

Exhibit 1

Purpose of Experimental Special Temporary Authority

Microsoft Infrastructure Group, LLC (“Microsoft”) respectfully requests experimental Special Temporary Authority (“STA”) to test and demonstrate the efficacy and cutting-edge capabilities of Microsoft Azure’s cloud computing network for the direct reception and processing of Earth Observation (“EO”) data from the Deimos-2 EO satellite. Grant of the requested authority is in the public interest as it will allow Microsoft to continue to evaluate the network’s performance, validate its operational capabilities, and provide additional demonstrations to prospective network customers.

Operational Description

Microsoft seeks an STA for a period of six months beginning on or before March 1, 2021 to permit it to operate an earth station in Quincy, Washington that will communicate with the Deimos-2 spacecraft and to operate an earth station in Brewster, Washington that will operate on a receive-only basis with Deimos-2. Microsoft is seeking STA only for testing and demonstration purposes and does not seek authority to provide commercial service to users in the United States. Pursuant to Section 5.64(b) of the Commission’s rules, 47 C.F.R. §5.64(b), Microsoft is supplying an orbital debris mitigation statement for Deimos-2 in Exhibit 2.

Microsoft proposes to operate two Comtech 6.1 meter antennas at its Microsoft Azure data center located in Quincy, Washington to communicate with Deimos-2. The earth station will operate using the following frequency bands:

DEIMOS-2	Center Frequency (MHz)	Bandwidth (MHz)	Minimum Frequency (MHz)	Maximum Frequency (MHz)
X-Band frequency (downlink)	8090	130	8025	8155
	8220	130	8155	8285

Launched in 2014, the Deimos-2 EO spacecraft operates in non-geostationary orbit, pursuant to authority from Spain’s Ministry of Economy and Business Directorate-General for Telecommunications and Information Technologies Sub-Directorate-General for Planning and Management of the Radio Spectrum.¹ Deimos-2 is owned and operated by Deimos Imaging, a Spanish private company and subsidiary of UrtheCast Corp., Canada. The spacecraft was co-developed by Elecnor Deimos, Spain, together with the South Korean company Satrec Initiative.

The Deimos-2 spacecraft provides cost-effective, dependable and high-resolution Earth observation applications for customers across the globe. With a total mass of 310 kg, the spacecraft can provide 75-cm pan-sharpened imagery and 3-m multi-spectral images in 4 bands (red, green, blue and NIR). The agile spacecraft can be steered to accurately point the pushbroom-type optical payload, which can provide 1 meter panchromatic and 4-meter multispectral images in a swath of 12 kilometers at nadir, at a nominal altitude of 630 kilometers.

¹ Ministerio de Economía y Empresa Dirección General de Telecomunicaciones y Tecnologías de la Información Subdirección General de Planificación y Gestión del Espectro Radioeléctrico. The Deimos-2 spacecraft operates under the Deimos-2 International Telecommunication Union (“ITU”) filing.

Microsoft will also operate a 7.6-meter NEC antenna at the Denali 20020 LLC gateway facility located in Brewster, Washington at 48° 8' 48.49" N.L. and 119° 42' 0.19" W.L., that will operate on a receive-only basis with Deimos-2 using the 8025-8155 MHz and 8155-8285 MHz (space-to-earth) frequency bands.²

Protection of Authorized Stations

8025-8400 MHz (Downlink)

The proposed antennas will receive in the 8025-8400 MHz bands. The 8025-8400 MHz band is allocated in the U.S. Table of Frequency Allocations on a primary basis to non-government Earth exploration-satellite services ("EESS"), subject to a case-by-case electromagnetic analysis of compatibility with U.S. government and other authorized operations in the band (footnote US258). The Commission has authorized U.S. earth and space station operations in both these bands.³

Microsoft proposes to receive in these bands on a non-protected, non-interference basis consistent with the requirements of Section 5.84 of the Commission's rules, 47 C.F.R. § 5.84. Additionally, Microsoft will coordinate with Federal and non-Federal operators in these bands to ensure compliance with this requirement. Microsoft has engaged in identical operations under its existing STA with call sign WQ9XZJ and has coordinated in this manner. Its demonstrations have generated no complaints from other spectrum users of harmful interference.

Operational compatibility between Deimos-2 and the satellites of other EESS systems is managed through the international coordination process, and interference is unlikely because EESS systems operating in the 8025-8400 MHz band normally transmit only in short periods of time while visible from the dedicated receiving earth stations (typically less than 10 minutes for a single pass). For interference to happen, satellites belonging to different systems would have to travel through the antenna beam of the receiving earth station and transmit at the same time and at the same frequency. This is avoided through frequency coordination between Deimos-2 and other satellites. The Deimos-2 transmitter is switched on only when a data download is required during the pass and only when the satellite is in view of the associated earth station, which is just a few minutes. The satellite uses a steerable antenna that points directly at the earth station during data transmission. As a result of the beam directionality, even during transmissions the power received by other earth station antennas is very low.

² See Denali 20020, LLC, Call Sign E990069, File No. SES-MOD-20140630-00551, granted January 27, 2016.

³ See, e.g., *ATLAS Space Operations, Inc.*, Call Sign E190253, File No. SES-LIC-20190429-00555, granted June 28, 2019 (authorizing earth station operations in the 2287.8340-2288.1660 MHz frequency band to provide launch support services for FalconSAT-6); *HawkEye 360, Inc.*, Call Sign S3042, File No. SAT-LOA-20190102-00001, granted in part and deferred in part, Dec. 10, 2019 (authorizing launch and operation of a fleet of EESS satellites in bands including 2200-2290 MHz and 8025-8400 MHz). See also *HawkEye 360, Inc.*, Call Sign WI2XWX, File Nos. 0024-EX-CN-2017 and 0055-EX-CM-2019 (experimental authorization for HawkEye space and ground station operations); *BlackSky Global, LLC*, Call Sign WJ2XFE, File No. 0864-EX-CN-2017 (experimental authorization for satellite operations in the 8025-8225 MHz band); *Stara Corporation*, Call Sign WO9XBL, File No. 1783-EX-ST-2019 (experimental authorization for two nano-satellites, NOOR-1A and NOOR-1B, in the 2200-2290 MHz band).

Deimos-2 operations in the 8025-8400 MHz downlink band comply with applicable power flux density (“PFD”) limitations in No. 22.5 and Table 21-4 of the ITU’s Radio Regulations, as shown below. Specifically, Table 21-4 of the ITU Radio Regulations states that the PFD at the Earth’s surface produced by emissions from an EESS space station in the 8025-8400 MHz band, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the following values:

- -150 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- $-150 + 0.5(d - 5)$ dB(W/m²) in any 4 kHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane;
- -140 dB(W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

The table below demonstrates that Deimos-2 conforms to these limits.

DOWNLINK X-BAND										
Elevation	EI		5	10	20	40	60	83	89	degrees
Nadir	gamma		65,22	63,84	58,92	44,28	27,11	6,38	0,91	degrees
Range	R		2377,08	1977,89	1431,31	910,36	705,64	624,24	620,09	km
Transmitter Power	Pt		2,00	2,00	2,00	2,00	2,00	2,00	2,00	dBW (RMS)
Antenna Gain	Gt		15,00	15,00	15,00	15,00	15,00	15,00	15,00	dB <i>i</i>
Equivalent Isotropic Radiated Power	EIRP	+	17,00	17,00	17,00	17,00	17,00	17,00	17,00	dBW
Propagation										
Free Space Loss	FSL	-	178,12	176,52	173,72	169,78	167,57	166,51	166,45	dB
Atmospheric losses	dB	-	0,61	0,30	0,15	0,08	0,06	0,05	0,05	
Received Power Flux Density	PFD _{rx}		-121,51	-119,92	-117,11	-113,18	-110,96	-109,90	-109,84	dBW/m ²
			-166,28	-164,69	-161,88	-157,95	-155,73	-154,67	-154,61	dBW/m ² /4kHz

Public Interest Showing

Microsoft’s Azure is a leading cloud computing platform that supports more than 200 services for customers in the United States and around the world. With a growing demand for EO services such as disaster prediction and tracking, increased visibility of supply chains and economic activity, and many others, Microsoft seeks to demonstrate to commercial EO systems the benefits of direct download of EO data to the Azure Cloud for immediate processing.

The requested STA will enable Microsoft to continue to conduct the appropriate tests, collect critical feedback regarding the overall architecture of the proposed system, and demonstrate how the network will enable business and government agencies to gain protected access to critical information gathered by EO satellites.

Grant of the requested authority will serve the public interest by proving the effectiveness of direct connections to the Azure Cloud for potential EO customers, such as Urthecast, paving the way for Microsoft to offer a new, advanced service for EO customers in the U.S. and elsewhere.

Time and Date of Proposed Operation.

Microsoft requests temporary authority for six months, beginning on or before March 1, 2021 through August 28, 2021.