Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Higher Ground LLC	)	File No. SES-LIC-20150615-_____
	)	
Application for a Blanket License to Operate C-band Mobile Earth Terminals	)	

APPLICATION FOR BLANKET EARTH STATION LICENSE

I. INTRODUCTION AND SUMMARY

Higher Ground LLC ("Higher Ground"), pursuant to 47 C.F.R. § 25.130, seeks a blanket license to operate up to 50,000 mobile earth terminals ("METs") for C-band operations with U.S.-licensed satellites to provide consumer-based text messaging/light email and Internet of Things ("IoT") communications in the United States, particularly in areas unserved by terrestrial CMRS networks. The METs, known as SatPaqs, will be embedded in protective cases attached to everyday smartphones.

Grant of this application will serve the public interest by (i) allowing the introduction of a new, ubiquitous service with consumer- and IoT-based applications via satellite; and (ii) making more intensive and efficient use of C-band spectrum through a non-interfering sharing regime. The Higher Ground system will protect other C-band operations from harmful interference – for example, by using a database-driven, permission-based authorization regime to ensure no operations cause harmful interference to C-band terrestrial fixed service ("FS") point-to-point ("PtP") operations. Waiver of the existing PtP coordination procedures is thus warranted, and this application is accompanied by a detailed Technical Appendix that explains SatPaq network operations and its self-coordination / interference protection regime, as well as

a supportive declaration by Dr. Jeffery Reed, President of Reed Engineering and Willis G. Worcester Professor of Electrical and Computer Engineering at Virginia Tech ("Reed Declaration").

As the National Broadband Plan recognized, spectrum sharing "increase[s] opportunity for entrepreneurs and other new market entrants to develop wireless innovations that may not have otherwise been possible."[1] The SatPaq does just that, and Higher Ground respectfully requests the Commission to promptly grant authority for this innovative service.

II. DESCRIPTION OF PROPOSED SERVICE

Higher Ground will provide innovative, low-cost satellite-based messaging and other services using small, lightweight METs embedded in protective cases attached to existing smartphones. The METs, known as SatPaqs, will communicate with authorized satellites on the Commission's Permitted Space Station List, including Galaxy 3-C at 95.05° W.L., Galaxy 12 at 129º W.L., and Galaxy 19 at 97° W.L. The satellites, in turn, will communicate with authorized gateway/remote control earth stations. Each of the initial three Galaxy satellites will communicate with one of three gateway/remote control earth stations in Napa, California (Call Sign E970391), and Hagerstown, Maryland (Call Signs E050048 and E050049).

Operating Frequencies. The SatPaqs will operate on C-band frequencies in the 3700-4200 MHz (space-to-Earth) and 5925-6425 MHz (Earth-to-space) bands.

Service Area. Higher Ground seeks authority to operate the SatPaqs in the continental United States, Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands.

[1] FCC, *Connecting America: The National Broadband Plan*, at 79 (2010) ("National Broadband Plan").

Technical Operations. The SatPaqs will use a rectangular, quad-patch, directional antenna to transmit in time division multiple access mode. Consistent with 47 C.F.R. § 25.271, the SatPaq Network Control will authorize and monitor SatPaq operations and maintain the ability to shut off any SatPaq immediately upon notification of harmful interference. Details of the SatPaq technical operations, including the self-coordination / interference protection regime that underlies the requested waiver of the Parts 101 and 25 coordination procedures, are further described in the accompanying Technical Appendix, the Reed Declaration, and FCC Form 312, Schedule B.

III. THE PROPOSED SERVICE WILL SERVE THE PUBLIC INTEREST WITHOUT CAUSING HARMFUL INTERFERENCE

A. The Proposed Service Offers Substantial Public Interest Benefits

Grant of this application will serve the public interest by enabling new satellite-based consumer and IoT communications across the entire United States – including areas where CMRS networks do not operate – and by facilitating innovative, intensive, efficient use of C-band spectrum.

Higher Ground will achieve these goals via a spectrum sharing regime that will protect other satellite services and FS point-to-point operations. Such spectrum sharing is generally understood as one critical method to address the growing demand for mobile data services. As part of the National Broadband Plan, the FCC sought to promote "opportunistic uses across more radio spectrum" and suggested further consideration of sharing regimes based on "the geolocation database concept" adopted for the "TV White Spaces":

> In the TV bands, the development of an effective database is possible because TV stations, as well as other facilities that must be protected, *generally are fixed and known*, so that locating the specific protection zone around these facilities is relatively straightforward. It is possible to extend this concept for opportunistic

use to other frequency bands where the behavior of stations is *well understood and predictable*.[2]

The SatPaq offers just such an approach, as FS point-to-point operations in the C-band "generally are fixed and known," and their behavior is "well understood and predictable."

B. The Proposed Service Will Not Cause Harmful Interference to Existing Services

Operation of the proposed SatPaqs will not cause harmful interference to FS point-to-point systems or to other C-band satellite systems, as further discussed in the attached Technical Appendix.

Specifically, Higher Ground will deploy a database-driven, permission-based network solution that will prevent harmful interference to terrestrial PtP systems in the 5925-6425 MHz band. The SatPaq network matches a SatPaq's geocoordinates with a look-up table that incorporates the FCC's Universal Licensing System database information for all C-band PtP licensees and identifies Protection Zones for the PtP receivers. Whenever the SatPaq network computes that there is any possibility of harmful interference to a PtP receiver, the SatPaq will be assigned to transmit on other frequencies that are available for operations or directed to transmit to a satellite in a different direction. Moreover, Dr. Reed finds that Higher Ground's proposed Protection Zones "are at least 25 times larger than the areas that would be sufficient to avoid harmful interference to PtP receivers."[3] As Dr. Reed concludes, "The SatPaq system's interference avoidance techniques, such as Protection Zones, frequency agility, and

[2] *Id.* at 98 (emphasis added).

[3] Reed Declaration at 3.

satellite diversity are more than sufficient to avoid causing harmful interference to PtP receivers."[4]

This self-coordination interference protection regime, relying on a geolocation database and very conservative Protection Zones, will ensure that SatPaqs can drive more intensive use of the C-band while ensuring non-interference to PtP operations in the band.

Additionally, to prevent harmful interference to other satellite systems, the SatPaqs will employ spread spectrum techniques to comply at all times with the off-axis power spectral density limits specified in 47 C.F.R. § 25.218(d).

IV. THE FCC SHOULD WAIVE TRADITIONAL COORDINATION REQUIREMENTS

Operation of the proposed SatPaqs will be consistent with the technical requirements of the Part 25 rules except with respect to coordination with existing PtP systems. As demonstrated in the attached Technical Appendix, the self-coordination/permission-based techniques identified above will avoid harmful interference to terrestrial systems, thus effectively rendering traditional coordination with terrestrial FS unnecessary. Accordingly, Higher Ground requests a waiver of the Commission's coordination rules.[5]

The Commission may waive its rules upon good cause, 47 C.F.R. § 1.3, when a waiver would not undermine the policy objective of the rule[6] and would better serve the public

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[4] *Id.*

[5] *See, e.g.*, 47 C.F.R. §§ 25.130(b), 25.203(c), 101.103. Higher Ground also requests a waiver of Note 6 to 47 C.F.R. § 101.147(a), which prohibits assignment of the 5925-6425 MHz band to mobile earth stations. The restriction under Note 6 is intended to protect terrestrial FS from potential harmful interference and should be waived for the same reasons justifying a waiver of the coordination rules, as discussed herein.

[6] *See Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1166 (D.C. Cir. 1990).

interest than requiring strict compliance.[7] Here, the proposed SatPaqs will avoid harmful interference by using techniques that prohibit potentially interfering operations within very conservative Protection Zones surrounding PtP receivers. Thus, strict compliance with traditional coordination requirements is unnecessary, and grant of the requested waiver would not undermine the underlying regulatory purpose of preventing harmful interference to FS PtP facilities.[8] Moreover, a waiver would better serve the public interest by allowing Higher Ground to introduce innovative, low-cost satellite-based consumer and IoT communications services across the United States, while make more efficient use of spectrum resources.

V. CONCLUSION

For the foregoing reasons, Higher Ground respectfully requests Commission grant of this application.

Respectfully submitted,

HIGHER GROUND LLC

By: /s/ Robert S. Reis
Robert S. Reis
President

[7] *See WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969).

[8] *See Amendment of Part 25 of the Commission's Rules and Regulations to Reduce Alien Carrier Interference Between Fixed-Satellites at Reduced Orbital Spacings and to Revise Application Processing Procedures for Satellite Communication Services*, Second Report and Order and Further Notice of Proposed Rulemaking, 8 FCC Rcd 1316, ¶ 5 (1993) ("Interference between terrestrial facilities and earth stations is addressed by the current frequency coordination procedures of Part 21 and 25.").