ECHOSTAR-9

ATTACHMENT A

TECHNICAL APPENDIX

1.0 Overall Description (§25.114(d)(1))

The ECHOSTAR-9 satellite currently operates at the 121°W.L. orbital location. The spacecraft carries a C-band, Ku-band, upper Ka-band and lower Ka-band payload. For licensing purposes, the C-band payload is known as the IA-13 space station and the combined Ku-band and Ka-band payloads make up the ECHOSTAR-9 space station. INTELSAT North America L.L.C. is authorized to utilize the C-band frequencies and EchoStar Satellite Services L.L.C. ("EchoStar") is authorized to utilize the Ku-band and upper Ka-band frequencies. This technical appendix is submitted in support of the modification application of EchoStar to update EchoStar 9's authorized technical parameters and service areas to reflect the satellite's existing operational and geographic coverage capabilities. At the same time, we are submitting the full technical information regarding EchoStar 9 in the latest Schedule S format.

The interconnectivity of the ECHOSTAR-9 uplink and downlink transponders and its detailed frequency plan is described in the Schedule S and in previous applications.

2.0 Schedule S (§25.114(c))

The Schedule S database is included with this filing. Pursuant to Section 25.114(c)(4)(vi)(A), the gxt diagram for the global telecommand receive beam (associated beams "TCH" and "TCV" in Schedule S) and the global horn antenna (associated beams "TLMH" and "TLMV" in Schedule S) are not included because for this these beams, the contour at 8 dB below peak falls entirely beyond the edge of the visible Earth. The omnidirectional antenna is used for orbit raising and contingency purposes. The communications antenna is used for normal, on station operations operation.

3.0 TT&C frequencies

The Telemetry, Tracking and Command ("TT&C") capabilities are performed in Ku-band. The command is 1.6 MHz in bandwidth with center frequencies 14003 MHz and 14497 MHz. The telemetry has 1 MHz bandwidth and center frequencies 11705.5 MHz and 12198 MHz.

4.0 Certification with respect to two degree spacing levels (§25.140(a))

With respect to Ku band, the downlink EIRP density will not exceed 14 dBW/4kHz and that the associated uplink operations will not exceed applicable EIRP density envelopes in §25.218 unless the non-routine uplink and/or downlink operation are coordinated with the operators of authorized co-frequency space stations at assigned locations within six degrees of 121 W.L.

With respect to Ka band, the downlink pfd will not exceed -118 dBW/m^2/MHz and that associated uplink operation will not exceed applicable EIRP density envelopes in §25.218(i)

unless the non-routine uplink and/or downlink operations are coordinated with the operators of authorized co-frequency space stations at assigned locations within six degrees of 121 W.L.

5.0 Mitigation of Orbital Debris (§25.114(d)(14))

The information required under §25.114(d)(14) of the Commission's Rules is already on file with the Commission and is incorporated by reference herein.[1]

[1] *See* EchoStar 9 Technical Annex at A17-A19, Attachment A to IBFS File No. SAT-MOD-20060830-00092 (Aug. 30, 2006).

DECLARATION

I, Donna Wang, hereby certify under penalty of perjury that I am the technically qualified person responsible for the technical information contained in the foregoing exhibit; that I am familiar with the technical requirements of Part 25; and that I either prepared or reviewed the technical information contained in the exhibit and that it is complete and accurate to the best of my knowledge, information and belief.

/s/ Donna Wang

Donna Wang
Principal Regulatory Engineer
EchoStar

Dated: November 8, 2019