broadband wireless use across the referenced spectrum, but also seeks detailed comments on three specific bands: 3.7 – 4.2 GHz; 5.925 – 6.425 GHz and 6.425 – 7.125 GHz. In these comments, CenturyLink focuses its attention on the 5.925 – 6.425 GHz band. CenturyLink is an incumbent user of spectrum with hundreds of licenses for fixed microwave point-to-point facilities in this band. As such, CenturyLink is wary of additional uses of spectrum in this band, and particularly cautions against use of this band by mobile or unlicensed devices.³ If the Commission intends to move forward with additional spectrum uses in or near the bands currently used by fixed microwave point-to-point facilities it must ensure that those existing facilities are protected from harmful interference, and that if any interference does occur that it can be reliably identified and immediately eliminated.

¹ This filing is made on behalf of CenturyLink, Inc. and its subsidiary entities that provide communication services using fixed microwave facilities.

² *In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket No. 17-183, Notice of Inquiry, 32 FCC Rcd 6373 (rel. Aug. 3, 2017) (NOI).

³ CenturyLink also has fixed microwave point-to-point facilities using frequencies in the 6.525 – 6.875 GHz band and its concerns expressed here regarding the 5.925 – 6.425 GHz band apply equally to spectrum use in the 6.525 – 6.875 GHz band.

As the Commission recognizes in the NOI, along with fixed satellite service, the 5.925-6.425 GHz band is heavily used for fixed services with more than 27,000 issued licenses for microwave point-to-point links in this band.⁴ CenturyLink entities currently hold hundreds of these licenses. CenturyLink's facilities in this band are important segments in the backbone of its national communications network. These facilities enable CenturyLink to provide communications services particularly in more rural areas of the country where traditional wireline facilities are exceedingly difficult or expensive to place. These microwave facilities support wireline voice, narrowband data, and broadband services to rural communities including critical access to emergency services, E911 circuits that enable life-saving emergency communications, and circuits that aid the Federal Aviation Administration (FAA) in airport operations. They may also serve as diverse paths that can be critical to ensure communications are sustained if a primary path is disabled. These facilities also enable CenturyLink to provide communications infrastructure to support wireless communication services in these areas by providing backhaul of wireless communications.

Additionally, 6 GHz spectrum is preferred spectrum for microwave point-to-point facilities, especially for longer links which are more common in rural areas. At lower frequencies, such as 6 GHz, a signal can propagate farther than at higher frequencies. At higher frequencies, to send a signal the same distance as a single link at the lower frequency may require one or two additional links to complete the communication. Relocation to a higher frequency involves significant additional cost for additional infrastructure (towers, additional antennas and radios, and supporting plant including power supply and protective shelters for equipment), property agreements (tower land leases and access road easements), regulatory

⁴ NOI, 32 FCC Rcd at 6381-82 ¶ 25.

filings (additional tower structure registrations and antenna licenses), spectrum coordination, and maintenance. Further, fixed wireless microwave point-to-point links are typically deployed where it is cost-prohibitive to deploy an aerial or buried wireline solution due to rugged terrain or extended distance. Altering a path to relocate to a higher frequency in areas that are already challenging to serve just makes it more difficult to provide better service to these areas. Thus, 6 GHz spectrum should remain allocated to fixed services for non-Federal use on a primary basis.

To protect against harmful interference with fixed microwave facilities, the Commission has designated use of the 5925-6425 MHz band to only fixed facilities and implemented specific frequency coordination procedures.⁵ Prohibiting mobile services in this band has been an effective tool for protecting and preserving quality communications services across these fixed service facilities.⁶ And, the Commission has been clear that poor quality communications which could cause rural businesses to lose customers, could cause families to be cut off from relatives, and could interrupt public safety communications are not acceptable.⁷

Even so, the Commission also notes that one entity, Higher Ground, has been granted a license via a waiver of the Commission's rules to operate mobile devices that transmit to

⁵ See *Table of Frequency Allocations*, 47 C.F.R. § 2.106; 47 C.F.R. § 101.103.

⁶ In a 2005 rulemaking proceeding, the Commission permitted earth stations on vessels to operate in this band, but required bilateral coordination measures to protect fixed wireless facilities using frequencies in this band from interference, and did not alter the general prohibition of mobile devices in this band. See *In the Matter of Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, IB Docket No. 02-10, Report and Order, 20 FCC Rcd 674, 681-97 ¶¶ 12-54, 699-704 ¶¶ 59-72 (rel. Jan. 6, 2005).

⁷ See, e.g., *In the Matter of Rural Call Completion*, WC Docket No. 13-39, Report and Order and Further Notice of Proposed Rulemaking, 28 FCC Rcd 16154, 16155 ¶ 1 (rel. Nov. 8, 2013).

satellites to provide text messaging, light e-mail, and Internet of Things communication.⁸ As the Commission also noted, applications for review of the grant of that waiver and license are pending.⁹ CenturyLink, along with many others has opposed Higher Ground's license application and waiver request and has supported the pending applications for review of the license grant.¹⁰ In order to grant the license application, the Bureaus had to waive several Commission rules including (1) its current frequency coordination procedures for this band; (2) Note 6 to 47 C.F.R. § 101.147(a), which prohibits assignment of the 5925-6425 MHz band to mobile earth stations; and (3) the current Table of Frequency Allocations which similarly reflects that no mobile services are authorized in this band in the United States. Over significant objection, the Bureaus granted the license application with conditions in January of this year.¹¹

Yet, even though the license was granted in January which was one-and-one-half years after the application was first filed, to CenturyLink's knowledge, at this time Higher Ground is not using the license. CenturyLink has not been provided any notice that Higher Ground has commercially launched its service anywhere in the United States, or even that it is currently engaged in testing of the devices and its novel interference protection regime. As such, there is

⁸ NOI, 32 FCC Rcd at 6381 ¶ 24.

⁹ NOI, 32 FCC Rcd at 6381 ¶ 24, n.37.

¹⁰ See, e.g., Comments of CenturyLink in Opposition to Application, IBFS File No. SES-LIC-20150616-00357, filed Sep. 10, 2015; CenturyLink Reply in Opposition to Application, filed Sep. 28, 2015; Ex Parte Letter from Tiffany West Smink, CenturyLink, to Marlene H. Dortch, FCC, filed Feb. 1, 2016 (refiled Mar. 7, 2016); Letter from Tiffany West Smink, CenturyLink, to Marlene H. Dortch, FCC, filed Mar. 4, 2016; Reply of CenturyLink (in response to Higher Ground's Consolidated Opposition to Applications for Review), filed Mar. 20, 2017.

¹¹ *In the Matter of Higher Ground LLC; Application for Blanket Earth Station License*, IBFS File No. SES-LIC-20150616-00357, Order and Authorization, DA 17-80 (rel. Jan. 18, 2017), *applications for review pending* (Fixed Wireless Communications Coalition, filed Feb. 10, 2017; APCO International, Enterprise Wireless Alliance, Utilities Telecommunications Council, filed Feb. 17, 2017).

currently no data to evaluate how or whether the novel interference protection regime and mobile devices are working as intended. At this time, the mere grant of the license and waiver without any experiential data provides no basis for evaluating the success or failure of authorizing this alternative use of the spectrum band.

For many of the reasons expressed in its filings in the Higher Ground license proceeding, CenturyLink remains concerned about the use of mobile devices in this spectrum.

Fundamentally, for mobile devices to share this spectrum with fixed service providers requires different interference protection coordination procedures than those established in the rules for fixed service providers. Higher Ground's license is dependent on its use of its own novel interference protection regime, and it remains to be seen if that protection regime will perform well in wide commercial use as has been predicted. Any interference protection regime that is to supplant the Commission's existing interference protection coordination procedures for this spectrum should be thoroughly tested and deemed effective to avoid harmful interference to existing fixed service facilities prior to use.

If one or more mobile devices using frequencies within the same band is positioned too close to a fixed microwave installation, it could interfere with the communications enabled by the facility. This could include interference that elevates total noise and interference power levels in radio receivers, which affects modulation and therefore affects capacity, performance, or availability of connectivity. This could also include interference that is so disruptive that it terminates communications through that facility and thus causes a major outage. This is not just intermittent interference to a call or two, or a data artifact here or there. This is potential interference impacting links in a communications network where each link carries hundreds of communications sessions at any point in time. And, it is not just potential interference to one or

two specific links in a particular location, but it is potential interference to each and every such link of the network throughout the country.

Additionally, if mobile devices caused harmful interference, the intermittent nature of such devices would make it extremely difficult to isolate, identify, or locate them. And, the mobile nature of these devices and the nearly random direction of transmission of their antennas would exacerbate the problem further. Troubleshooting time will be long, devices may not be accurately identified, and outages may be significant.

Consequently, the Commission should not authorize unlicensed use for mobile devices in this band. Some unlicensed fixed use may be acceptable with the assurance of reliable methods to determine the cause of any interference. At a minimum, however, there should be some form of registration prior to emission in the band combined with some form of database query regarding the close proximity of existing links.

Additionally, there should be strict out-of-band emission limits for any mobile devices in nearby bands. The nature of radio equipment used for a fixed long-haul link is to have very low power sensitivity thresholds in order to efficiently demodulate signals sent over long distances. On the other hand, the nature of many other radio devices such as those used for wireless local area networks is to be optimized for low cost communications. Any modifications of rules that would allow the co-location of both types of systems may cause harmful interference to the more sensitive equipment, not only from in-band spectrum use but also from spectrum use in adjacent bands. Consequently, not only should the Commission require strict out-of-band emission masks for new devices operating in nearby bands, but it should also consider lowering any power transmission level for those devices in the band directly adjacent to the receiving band of fixed links.

CenturyLink appreciates that the Commission is looking for ways to make more efficient use of limited, valuable spectrum, and CenturyLink is supportive of finding approaches that will enable fixed point-to-point microwave facilities to co-exist with additional spectrum uses. At the same time, however, the fixed point-to-point microwave facilities currently using mid-band spectrum with which mobile and unlicensed devices could interfere are critical to maintaining essential communication services throughout the nation. Low-risk of harmful interference cannot be an acceptable standard here. The Commission should ensure that these communication facilities are not at risk for harmful interference. Even then, however, because any new spectrum-sharing approach will likely trigger some interference, there also must be effective mechanisms to reliably determine the cause of any such interference and eliminate the interference immediately. In this manner the Commission can best protect critical existing communications facilities while ushering in the benefits of expanded spectrum use for consumers nationwide.

Respectfully submitted,

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