

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

_____)	
In the Matter of)	
)	
KEPLER COMMUNICATIONS INC.)	Call Sign S2981
)	
Petition for Declaratory Ruling Requesting)	File No. SAT-PDR-20161115-00114
U.S. Market Access)	
_____)	

COMMENTS OF SPACE EXPLORATION HOLDINGS, LLC

Space Exploration Holdings, LLC (“SpaceX”) hereby comments on the application filed by Kepler Communications Inc. (“Kepler”) seeking authorization to serve the U.S. market with its non-geostationary orbit (“NGSO”) satellite system providing Fixed-Satellite Service (“FSS”).¹ Kepler seeks to operate up to 140 satellites to provide global connectivity for the Internet of Things, especially sensors and other “intelligent devices.”² Kepler’s application, however, raises several questions relating to Kepler’s ability to coexist with other FSS systems and the spectral efficiency of the Kepler system itself.

Perhaps most significantly, Kepler’s system appears to offer only very limited capacity, despite requesting authorization to use a large amount of V-band spectrum for communications links. Kepler’s application does not make clear how and to what extent it intends to reuse spectrum, making a precise analysis impossible. However, Kepler proposes to divide 2 GHz of V-band downlink spectrum into channels only 15 MHz wide, offering sharply limited capacity

¹ See *Petition for Declaratory Ruling*, IBFS File No. SAT-PDR-20161115-00114, at 2 (Nov. 15, 2016) (“Kepler Application”).

² *Id.*, Technical Narrative at 1.

despite the system’s significant spectrum demands. Similarly, Kepler apparently seeks to use VHF, UHF, and S-band spectrum for its telemetry, tracking, and command (“TT&C”) links. This represents a further inefficiency in Kepler’s proposed spectrum use, when it could simply have used a small amount of spectrum contiguous with its service links, as the Commission’s rules ordinarily require.³ Kepler does not appear to request a waiver of these rules, but also does not make the required showing that this arrangement will “cause no greater interference and require no greater protection from harmful interference than the communications traffic on the satellite network or have been coordinated with operators of authorized co-frequency space stations at orbital locations within six degrees of the assigned orbital location.”⁴ The Commission should consider whether to permit such a configuration.

Kepler’s service beams themselves may also pose challenges for coexistence with other NGSO systems. Kepler’s beams are quite wide—8 to 10 degrees—increasing the probability that in-line events will occur. Moreover, Kepler’s antenna gain contours indicate that its antennas will exhibit very poor sidelobe performance. This means that Kepler may cause significant interference to satellites well outside of Kepler’s beams themselves.

Worse still, although Kepler touts the “antenna arrays and SDRs” that its system will use to “simplif[y] Kepler’s ability to avoid inline interference and coordinate with both existing and new NGSO systems,”⁵ its technical narrative suggests that it may have designed its system on the basis of a significant misunderstanding of the Commission’s avoidance of in-line event rules. The diagram provided in its application suggests that the Kepler system will dynamically steer its

³ See 47 C.F.R. § 25.202(g).

⁴ *Id.*

⁵ Kepler Application at 12.

beams to avoid operating within 10 degrees of the center of another NGSO system's link, as measured from that NGSO satellite.⁶ Plainly, however, such an approach would not be an effective means of avoiding harmful interference because it does not take into account a number of crucial factors, such as the width of the other NGSO system's beam, the possibility that the other system's beam might itself be steered away from nadir, or the fact that in-line interference may occur even if the two systems' beams are not co-aligned. This is why the Commission's rules define in-line events in terms of the apparent angle between two satellites *as observed by an Earth station*, not by an NGSO satellite. The Commission should seek additional information from Kepler to ensure that its system is capable of complying with any applicable rules regarding avoidance of in-line events, in addition to or in place of the noncompliant and likely ineffective strategy described in Kepler's application.

Respectfully submitted,

SPACE EXPLORATION HOLDINGS, LLC

By: /s/ Tim Hughes

Tim Hughes
Senior Vice President

William M. Wiltshire
Paul Caritj
HARRIS, WILTSHIRE & GRANNIS LLP
1919 M Street, N.W.
Suite 800
Washington, DC 20036
202-730-1300 tel
202-730-1301 fax

Counsel to SpaceX

Patricia Cooper
Vice President, Satellite Government
Affairs
SPACE EXPLORATION TECHNOLOGIES CORP.
1030 15th Street, N.W.
Suite 220E
Washington, DC 20005
202-649-2700 tel
202-649-2701 fax

September 11, 2017

⁶ Kepler Application, Technical Narrative at 16.

CERTIFICATE OF SERVICE

I hereby certify that, on this 11th day of September, 2017, a copy of the foregoing Comments was served by U.S. mail upon:

Nickolas G. Spina
Manager of Launch and Regulatory Affairs
Kepler Communications Inc.
675 King Street West, #204
Toronto, ON Canada
M5V 1M9

/s/ Abigail Hylton _____
Abigail Hylton