

EXHIBIT 1
REQUEST TO MODIFY AUTHORIZATION FOR T8

DIRECTV Enterprises, LLC (“DIRECTV”), pursuant to Section 25.117 of the rules of the Federal Communications Commission (“Commission” or “FCC”), 47 C.F.R. § 25.117, hereby seeks to modify its authorization for the T8 satellite (Call Sign S2632).¹ Specifically, this modification application seeks authority to relocate T8 from its current location at 100.75° W.L. to 119.05° W.L. to ensure continuity of service ahead of the deorbiting of DIRECTV’s T7S satellite (Call Sign S2455).²

In accordance with the Commission’s rules,³ this application has been filed electronically as an attachment to FCC Form 312. DIRECTV provides the technical information relating to the proposed modification on Schedule S and in the attached Engineering Statement.⁴ The remainder of the technical information on file with the Commission for the T8 satellite is unchanged and incorporated by reference.⁵

¹ See *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-01088, File No. SAT-MOD-20150304-00009 (May 29, 2015); *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-00431, File Nos. SAT-AMD-20070111-00010, SAT-MOD-20061213-00151 (Mar. 30, 2007). T8’s Ka-band payload was originally authorized under Call Sign S2132, which was consolidated with Call Sign S2632 in September 2017.

² See *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-01011, File No. SAT-MOD-20140127-00010 (Apr. 25, 2014).

³ 47 C.F.R. § 25.117(c).

⁴ 47 C.F.R. § 25.114.

⁵ See File Nos. SAT-RPL-20040630-00127; SAT-MOD-20050513-00101; SAT-AMD-20070111-00009; SAT-MOD-20061213-00152; SAT-MOD-20061213-00151; SAT-MOD-20150304-00009; SAT-LOA-19931203-00040; SAT-MOD-20040630-00128; SAT-MOD-20050513-00100; SAT-AMD-20070111-00010; SAT-MOD-20030123-00045.

I. PROPOSED MODIFICATION

DIRECTV requests authority to relocate T8 to, and operate the satellite at, 119.05° W.L. T8 is permanently authorized to operate at 100.85° W.L.⁶ but is currently operating at 100.75° W.L. pursuant to special temporary authority.⁷ Upon arrival at 119.05° W.L., T8 will initially be collocated with DIRECTV's T7S satellite, which is currently operating at the nominal 119° W.L. orbital location.⁸ T7S is approaching the end of its operational life, and DIRECTV plans to deorbit the satellite later this year. In connection with the deorbiting of T7S, DIRECTV plans to relocate T8 to 119.05° W.L. and to transfer all traffic from T7S to T8. Once the traffic transfer operations have been successfully completed, DIRECTV will commence deorbiting maneuvers for T7S, and T8 will continue operating from the nominal 119° W.L. orbital location.⁹

At the 119.05° W.L. orbital location, T8 will provide DBS service using the same Ku-DBS frequencies already licensed to T7S at the nominal 119° W.L. orbital location—12.2-12.7 GHz (space-to-Earth) and 17.3-17.8 GHz (Earth-to-space).¹⁰ Upon grant of FCC authority,

⁶ See *supra* n. 1.

⁷ See *Satellite Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-01440, File No. SAT-STA-20191120-00136 (Jan. 17, 2020); *DIRECTV Enterprises, LLC, 60-Day STA Extension Request to Operate T8 (Call Sign S2632) at 100.75 WL*, File No. SAT-STA-20200629-00083 (filed June 29, 2020).

⁸ See *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-01011, File No. SAT-MOD-20140127-00010 (Apr. 25, 2014).

⁹ DIRECTV will separately file a timely notification regarding the completion of the T7S end-of-life maneuvers in accordance with its authorization. See *D7S Extension Application*, Stamp Grant, Call Sign S2455, File No. SAT-MOD-20140127-00010, Condition 2 (Apr. 24, 2014).

¹⁰ T8 is a hybrid spacecraft currently authorized to provide DBS service in the AP30/30A bands (12.2-12.7 GHz (space-to-Earth) and 17.3-17.8 GHz (Earth-to-space)) and FSS in the Ka-band (18.3-18.8 GHz and 19.7-20.2 GHz (space-to-earth) and 28.35-28.6 GHz and 29.25-30.0 GHz (Earth-to-space)). See *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-01088, File No. SAT-MOD-20150304-00009 (May 29, 2015); *Policy Branch Information; Actions Taken*, Public Notice, Report No. SAT-00431, File Nos. SAT-AMD-20070111-00010,

DIRECTV expects to begin drifting T8 to 119.05° W.L. as early as September 1, 2020. The drift period is expected to last approximately 45 days. DIRECTV is simultaneously filing a request for special temporary authority to begin drifting the satellite to the nominal 119° W.L. orbital location while this modification application remains pending.

During the drift of T8, DIRECTV will utilize only the satellite's telemetry, tracking, and command ("TT&C") frequencies and will follow industry practices for coordinating TT&C transmission during the relocation process. T8's specific TT&C frequencies are as follows:

Uplink:	Downlink:
17307.00 MHz	12203.25 MHz
	12203.75 MHz

II. PUBLIC INTEREST SHOWING

Grant of this modification application to relocate T8 to 119.05° W.L. is in the public interest. The proposed relocation of T8 will enable DIRECTV to efficiently manage its on-orbit resources to ensure continued and enhanced services to broadcast customers from the nominal 119° W.L. orbital location. By relocating T8, DIRECTV will be able to maintain service to DBS customers at this orbital location, including those in Alaska and Hawaii.

The relocation of T8 from 100.75° W.L. will not have an adverse impact on any existing customers. At its current location, T8 primarily provides in-orbit backup capacity, and DIRECTV will be able to ensure continuity of service with DIRECTV's T16 satellite (Call Sign

SAT-MOD-20061213-00151 (Mar. 30, 2007). In this modification application, DIRECTV seeks authority to operate only the satellite's DBS frequencies at the 119.05° W.L orbital location.

S3039) at 100.85° W.L.¹¹ DIRECTV has previously advised the Commission of its intention to relocate T8 to the nominal 119° W.L. orbital location.¹²

Grant of this relocation request will not result in increased risk of harmful interference. As noted above, DIRECTV will operate only at the above-listed TT&C frequencies during the drift and will coordinate its TT&C transmissions with operators of satellites in the drift path. Should any interference occur during the drift, DIRECTV will take all reasonable steps to eliminate such interference. DIRECTV will operate T8's communications payload and TT&C frequencies at the nominal 119° W.L. orbital location in conformance with existing coordination agreements and the FCC's rules governing operations vis-à-vis adjacent locations. DIRECTV will operate T8 at the nominal 119° W.L. orbital location in accordance with all previously imposed FCC conditions.

III. REQUEST FOR GRANT WITHOUT MILESTONES OR A BOND

Because T8 is already in-orbit and operating, grant of this modification application is not subject to milestone conditions, and DIRECTV is not required to post a bond under Sections 25.164(a) and 25.165 of the Commission's rules.¹³

IV. CONCLUSION

For the reasons set forth above, DIRECTV respectfully requests that the Commission grant this modification application to relocate the T8 satellite.

¹¹ See *Policy Branch Information; Actions Taken*, Report No. SAT-01402, SAT-MOD-20190508-00036 (July 19, 2019) (Public Notice).

¹² See e.g., *DIRECTV Enterprises, LLC, 60-Day STA Extension Request to Operate T8 (Call Sign S2632) at 100.75 WL*, File No. SAT-STA-20200629-00083, Narrative Exhibit at 2 n.8 (filed June 29, 2020).

¹³ See 47 C.F.R. §§ 25.164(a) and 25.165.

ENGINEERING STATEMENT

General Description – 47 C.F.R. § 25.114(d)(1)

This technical appendix is submitted in support of the modification application of DIRECTV seeking authority to relocate the T8 satellite from 100.75° W.L. to 119.05° W.L. DIRECTV herein provides the technical information to support the proposed modification at 119.05° W.L., only to the extent it differs from information relating the current operation of T8. The remainder of the technical information pertaining to T8 remains unchanged and is incorporated by reference.¹

Schedule S – 47 C.F.R. § 25.114(c)

DIRECTV provides the technical information relating to the proposed modification on Schedule S and in narrative form below.²

T8 is a hybrid, high-power satellite designed to provide DBS service in the AP30/30A bands (12.2-12.7 GHz (space-to-Earth) and 17.3-17.8 GHz (Earth-to-space)) and FSS in the Ka-band (18.3-18.8 GHz and 19.7-20.2 GHz (space-to-earth), and 28.35-28.6 GHz and 29.25-30 GHz (Earth-to-space)). At the 119.05° W.L. orbital position, solely the Ku-band DBS portion of T8 capability will be utilized.

The satellite provides 16 operating uplink and downlink Ku-band transponders in right hand circular polarization (“RHCP”) via a national beam with coverage over all 50 states

¹ See File Nos. SAT-RPL-20040630-00127; SAT-MOD-20050513-00101; SAT-AMD-20070111-00009; SAT-MOD-20061213-00152; SAT-MOD-20061213-00151; SAT-MOD-20150304-00009; SAT-LOA-19931203-00040; SAT-MOD-20040630-00128; SAT-MOD-20050513-00100; SAT-AMD-20070111-00010; SAT-MOD-20030123-00045.

² Four antenna beam diagrams in the Schedule S have been modified to reflect the updated orbital position at 119.05° W.L. The remainder of the information included in the Schedule S has not changed as a result of this modification application but has been included in order to successfully validate the form.

(contiguous United States, Alaska, and Hawaii). Individual copol and crosspol gxts for each of these beams are included in the accompanying Schedule S.

The T8 satellite will be maintained in synchronous orbit at its nominal orbital location with a North-to-South drift tolerance of $\pm 0.05^\circ$ and with an East-to-West drift tolerance of $\pm 0.05^\circ$. The antenna axis attitude will be maintained within $\pm 0.119^\circ$ during normal mode and $\pm 0.199^\circ$ during orbit maneuvers (i.e., station-keeping).

Orbital Debris Mitigation – 47 C.F.R. § 25.114(d)(14))

DIRECTV has assessed and limited the amount of debris released in a planned manner during normal operations. T8 will not be a source of debris during drift, or operating mode, as DIRECTV does not intend to release debris during the planned course of operations of the satellite.

DIRECTV has also considered the possibility of T8 becoming a source of debris pursuant to this subsection.³ DIRECTV has taken steps to address this possibility by incorporating redundancy, shielding, separation of components, and other physical characteristics into the satellite's design. The command receivers and decoders, telemetry encoders and transmitters, and the bus control electronics are fully redundant, physically separated, and located within a shielded area to minimize the probability of the spacecraft becoming a source of debris.

47 C.F.R. § 25.114(d)(14)(ii)

To the maximum extent possible, DIRECTV has assessed and limited the probability of orbital debris risk addressed by this subsection.⁴ The key areas reviewed for this purpose have included leakage of propellant and mixing of fuel and oxidizer as well as battery pressure

³ 47 C.F.R. § 25.114(d)(14)(i).

⁴ 47 C.F.R. § 25.114(d)(14)(ii).

vessels. The basic propulsion design (including component and functional redundancy, and the placement of propellant tanks inside the central structure which provides a high level of shielding), propulsion subsystem component construction, preflight verification through both proof testing and analysis, and quality standards have been designed to ensure a very low risk of propellant leakage and fuel and oxidizer mixing. During the mission, batteries and various critical areas of the propulsion subsystem are continually monitored (for both pressure and temperature) to preclude conditions that could result in the subsequent generation of debris.

After T8 reaches its final disposal orbit, on-board sources of stored energy will be depleted, and all batteries will be left in a permanent discharge state. The solar cells will be slewed away from the sun to minimize power generation.

47 C.F.R. § 25.114(d)(14)(iii)

DIRECTV has assessed and limited the probability of T8 becoming a source of debris under this subsection through detailed and conscientious mission planning.⁵ DIRECTV has reviewed the list of licensed systems and systems that are under consideration by the Commission for the 119.05° W.L. orbital location it has requested. In addition, to address non-U.S. licensed systems, DIRECTV has reviewed the list of satellite networks in the vicinity of 119.05° W.L. for which a request for coordination has been submitted to the ITU. Only those networks that are operating, or are planned to be operating, within $\pm 0.2^\circ$ of the applied-for location have been taken into account in this review.

As a consequence of this review, DIRECTV has determined that two other systems have been licensed by the Commission for, and are currently operating within, 0.2° of the requested location for T8—the ECHOSTAR-14 satellite at 118.9° W.L. (Call Sign S2790) and the

⁵ 47 C.F.R. § 25.114(d)(14)(iii).

ECHOSTAR-7 satellite at 118.8° W.L. (Call Sign S2740), both operated by DISH Operating, LLC. In addition, DIRECTV's T7S satellite, which T8 is slated to replace, is currently operating at 119.05° W.L. There will be no overlap of the station-keeping volumes of T8 with the ECHOSTAR-14 or ECHOSTAR-7 satellites, while DIRECTV will ensure that T8 and T7S will be operated, while co-located, in such a way that collisions will be prevented.

With regard to FCC or ITU filings within ± 0.2 degrees of the applied-for location for T8, none were identified during DIRECTV's search save for the United States Administration filings known to be related to DISH,⁶ for which DIRECTV has already coordinated.

47 C.F.R. § 25.114(d)(14)(iv)

Consistent with the requirements of Section 25.283(a) of the Commission's rules, at the end of the operational life of the satellite, DIRECTV will maneuver T8 into a disposal orbit with an altitude no less than that calculated using the IADC formula:

$$36,021 \text{ km} + (1000 \cdot C_R \cdot A/m)$$

where C_R is the solar pressure radiation coefficient of the spacecraft, and A/m is the Area to mass ratio, in square meters per kilogram, of the spacecraft. The relevant values for the T8 satellite are:

$$C_R = 1.2$$

$$A/m = 0.044 \text{ m}^2/\text{kg}$$

Inserting these values into the equation yields the following results:

$$36,021 \text{ km} + (1000 \cdot 1.2 \cdot (0.044)) = 36073.8 \text{ km}$$

⁶ Specifically, two FSS filings for BSS TT&C frequencies (USABSS-10 at 119.0° W.L. and USABSS-3 at 119.2° W.L.) and four BSS filings (USABSS-10, USABSS-14 and USABSS-31 at 119.0° W.L., and USABSS-3 at 119.2° W.L.).

Since geostationary altitude is generally considered to be 35,786 km,⁷ this yields a desired disposal orbit of at least 288 km above the geostationary arc. DIRECTV intends to boost T8 to at least this height.

DIRECTV currently intends to allocate and reserve approximately 33.4 kg of propellant, sufficient for final orbit raising maneuvers to an orbit with a minimum perigee altitude of 300 km above the geostationary arc. This value was determined through a detailed launch vehicle propellant budget analysis. In addition, DIRECTV has assessed fuel gauging uncertainty and this budgeted propellant provides an adequate margin of fuel reserve to ensure that the disposal orbit will be achieved.

⁷ See *Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd 11567, 11593 ¶ 65 (2004).

FCC Form 312, Response to Question 40
Officers, Directors, and Ten Percent or Greater Shareholders

DIRECTV Enterprises, LLC, a Delaware limited liability company, is wholly owned by DIRECTV Holdings, LLC. DIRECTV Holdings, LLC, a Delaware limited liability company, is wholly owned by The DIRECTV Group, Inc., a Delaware corporation. The DIRECTV Group, Inc. is wholly owned by DIRECTV Group Holdings, LLC, a Delaware limited liability company. The address for all of these entities is 2260 E. Imperial Highway, El Segundo, California 90245.

DIRECTV Group Holdings, LLC is a wholly owned subsidiary of AT&T Inc., a Delaware corporation. AT&T Inc. is a publicly traded company, and there is no one person or group that owns 10% or more of the stock of AT&T Inc. The address for AT&T Inc. is 208 S. Akard Street, Dallas, Texas 75202.

The following individuals are officers of DIRECTV Enterprises, LLC:

David Christopher	President and Chief Executive Officer
Gary E. Johnson	Vice President - Tax
Brian Paperny	Vice President - Tax
Jeston B. Dumas	Treasurer
Brian M. Regan	Secretary
Teresa Blizzard	Assistant Vice President - Tax
Wade Dahlman	Assistant Vice President - Tax
Brian V. Marler	Assistant Vice President - Tax
Gregory W. Nagrosst	Assistant Vice President - Tax
Fletcher Ricks	Assistant Vice President - Tax
Steven Shashack	Assistant Vice President - Tax
Gary Voelkel	Assistant Vice President - Tax
Terry Britt	Assistant Secretary - Tax
Karen M. Diorio	Assistant Secretary - Tax
Frank J. Maxwell	Assistant Secretary - Tax
Vivian Swierc	Assistant Secretary - Tax
Elaine Lou	Assistant Treasurer
Andrew B. Keiser	Assistant Treasurer
Sherri L. Bazan	Assistant Treasurer
Stacy W. Roth	Assistant Treasurer
Paul M. Wilson	Assistant Secretary
Jason Bunch	Executive Director - Payroll
Deirdre Scott	Director - Payroll

Each officer is a U.S. citizen and can be contacted at the following address: DIRECTV Enterprises, LLC, 2260 E. Imperial Highway, El Segundo, CA 90245.