EXHIBIT 1

REQUEST TO MODIFY AUTHORIZATION FOR SPACEWAY 2

DIRECTV Enterprises, LLC, a wholly-owned subsidiary of AT&T, Inc. (collectively, "AT&T"), 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 SPACEWAY 2 satellite (Call Sign S2133). Specifically, this modification application seeks authority to relocate SPACEWAY 2 from 99.075° W.L. to 138.9° W.L.

In accordance with the Commission's rules,[1] this application has been filed electronically as an attachment to FCC Form 312. AT&T provides the technical information relating to the proposed modification on Schedule S and in the attached Engineering Statement.[2] The remainder of the technical information on file with the Commission for the SPACEWAY 2 satellite is unchanged and incorporated by reference.[3] To the extent necessary, AT&T requests that previously granted technical waivers continue to apply to operation of SPACEWAY 2 at 138.9° W.L.[4]

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[1] 47 C.F.R. § 25.117(c).

[2] 47 C.F.R. § 25.114.

[3] *See* File Nos. SAT-MOD-20141029-00116, SAT-MOD-20071010-00137, SAT-MOD-20041122-00212, SAT-MOD-20040614-00113.

[4] In 2004, the Commission granted waivers for SPACEWAY 2 of 47 C.F.R. § 25.210(c) (Capability to Change Transponder Saturation Flux Density) and 47 C.F.R. § 25.210(i) (Cross-Polarization Isolation). *See Spaceway First Modification 99 WL*, File No. SAT-MOD-20040614-00113 (stamp grant Nov. 4, 2004). Due to changes in these Part 25 rules, waivers are no longer required. The Commission also granted a waiver of the requirement to provide certain information in Schedule S. *See id.*

I. PROPOSED MODIFICATION

AT&T requests authority to relocate SPACEWAY 2 to, and operate the satellite in an inclined orbit at, 138.9° W.L.[5] SPACEWAY 2 is a Ka-band satellite operating in the 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) frequency bands. Upon receipt of Commission approval, AT&T expects to begin drifting SPACEWAY 2 to 138.9° W.L. as early as March 15, 2020. The drift period is expected to last approximately 30-35 days.

During the drift of SPACEWAY 2, AT&T 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. SPACEWAY 2's specific TT&C frequencies are as follows:

Uplink:	Downlink:
29503.9063 MHz	19701.75 MHz
29511.7189 MHz	19702.75 MHz

II. PUBLIC INTEREST SHOWING

Grant of this modification application to relocate SPACEWAY 2 is in the public interest. SPACEWAY 2 is currently operating at 99.075° W.L.[6] Relocating the satellite to 138.9° W.L. will allow AT&T to continue to serve customers at that location using Ka-band capacity. No

[5] AT&T will separately file a notification of inclined operations in accordance with Section 25.280.

[6] *See Policy Branch Information*; *Actions Taken*, Report No. SAT-01062, File No. SAT-MOD-20141029-00116 (Jan. 9, 2015) (Public Notice) ("*Relocation Modification*").

other operators are currently licensed, or approved for market access, to provide Ka-band services from the nominal 139° W.L. location.[7]

The proposed relocation of SPACEWAY 2 to 138.9° W.L. will serve as Ka-band backup capacity in Alaska for the C-band capacity currently used by AT&T Alaska. AT&T Alaska uses satellite capacity to provide telephony services to locations in Alaska, including those that cannot be reached by traditional wireline and terrestrial services.

The relocation of SPACEWAY 2 from 99.075° W.L. will not have an adverse impact on any existing customers. At its current location, the SPACEWAY 2 satellite primarily provides in-orbit backup capacity, and AT&T will be able to ensure continuity of service with T11 (S2640) at 99.185° W.L.[8] and T14 (S2869) at 99.235° W.L.[9]

Grant of this relocation request will not result in increased risk of harmful interference. As noted above, AT&T 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, AT&T will take all reasonable steps to eliminate such interference. AT&T will operate SPACEWAY 2's communications payload and TT&C frequencies at the nominal 139° W.L. location in conformance with existing coordination agreements and the FCC's rules governing operations vis-à-vis adjacent locations. AT&T will operate SPACEWAY 2 at the nominal 139° W.L. location in accordance with all previously imposed FCC conditions.

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[7] *See* FCC, Approved Space Station List, https://www.fcc.gov/approved-space-station-list (last visited Feb. 21, 2020).

[8] *See Policy Branch Information; Actions Taken*, Report No. SAT-01290, SAT-MOD-20170921-00134 (Dec. 15, 2017) (Public Notice).

[9] *See Policy Branch Information; Actions Taken*, Report No. SAT-00917, SAT-LOA-20120518-00085 (Dec. 7, 2012) (Public Notice).

III. REQUEST FOR WAIVER

AT&T requests waiver, to the extent necessary, of Section 25.283(c) of the Commission's rules.[10] Section 25.283(c) of the Commission's rules require an applicant to discharge stored energy at the spacecraft's end of life.[11] The Commission has amended Section 25.283(c) to "permit a satellite to maintain *de minimis* propellant or pressurant upon disposal."[12]

SPACEWAY 2 is a Boeing 702 spacecraft that was constructed prior to the adoption of Section 25.283(c).[13] As such, the spacecraft was not designed to discharge the pressurant used during orbit raising but rather permanently isolate the pressurant from the propulsion system by firing a pyrotechnic valve at beginning of in-orbit life. Several spacecraft models of this generation have similar designs.[14]

The residual pressurant on the SPACEWAY 2 satellite complies with the FCC's revised Section 25.283(c). Information regarding the approximate amount of residual helium and xenon gas remaining at end of operational life is as follows:

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[10] 47 C.F.R. §§ 25.114(d)(14)(ii), 25.283(c).

[11] *Id*.

[12] *In the Matter of Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713, ¶ 359 (2015).

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

[14] *See* Ex parte of the Satellite Industry Association et al., IB Docket No. 02-54 (filed Oct. 29, 2009) (providing the FCC a list of spacecraft models which were in currently in use that were unable to fully comply with the requirements of 47 C.F.R. §283(c) and requesting a blanket waiver for in-orbit satellites that could not comply with the rule).

Tank	Volume (M^3)	Pressure (KPA)	Temp (c)	Mass (KG)
HE1	0.0688	1707.8	21.1	0.5096
HE2	0.0688	1707.8	21.1	0.5096
XE1	0.0688	1712	21.1	5.05
XE2	0.0688	1712	21.1	5.05

However, to the extent necessary and out of an abundance of caution, AT&T requests waiver of Section 25.283(c).[15] As shown above, there is good cause for the requested waiver, if it is needed. Moreover, grant of such waiver would be consistent with previous Commission action for similar model spacecraft placed into service around the same time as SPACEWAY 2.[16]

IV. REQUEST FOR GRANT WITHOUT MILESONES OR A BOND

Because SPACEWAY 2 is already in-orbit and operating, grant of this modification application is not subject to milestone conditions, and AT&T is not required to post a bond under Sections 25.164(a) and 25.165 of the Commission's rules.[17]

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[15] Under Section 1.3 of the Commission's rules, the Commission has authority to waive its rules "for good cause shown." Good cause exists if "special circumstances warrant a deviation from the general rule and such deviation will serve the public interest" better than adherence to the general rule. In determining whether waiver is appropriate, the Commission should "take into account considerations of hardship, equity, or more effective implementation of overall policy." *See* 47 C.F.R. § 1.3; *see also WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969); *Ne. Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

[16] *See e.g. XM Radio Inc. Application for Modification*, IBFS File No. SAT-MOD-20101216-00263 (stamp grant with conditions Mar. 8, 2011) (waiving Section 25.283(c) on account of XM-3 being a Boeing 702 model spacecraft with two helium tanks that sealed immediately following the last orbit-raising maneuver during the launch phase and which cannot be further discharged); Grant of the waiver is also supported on hardship grounds. SPACEWAY 2 is an in-orbit spacecraft that commenced service on April 14, 2006. *See e.g. Modification Application to Relocate Horizons 2 from 74.0 to 74.05 W.L.*, SAT-MOD-20070628-00090 (stamp grant with conditions Nov. 30, 2007) (waiving Section 25.283(c) when modification of a satellite would present an undue hardship given the late stage of satellite construction at the time the rule was adopted).

[17] *See* 47 C.F.R. §§ 25.164(a) and 25.165.

V. CONCLUSION

For the reasons set forth above, AT&T respectfully requests that the Commission grant this modification application to relocate SPACEWAY 2.

ENGINEERING STATEMENT

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

This technical appendix is submitted in support of the modification application of AT&T seeking authority to relocate the SPACEWAY 2 satellite from 99.075° W.L. to 138.9° W.L. AT&T herein provides the technical information to support the proposed modification at 138.9° W.L., only to the extent it differs from information relating the current operation of SPACEWAY 2. The remainder of the technical information pertaining to SPACEWAY 2 remains unchanged and is incorporated by reference.[1]

Schedule S – 47 C.F.R. § 25.114(c)

AT&T provides the technical information relating to the proposed modification on Schedule S and in narrative form below.[2]

SPACEWAY 2 has a very large number of identical receive spot beams that operate in the 29.25-29.5 GHz band, and a 1500 element transmit phased array antenna that operates in the 19.7-20.2 GHz band. Only a small subset of the SPACEWAY 2 receive beams will be used at the 138.9° W.L. location and individual gxts for each of these beams are included in the accompanying Schedule S. For the 19.7-20.2 GHz downlink band, the transmit phased array will be configured to generate a specific set of beams and gxts for that specific set are included in the accompanying Schedule S. In addition, for the 28.35-28.6 GHz receive band, the current authorization includes receive beams, and gxts for those receive beams at the applied-for location

[1] *See* File Nos. SAT-MOD-20141029-00116, SAT-MOD-20071010-00137, SAT-MOD-20041122-00212, SAT-MOD-20040614-00113.

[2] Note that certain data elements that are not changing as part of this modification application have been included in the Schedule S in order to successfully validate the form. Specifically, the limited data in the "Receive Channels" and "Transmit Channels" portion of the Schedule S was taken from the existing Schedule S. This data is not changing as part of this modification request.

have also been included. For the 18.3-18.8 GHz downlink band the current authorization includes a wide area beam. The gxt for this beam from the applied-for location has been included with this application.

In accordance with § 25.114(c)(5)(i), (iii), (iv) and (v): the requested orbital location is 138.9° W.L. Note that this location is 0.1° away from AMC-8 at 139.0° W.L., so there will be no overlap of station-keeping volumes for SPACEWAY 2 with AMC-8. The east-west station-keeping range, and up until the start of inclined operations, the north-south station-keeping range for SPACEWAY 2 will be ±0.05°. The antenna axis attitude will be maintained to within 0.1° throughout all operations.

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

47 C.F.R. § 25.114(d)(14)(i)

AT&T has assessed and limited the amount of debris released in a planned manner during normal operations in accordance with this subsection.[3] SPACEWAY 2 will not be a source of debris during drift, or operating mode, as AT&T does not intend to release debris during the planned course of operations of the satellite.

AT&T has also evaluated the possibility of SPACEWAY 2 becoming a source of debris pursuant to this subsection.[4] AT&T has taken steps to address this possibility by incorporating redundancy, shielding, separation of components, and other physical characteristics into the satellite's design. For example, omni-directional antennas have been mounted on opposite sides of the spacecraft, and either will be sufficient to support orbit raising. The command receivers and decoders, telemetry encoders and transmitters, and the bus control electronics are fully

[3] 47 C.F.R. § 25.114(d)(14)(i).

[4] *Id.*

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, AT&T has assessed and limited the probability of orbital debris risk addressed by this subsection.[5] The key areas reviewed for this purpose have included leakage of propellant and mixing of fuel and oxidizer as well as battery pressure vessels. The basic propulsion design (including component and functional redundancy, and the placement of fuel 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 SPACEWAY 2 reaches its final disposal orbit, on-board sources of stored energy will be depleted or safely secured,[6] 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)

AT&T has assessed and limited the probability of SPACEWAY 2 becoming a source of debris under this subsection through detailed and conscientious mission planning.[7] AT&T has reviewed the list of licensed systems and systems that are under consideration by the

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[5] 47 C.F.R. § 25.114(d)(14)(ii).

[6] *See supra* Exhibit I, Section III (requesting waiver of Section 25.283(c) to the extent necessary).

[7] 47 C.F.R. § 25.114(d)(14)(iii).

Commission for the 138.9° W.L. orbital location it has requested. In addition, to address non-U.S. licensed systems, AT&T has reviewed the list of satellite networks in the vicinity of 138.9° 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 ± 0.2° of the applied-for location have been taken into account in this review.

As a consequence of this review, it has been determined that only two other systems have been licensed by the Commission for, and are currently operating within 0.2° of, the requested location for SPACEWAY 2, that being the AMC-8 and AMC-18 satellites at 139.0° W.L. used by SES and AT&T Alaska.[8] As noted above, the applied-for location is slightly offset from 139.0° W.L. such that there will be no overlap of the station-keeping volumes of SPACEWAY 2 with the AMC-8 and AMC-18 satellites.

With regard to ITU filings within ±0.2 degrees of the applied-for location for SPACEWAY 2, the only satellite networks for which the ITU has published any information are F-SAT-N4-139W (coordination request published in BR IFIC 2808 on November 24, 2015), F-SAT-N6-139W (coordination request published in BR IFIC 2880 on October 2, 2018) and NSS-G8 139W (coordination request published in BR IFIC 2905 on October 1, 2019). DIRECTV can find no evidence that satellite construction contracts have been awarded for these networks, nor does the most recently available Federal Aviation Administration Commercial Space Data show any pending satellite launch for these networks.

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

[8] The next closest U.S.-licensed satellite is Intelsat 5 (S2704), which is authorized to operate at 137º W.L. in an inclined orbit. *See Policy Branch Information*; *Actions Taken Report* No. SAT-01361, File No. SAT-MOD-20180501-00036 (Dec. 29, 2018) (Public Notice).

end of the operational life of the satellite, AT&T will maneuver SPACEWAY 2 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 SPACEWAY 2 satellite are:

$$C_R = 1.25$$

$$A = 96 \text{ m}^2$$

$$m = 3679 \text{ kg}$$

Inserting these values into the equation yields the following results:

$$36{,}021 \text{ km} + (1000*1.25*(96/3679)) = 36053.6 \text{ km}$$

Since geostationary altitude is generally considered to be 35,786 km,[9] this yields a desired disposal orbit of at least 267.6 km above the geostationary arc. AT&T intends to boost SPACEWAY 2 to at least this height.

AT&T currently intends to allocate and reserve approximately 3.94 kg of propellant for final orbit raising maneuvers to this altitude. This value was determined through a detailed launch vehicle propellant budget analysis. In addition, AT&T 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.

[9] *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
Brian Paperny	Vice President - Tax
Julianne K. Galloway	Treasurer
Brian M. Regan	Secretary
Sherri L. Bazan	Assistant Treasurer
Teresa Blizzard	Assistant Secretary - Tax
Karen M. Diorio	Assistant Secretary - Tax
Gary E. Johnson	Assistant Treasurer - Tax
Elaine Lou	Assistant Treasurer
Stacy W. Roth	Assistant Treasurer
Steven Shashack	Assistant Treasurer - Tax
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.