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

In the Matter of	)	
	)	
Higher Ground LLC	)	File No. SES-LIC-20150616-00357
	)	
Application for a Blanket License to Operate C-band Mobile Earth Terminals	)	Call Sign E150095
	)	

APPLICATION FOR REVIEW OF THE
FIXED WIRELESS COMMUNICATIONS COALITION

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APPLICATION FOR REVIEW OF THE FIXED WIRELESS COMMUNICATIONS COALITION

Pursuant to Section 1.115 of the Commission's rules, the Fixed Wireless Communications Coalition (FWCC)[1] respectfully requests Commission review of the Order and Authorization (*Order*) in the above-referenced docket, released jointly by the International Bureau, the Office of Engineering and Technology, and the Wireless Telecommunications Bureau (collectively, the Bureaus).[2]

We are simultaneously filing a motion to stay the effect of the *Order* while the Commission considers this Application for Review.

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[1] The FWCC is a coalition of companies, associations, and individuals actively involved in the fixed services—*i.e.*, terrestrial fixed microwave communications. Our membership includes manufacturers of microwave equipment, fixed microwave engineering firms, licensees of terrestrial fixed microwave systems and their associations, and communications service providers and their associations. The membership also includes railroads, public utilities, petroleum and pipeline entities, public safety agencies, cable TV providers, backhaul providers, and/or their respective associations, communications carriers, and telecommunications attorneys and engineers. Our members build, install, and use both licensed and unlicensed point-to-point, point–to–multipoint, and other fixed wireless systems, in frequency bands from 900 MHz to 95 GHz. For more information, see www.fwcc.us.

[2] *Higher Ground LLC*, Order and Authorization, DA 17-80 (released Jan. 18, 2017).

A. INTRODUCTION AND SUMMARY

The *Order* authorizes Higher Ground LLC to deploy up to 50,000 mobile satellite earth stations transmitting in the 5925-6425 MHz band. The Fixed Service (FS) operates 57,654 point-to-point microwave links in this same band.[3] Many of these links carry services that are critical to safety of life and property.

The allocation and frequency coordination rules that the *Order* waived for Higher Ground serve to protect the FS from interference.[4] The express terms of the waiver require Higher Ground to prevent harmful interference to any current or future FS operation.[5] Its system would control tens of thousands of mobile terminals by means of an automatic, unilateral, frequency coordination system that uses FS link information in the Commission's Universal Licensing System database.[6]

The dispute here turns on one question: whether the record establishes that Higher Ground will fully protect the FS from harmful interference. If assured of that protection, the FWCC would drop its opposition, just as we have refrained in the past from objecting to non-

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[3] Data as of 12/31/2016, courtesy of Comsearch.

[4] The FS is the only authorized incumbent in the band that needs protection. The other authorized users are Fixed Satellite Service (FSS) uplinks, whose earth stations are transmit-only at these frequencies. Unlicensed services also use the band, but are not "authorized" for the purpose of interference protection.

[5] *Order* at ¶ 40(b).

[6] "Unilateral" here means the Higher Ground system would make its own decisions on whether a transmission would cause interference, without consulting potential interference victims. In contrast, all previous and present frequency coordination between satellite and FS operations in this band uses bilateral coordination, under which potential victims have the opportunity to object to a proposed operation that might cause them harm. *See* 47 C.F.R. §§ 25.203(c), 101.103(d).

interfering uses of FS spectrum.[7] Higher Ground, however, has failed to carry its burden of showing the FS will be free of interference. It is not even close. The record has almost no support at all for Higher Ground, other than its own unsubstantiated claims.

The meager state of the record results largely from Higher Ground's own decision to withhold details of how its system operates. Nor does Higher Ground suggest its system has been tested under anything like real-world conditions. Higher Ground is saying, in effect: trust us.

The Commission should not simply accept Higher Ground's word that its system will work as claimed. Our skepticism is based on fact. The FWCC learned inadvertently that Higher Ground's system is deficient in at least one important respect: it offers no protection against adjacent channel interference.[8] Even if Higher Ground were to repair this fault, the Commission should still be concerned that other, still-undiscovered design errors might lurk in the system. "Trust us" is not a satisfactory answer.

A second defect in the *Order* is its reliance on remedies that can come into play only after interference has been detected. These are not useful. FS interference is extremely rare. If an interruption in service occurs, the operator cannot tell if was caused by interference, propagation anomalies (which are much more common), or something else. In no event could an operator associate an interference incident with Higher Ground. The Order requires Higher Ground to keep detailed logs for the purpose of confirming or denying that it caused interference on a

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[7] For example, the FWCC did not oppose the adoption of Section 15.250, which authorizes low-power wideband systems at 5925-7250 MHz, and we did not oppose the grant of a waiver for an automatic outdoor system for consumers operating at 6240-6740 MHz. *iRobot Corporation*, Order, 30 FCC Rcd 8377 (OET 2015).

[8] We explain below why Higher Ground's offer to comply with the Commission's limits on out-of-band emissions does not address this problem.

particular occasion,[9] but FS operators, with no way of knowing that interference occurred, much less of suspecting that Higher Ground caused it, can never make use of the logs. Even if the interference could be traced back to Higher Ground, the damage would be done. No one, including Higher Ground, could say it would not recur. The only workable form of protection is to prevent interference before it happens.

In short, Higher Ground has failed to meet its threshold test for waiver: a showing that the waiver would satisfy the purpose of the rules it seeks to have waived.

Procedurally, instead of adjudicating Higher Ground's request as a waiver, the Bureaus should have opened a rulemaking. The potentially widespread impact of mobile service in a fixed band, and the paucity of public information on Higher Ground's system, make a rulemaking the only appropriate vehicle. Having made the decision to proceed by waiver, the Bureaus erred further in failing to give adequate and effective public notice.

We ask the Commission to revoke Higher Ground's waiver and rescind its authorization. In the alternative, the Commission should set aside the waiver grant, return the application to pending status, and open a rulemaking to evaluate the protections that Higher Ground's system offers to incumbents.

Section 1.115(b)(2) factors

This Application for Review seeks relief pursuant to the following factors specified in the rules:[10]

> (iv) an erroneous finding as to an important or material question of fact; and
>
> (v) prejudicial procedural error.

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9 *Order* at ¶ 40(e).

10 47 C.F.R. § 1.115(b)(2).

B. STANDING

The FWCC has standing under the Commission's rules.[11] We participated in the proceeding, having filed a timely Petition to Deny against Higher Ground's application, a timely Reply To Consolidated Opposition, and three subsequent *ex parte* statements. Moreover, the challenged order threatens affirmative harm to FWCC members, for the reasons set out here.

C. HIGHER GROUND FAILED TO MEET ITS WAIVER BURDEN BY PROVIDING CREDIBLE ASSURANCE THAT ITS OPERATION WILL SUCCESSFULLY PROTECT THE FIXED SERVICE FROM HARMFUL INTERFERENCE.

The fundamental requirement for a rule waiver is that the waiver "not undermine the policy, served by the rule, that has been adjudged in the public interest."[12] Here, the purpose of the underlying rule is the prevention of interference to authorized spectrum incumbents, namely, the FS. The *Order* conditioned the waiver on Higher Ground's not causing interference to authorized incumbents,[13] yet improperly granted the waiver despite Higher Ground's failure to show it can meet the condition.

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11 47 C.F.R. § 1.115(a).

12 *WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir 1969); *see also Ms. Laura Stefani*, 30 FCC Rcd 137 at 5 (WTB 2015) (proponent "has not shown that a waiver here would be consistent with the underlying purpose of the rules it seeks to waive, namely interference protection to other licensees"), *rev'd in part on additional factual showings*, 30 FCC Rcd. 10164 (WTB 2015).

13 "Higher Ground's system must … avoid causing interference to all current and future users of the band operating under an existing allocation." *Order* at ¶ 20; "[T]his waiver … is being authorized under a carefully drawn set of conditions designed to minimize any risk of interference due to operations under the waiver." *Order* at ¶ 35; "Higher Ground's authorization IS CONDITIONED on the following requirements: … (b) Higher Ground operations must not cause harmful interference to any current or future authorized station … [in the] 5925-6425 MHz band …." *Order* at ¶ 40(b).

1. The Bureaus improperly accepted Higher Ground's unsupported claims of non-interference.

Higher Ground assured the Commission it will not cause harmful interference.[14] The *Order* cites Higher Ground's having said it "thoroughly explained and demonstrated its coordination process both to the Commission and interested parties … [and] has provided sufficient answers and explanations for any issues raised."[15]

That is not true. Higher Ground provided only conclusory statements about the efficacy of its system, without the detail needed to permit independent evaluation. The Technical Appendix filed with its application is a start, but does not go far enough. The section titled "Interference Protection to Point-to-Point Microwave" lays out performance criteria for the system—*what* the system is designed to do, but not *how* it will do it. Similarly, when a Higher Ground principal carried out a staged demonstration for frequency coordination experts, he asserted impressive performance claims, but deflected questions on the details of how these could be achieved in practice.[16]

Even more troubling is the lack of any real-world test data showing Higher Ground's system actually works as designed. Laboratory data (also missing) would not be enough to make the case. A suitable test would take place in the field using point-to-point links similar to those in ordinary operation. Even the TV white space coordination system, whose task is less demanding,

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[14] "[A] waiver grant will not increase the risk of harmful inference because Higher Ground will use self-coordination and other interference avoidance techniques." Consolidated Opposition of Higher Ground LLC at 5 (filed Sept. 23, 2015).

[15] *Order* at ¶ 24.

[16] Presentation by Rob Reis of Higher Ground at the National Spectrum Management Association (May 18, 2016).

underwent extensive public testing.[17] Higher Ground's first real test will come only with commercial deployment, when it will threaten tens of thousands of FS links.

Unaccountably, the Bureaus nonetheless found that "Higher Ground's automated coordination process, while unconventional and proprietary, *provides necessary safeguards against harmful interference to users in the band*."[18]

No publicly available information supports that claim.

The Bureaus add: "[T]he use of a single database that authorizes and manages the devices within a single network is relatively simple."[19] Simple *in principle*, perhaps. In practice, we just don't know. There has never been automated frequency coordination of mobile devices on a commercial scale. Even the much simpler TV white space environment has no commercial experience with mobile coordination: the Commission has not certified any white space mobile devices. The Bureaus concede as much: "[A] self-coordination system like Higher Ground's does not have a track record of widescale, generalized deployment."[20] Yet the Bureaus authorized 50,000 units of an unproven technology for use anywhere in the country.

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17 *Evaluation of the Performance of Prototype TV- Band White Space Devices, Phase II*, OET Report FCC/OET 08-TR-1005 in ET Docket No. 04-186 (released Oct. 15, 2008).

18 *Order* at ¶ 25 (emphasis added). Similarly, and similarly unsupported: "Higher Ground has adequately demonstrated an alternative methodology to protect other users of this spectrum …." *Order* at ¶ 34; "Higher Ground has demonstrated that its proposed system should prevent or minimize the risk of harmful interference to FS operators in the 5925-6425 MHz frequency band." *Order* at ¶ 19; "[T]here is little risk of harmful interference given the low power transmissions proposed and the comprehensive self-coordination safeguards developed by Higher Ground." *Order* at ¶ 35.

19 *Order* at ¶ 29.

20 *Order* at ¶ 36.

It is no answer to say that any interference to FS will be brief.[21] In the case of cellular and land mobile radio systems, including public safety systems, even a short interruption to one FS backhaul link can take an entire network out of service, creating an outage that may persist for several minutes while the network resynchronizes. A detailed, empirical study of one state's public safety communications system showed that a one-second microwave interruption can cause first-responder outages of fifteen minutes. A complete loss of radio communications to police, fire, and EMS personnel can be devastating: an officer unable to call for help, a fire alarm than goes unanswered, the missed dispatch of an EMS unit to a heart attack victim. Users of other critical services, such as utilities, pipelines, and railroads, have their own comparable issues.

FS operators and their customers pay high prices for extremely reliable service. A fair application of the waiver standard requires that Higher Ground not degrade that service.

2. The discovery of one serious fault in Higher Ground's system suggests there could be more.

Our concern about Higher Ground's opacity is not hypothetical. At a meeting of the frequency coordination community last year, a representative of Higher Ground responded to a question by saying his company will not provide protection against adjacent channel interference—*i.e.*, interference from a transmitter operating in a channel adjacent to the one where the receiver is tuned.[22] The FWCC brought this omission to the Commission's attention.[23] Higher Ground

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21 *Ex parte* statement of CenturyLink at 2 (filed March 4, 2016).

22 Rob Reis of Higher Ground at the National Spectrum Management Association (May 18, 2016).

23 *Ex parte* statement of FWCC at 4 (filed June 8, 2016).

responded that its operations will comply with applicable out-of-band emission limits.[24] The Bureaus erroneously accepted this answer.[25]

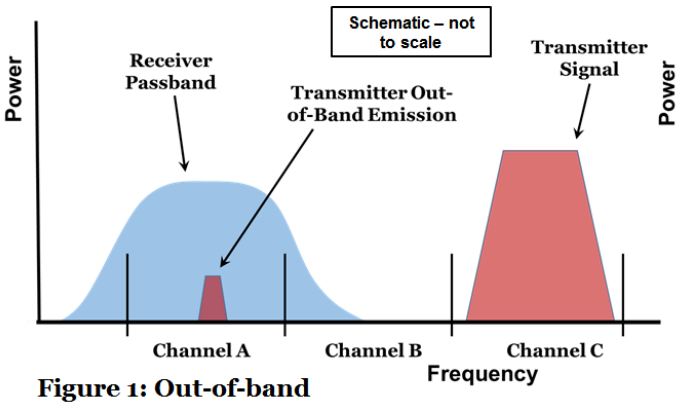

Figure 1: Out-of-band Emissions

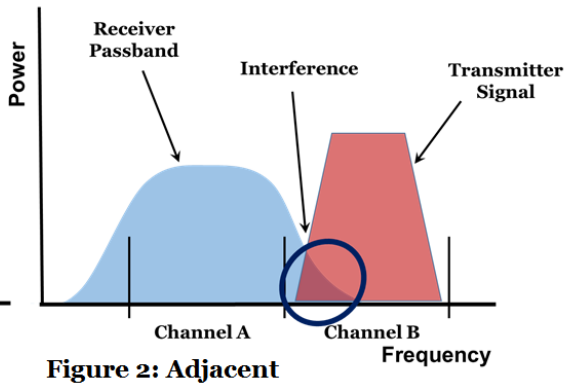

Figure 2: Adjacent channel interference

Higher Ground's response was an evasion, a technical play on words. The out-of-band limits that Higher Ground promises to comply with—it has to anyway—address a different problem: namely, a transmitter tuned to one channel that improperly puts a signal into a different channel. See Figure 1. Our concern is different: a receiver tuned to one band picking up signal from a transmitter in an adjacent channel. See Figure 2. Adjacent channel interference has nothing to do with the transmitter's out-of-band emissions. It can occur even if the out-of-band emissions are zero, as in Figure 2. The overlap of receiver sensitivity into an adjacent channel is not a defect, but a normal characteristic of most receivers.[26]

FS frequency coordinators must take adjacent channel reception into account. Higher Ground's refusal to do the same means its system creates an interference threat.

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24 *Ex parte* statement of Higher Ground at 5 (filed July 21, 2016).

25 *Order* at ¶ 22.

26 That is why the Commission spaces FM stations (for example) on adjacent frequency channels many tens of kilometers apart. 47 C.F.R. § 73.207(a). Many other services have comparable rules or coordination guidelines.

Even if Higher Ground were to modify its coordination criteria to resolve the problem, it would still leave the risk of other, still-unknown defects. We learned of the adjacent channel issue only because someone at a meeting happened to ask the right question. Existence of the problem confirms the company's failure to meet its waiver standard. Its accidentally having come to light reinforces our concerns about Higher Ground's limited disclosures.

D. *POST HOC* INTERFERENCE REMEDIES WILL BE USELESS.

The *Order* relies in large part on Higher Ground's addressing interference *after* it occurs, including operation logs and a point of contact for the resolution of any harmful interference.[27]

We explained in the proceeding,[28] and explain again here, that such provisions will not work. The Bureaus mistakenly presume that an FS operator (1) knows when interference happens, (2) knows to suspect Higher Ground as the source, so as to invoke the above procedures, and (3) has assurance the procedures will prevent future interference. All of these elements are false.

A properly coordinated and engineered FS link is extremely reliable. Most links in the 5925-6425 MHz band are designed for availabilities of 99.999 percent or better; some operate at 99.9999 percent.[29] Unplanned outages are most often caused by extreme atmospheric conditions. Outages due to interference are extremely rare, thanks to the bilateral frequency coordination process. If an interruption occurs, the operator cannot tell what caused it, cannot tie the

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27 *See Order* at ¶¶ 36, 40.

28 FWCC Petition to Deny at 6 (filed Sept. 11, 2015); see also e*x parte* statement of FWCC at 5-6 (filed June 8, 2016).

29 Availability of 99.999 percent means all outages from all causes combined total no more than 5.3 minutes per year; 99.9999 percent reliability means total outages of no more than 32 *seconds* per year.

interruption to interference, and could never associate it with Higher Ground's operation. No meaningful remediation would be possible in any event. An FS interference victim licensed under traditional, bilateral coordination can troubleshoot against a small number of known, fixed transmitters, and thus prevent the interference from recurring. Under Higher Ground's mobile service model, nobody—not even Higher Ground—will know when and where a potentially interfering device might transmit again.

This means the *post hoc* measures the Bureaus rely on for resolving interference will be of no help. The only way for Higher Ground to meet its waiver obligations, and for the Commission to lawfully grant the waiver, is to safeguard the integrity of FS transmissions by ensuring proactively that interference cannot occur.

E. THE BUREAUS SHOULD HAVE PROCEEDED BY RULEMAKING RATHER THAN BY WAIVER.

The Higher Ground application opened matters that have widespread prospective implications, better suited to a notice-and-comment rulemaking than to a waiver proceeding.[30] The International Bureau itself said, "We find that this proceeding raises issues of broadly applicable policy under the Communications Act of 1934, as amended …"[31] That alone should be reason enough for a rulemaking.

The Bureaus found a rulemaking to be unnecessary because the proposed spectrum use is tailored to "one individual's operations"[32] That seriously understates the potential impact: 50,000

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30 FWCC Petition to Deny at 1 n.3 (filed Sept. 11, 2015); FWCC Reply to Consolidated Opposition of Higher Ground LLC at 1-3 (filed Oct. 5, 2015).

31 Public Notice, Report No. SES-01795 at 15 (released Nov. 4, 2015).

32 *Order* at 34.

mobile terminals that can affect an even larger number of FS links. We are not aware of any past Commission waiver proceeding that dealt with risks on this scale.

The Bureaus defend their decision to adjudicate a waiver in part by quoting from *SEC v. Chenery*: "[T]he choice made between proceeding by general rule or by individual, *ad hoc* litigation is one that lies primarily in the informed discretion of the administrative agency."[33]

That passage does not give an agency *carte blanche*. The Court specifically limits an agency's range of options to "informed" discretion. Nothing in *Chenery* allows an agency to grant a waiver based on "facts" for which the agency has no adequate support. The waiver grant here relies expressly on two such: (1) Higher Ground's unsubstantiated (and partially disproven) claims that its system will prevent interference to the FS; and (2) reliance for remedying interference on *post hoc* waiver conditions that in practice can never be used.

The scope and exposure of a rulemaking would have better exposed these shortcomings. It also would also have given Higher Ground a forum in which to attempt to overcome its opponents' misgivings. With more information and a suitable setting for negotiation, the FS and Higher Ground might have collaborated on changes that could have resolved our concerns while still meeting Higher Ground's business needs.

A rulemaking would also have brought in parties that were not aware of the Higher Ground application. The International Bureau's public notice of the waiver request came on the last page of a 15-page, small-print, weekly listing of actions on satellite applications. This is not a publication calculated to catch the eye of potentially affected FS operators and users. Ordinarily the Commission alerts the public to a non-routine waiver request through a standalone

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[33] *Order* at ¶ 34 n.75, *citing* 332 U.S. 194, 203 (1947) (citation omitted).

public notice having its own entry in the Daily Digest. The International Bureau should have done at least that much here.

Because the Bureau's public notice did not appear in the FCC Record, it "may not be relied upon … except against persons who have actual notice of the document in question."[34] A standalone public notice typically does appear in the FCC Record, so the public can be deemed to know about it. Whether or not adequate public notice is a legal precondition to a waiver grant, simple fairness suggests the Bureau should have taken reasonable steps to make the request known.

F. THE BALANCE OF PUBLIC INTEREST CONSIDERATIONS GIVES PRIORITY TO PROTECTING FS.

Point-to-point links in the 6 GHz band are used for critical safety applications: remote control of railroad switches and signals, pipeline valves, and electric utility circuit breakers; interconnecting mobile radio base stations used for dispatching vehicles (first responders, locomotives, emergency repair crews etc.). They also carry backhaul traffic on cellular voice and land mobile and data systems, connect commercial centers with real-time financial and market data, and handle vast amounts of business data.[35] Some of the entities that provide or rely on these services filed in opposition to Higher Ground.[36] Interference to their operations would directly threaten the safety of life and property, and essential economic activity.

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34 47 C.F.R. § 0.445(e). Documents can also be "relied upon" if mailed or electronically delivered to a party, or if published in FCC Reports, the Federal Register, or Pike and Fischer Communications Regulation. *Id*. The public notice in question did not satisfy any of these options.

35 FWCC Petition to Deny at 2 (filed Sept. 11, 2015); *Order* at ¶ 13.

36 *Ex parte* statement of Association of American Railroads (filed Dec. 22, 2016) (information regarding train signals and remote switching of tracks and routing of trains, critical telemetry data, coordination of operations among different railroads); *Ex parte* statement of Utilities Technology Council (filed Sept. 5, 2016) (backbone for utility supervisory control and

We do not question the value, in principle, of a message service for areas that lack coverage, or the Commission's interest in trying out new technologies that might increase the use of spectrum.[37] The FWCC would not oppose Higher Ground if we were confident its system adequately protected FS operations. But Higher Ground has chosen not to disclose the information or to conduct tests that might help us to make that determination.

Nothing in Higher Ground's application suggests the public benefits from its proposed operations justify threatening the critical services carried on the FS.

G. REQUEST FOR RELIEF

The Commission should rule that the Bureaus granted the Higher Ground waiver in error, revoke the waiver, and rescind the authorization.

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data acquisition, monitoring and control of substations and valves, security and transfer-trip protection circuits, utility nuclear emergency telecommunications systems); Comments of Nebraska Public Power District (filed Sep. 2, 2016) (critical utility infrastructure communications, public safety backhaul, security systems at critical infrastructure sites); Opposition of Southern Company Services, Inc. (filed Sept. 30, 2016) (utility communications, backhaul to field crews, supervisory control and data acquisition); Petition to Deny of The Cities of Garland, Mesquite, Rowlett, & Sachse, Texas (filed Nov. 17, 2016) (public safety radio communications reliant on microwave communications); *Ex parte* statement of Cellular Network Partnership d/b/a Pioneer Cellular (filed Oct. 27, 2016) (wireless and public safety backhaul in mostly rural areas); Petition to Deny of TOPAZ Regional Wireless Cooperative (filed Oct. 3, 2016) (public safety connectivity); Petition to Deny of City of Mesa (filed Sept. 28, 2016) (public safety connectivity); State of Hawaii (filed Aug. 30, 2016 (public safety); *Ex parte* statement of Frontier Communications (filed Aug. 22, 2016) (telephone traffic over 20-50 mile links); CenturyLink Reply in Opposition to Application (filed Sept. 28, 2015) (communication services using fixed microwave); *Ex parte* statement of Enterprise Wireless Alliance (filed Nov. 22, 2016) (business enterprise and commercial licensees that rely on microwave for internal and third-party communications).

[37] *Order* at ¶ 11.

Alternatively, the Commission should set aside the waiver grant, return Higher Ground's application to pending status, and open a rulemaking to better evaluate the protections that Higher Ground's system should offer to incumbents.

Respectfully submitted,

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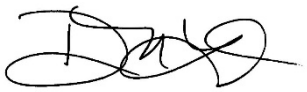
February 10, 2017

CERTIFICATE OF SERVICE

I, Deborah N. Lunt, a secretary with the law firm of Fletcher, Heald & Hildreth, PLC, hereby state that true copies of the foregoing APPLICATION FOR REVIEW were sent by first class mail, postage prepaid, February 10, 2017, to the attached Service List.



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