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

Application of	)	
DIRECTV ENTERPRISES, LLC	)	Call Sign:
For Authorization to Launch and Operate DIRECTV KU-79W, a Ku-Band Space Station, at 79.0° WL	)	File No. SAT-LOA-_____

APPLICATION FOR AUTHORIZATION TO LAUNCH AND OPERATE DIRECTV KU-79W

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APPLICATION FOR AUTHORITY TO LAUNCH AND OPERATE DIRECTV KU-79W, A KU-BAND SATELLITE, AT 79° W.L.

DIRECTV Enterprises, LLC ("DIRECTV") hereby applies for authority to launch and operate a geostationary Ku-band spacecraft, at the nominal 79º W.L. orbital location, which has recently become available for licensing.[1] A completed Form 312 and accompanying Schedule S related to this application are attached. DIRECTV intends to use this satellite, to be designated DIRECTV KU-79W, to provide high quality direct-to-home ("DTH") satellite service, including high-definition ("HD") video programming. This application provides the information required by the Commission's rules in support of the proposed satellite authorization. Expeditious grant of this application will enable DIRECTV to extend its leadership in digital home video entertainment innovation, in both the United States (including Puerto Rico) and Mexico.

[1] *See* Public Notice, Rep. No. SAT-00848, DA 12-268, at 2 (Feb. 24, 2012).

I. GRANT OF THIS APPLICATION WOULD SERVE THE PUBLIC INTEREST

Since initiating service in 1994, DIRECTV has become the leading provider of DTH digital television services in the United States, with approximately 19.9 million subscribers. It currently has a fleet of eleven in-orbit spacecraft operating in the Ku- and Ka-bands, which have enabled DIRECTV to maintain and extend its leadership in HD services and to inaugurate 3D services as well. Its affiliate, DIRECTV Latin America ("DTVLA"), is the leading provider of DTH digital television services throughout Latin America, serving nearly 12 million subscribers in over 10 countries using Ku-band satellites. This includes approximately four million subscribers served by DTVLA's affiliate Innova, S. de R.L. de C.V., commonly referred to as Sky Mexico, which is growing by approximately one million subscribers per year despite intensifying competition. These companies strive to combine unique and compelling content with technological innovation and industry-leading customer service to make DIRECTV and DTVLA the clear choice among consumers throughout the Americas.

This application seeks launch and operating authority for a new Ku-band spacecraft at 79º W.L., which DIRECTV intends to use to expand its DTH capabilities still further in order to support the ongoing transition to HD services in the U.S. (including Puerto Rico) and Mexico. Transmitting programming in HD (and 3D) format requires significantly more capacity than transmitting the same programming in SD format. As more programmers migrate to HD and 3D, DIRECTV will need to make sure that its system has the additional capacity available to handle the demands of an increasingly robust slate of HD and 3D programming. The need for additional capacity is especially acute in Mexico, where the existing use of a Ku-band satellite would ease the transition to the use of an additional Ku-band satellite.

Granting this application will serve the public interest in several ways. First, the Commission will enable DIRECTV to continue to provide subscribers throughout the U.S. (including Puerto Rico) with access to the full panoply of HD programming available in the market as the amount of such programming continues to increase, and will enable DTVLA to increase the amount of such programming available to subscribers in Mexico. Second, the ability to keep pace with HD programming demands will make DIRECTV and DTVLA better able to compete against cable and telco multichannel video services in this country and Mexico. Third, the rich and varied HD services offered from this orbital location will give subscribers additional incentive to upgrade to digital television sets, further promoting the digital transition in the United States. And fourth, by providing an attractive platform for niche programming in HD format (*e.g.*, international, foreign language, minority-focused), DIRECTV will greatly increase the incentive programmers have to produce HD programming that might be of particular appeal to audiences underserved by existing HD fare.

For all of these reasons, DIRECTV submits that the Commission should grant this application as expeditiously as possible.

II. INFORMATION REQUIRED UNDER SEC. 25.114 OF THE COMMISSION'S RULES

1. Name, Address, and Telephone Number of Applicant

DIRECTV Enterprises, LLC
2230 East Imperial Highway
El Segundo, CA 90245
(310) 964-0700

2. Name, Address, and Telephone Number of Counsel

William M. Wiltshire
Wiltshire & Grannis LLP
1200 Eighteenth Street, N.W.
Washington, DC 20036
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3. Type of Authorization Requested

DIRECTV hereby applies for authority to launch and operate DIRECTV KU-79W, a geostationary Ku-band satellite that will operate at the nominal 79° W.L. orbital location.

4. General Description of Overall System Facilities, Operations and Services

DIRECTV KU-79W will consist of a geostationary satellite located at the nominal 79° W.L. orbital location and associated ground station equipment. DIRECTV KU-79W is designed to provide DTH service in the FSS Ku-band (11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (Earth-to-space)). The on-station Telemetry, Tracking and Control ("TT&C") functions will be provided at the edges of these same frequency bands.

The DIRECTV KU-79W satellite is capable of supporting twenty four 36 MHz Ku-band transponders (twelve vertical polarization and twelve horizontal polarization) providing coverage via Mexican and US national beams. The Mexican national coverage beam is designed to provide coverage to all of Mexico, whereas the U.S. national beam is designed to provide coverage to the contiguous lower 48 states and Puerto Rico.[2] Both beams will carry national HD programming material. All Mexican national programming material will be distributed from within Mexico and all US national programming material will be distributed from DIRECTV broadcast facility locations within the U.S. The DIRECTV KU-79W system and associated ground Ku-band assets will be capable of transmitting approximately 120 channels of HD programming.

[2] Note that coverage to both Hawaii and Alaska are not technically possible from the 79º W.L. orbital location as elevation angles are too low.

5. Operational Characteristics

5.1 Frequency and Polarization Plan

Details of the DIRECTV KU-79W frequency/channelization and polarization plan, including the TT&C frequencies, are included in the accompanying Schedule S, which is hereby incorporated by reference as if fully set forth herein. The emission designator for transmissions in the uplink and downlink will be 36M0G7W. The allocated bandwidth for these emissions is 36 MHz.

The interconnection capability of each national programming uplink channel to its corresponding downlink channel for the DIRECTV KU-79W is shown in the accompanying Schedule S. Note that because of the national coverage design, the uplink and downlink channels can only be used once, either in the Mexican or the U.S. national beams.

5.2 Communications Payload

5.2.1 Uplink Transmissions

The maximum receive antenna gain, receive system noise temperature, and maximum G/T of the DIRECTV KU-79W satellite are all specified in the accompanying Schedule S. Note that the G/T will decrease, dB-for-dB, from the maximum as the uplink location moves away from beam peak. All Mexican national uplink channels are to be transmitted from locations within Mexico and all U.S. national uplink channels are to be transmitted from one or more of DIRECTV's existing uplink facilities.

The DIRECTV KU-79W uplink channels will be routed to the appropriate band-limiting input multiplexer ("IMUX") comprising the receive channel filters to limit the bandwidth of received signals. The specified performance of these filters is shown in Table 5-1. The received signals will then be frequency translated to the desired output

channel frequency. The filtered and frequency translated signals will be amplified by channel amplifiers with selectable fixed/Automatic Level Control (ALC) modes prior to final amplification. The fixed gain mode will have at least 20 dB of gain adjustment with a step size of 1 dB. The ALC will hold the output level constant over an input dynamic range of at least 15 dB and will have a minimum output level adjustment of 10 dB in 0.5 dB increments.

Parameter	Frequency (F_c)	Specification
Insertion Loss Variation	±9 MHz	0.15 dB_{p-p}
	±11.6 MHz	0.19 dB_{p-p}
	±14.4 MHz	0.40 dB_{p-p}
	±18.0 MHz	1.14 dB_{p-p}
Out of Band Rejection	±22.8 MHz	3.0 dB
	±35.5 MHz	30.0 dB
	±56.3 MHz	30.0 dB

Table 5-1. Response Characteristic of Representative DIRECTV KU-79W IMUX Channel Filter

5.2.2 Downlink Transmissions

The national coverage downlink beams will use 150 Watt TWTAs which, when combined with the transmit antenna gain, results in a maximum EIRP of 54 dBW. The peak transmit antenna gain and associated contours are specified in the accompanying Schedule S (see also Section 7.2).

DIRECTV KU-79W will employ output multiplexer ("OMUX") filters to limit the bandwidth of transmitted signals. The specified performance for these filters is shown in Table 5-2.

Parameter	Frequency (F_c)	Specification
Insertion Loss Variation	±9 MHz	0.10 dB_{p-p}
	±11.6 MHz	0.15 dB_{p-p}
	±14.4 MHz	0.22 dB_{p-p}
	±18.0 MHz	0.38 dB_{p-p}
Out of Band Rejection	±26.3 MHz	3.0 dB
	±33.3 MHz	25.0 dB

Table 5-2. Response Characteristic of Representative DIRECTV KU-79W OMUX Channel Filter

5.3 TT&C Subsystem

The TT&C subsystem provides redundant telemetry, tracking, and command channels for the spacecraft. The principal functions of the subsystem are:

1. Reception and amplification of the radio frequency command uplinks and demodulation of baseband for subsequent signal processing and command distribution.

2. Modulation, up-conversion, amplification, and transmission of all telemetry data.

3. Reception and retransmission of ground-station-generated ranging signals.

The subsystem is configurable to accommodate the unique requirements of pre-launch, orbit raising, and on-station orbit operations. Access at initial spacecraft acquisition and major orbit-raising maneuvers will be via the wide-beam (+Z) and narrow-beam (-Z) omni antennas. Normal on-station commands will be received through the receive communications antenna, while on-station telemetry will be transmitted through the transmit communications antenna. The command and telemetry frequencies and antenna polarizations are shown in the accompanying Schedule S. The minimum cross-polarization isolation for the on-station command and telemetry antennas will be 30 dB.

The telemetry and command link performance is summarized in the link budget analysis in Appendix C. The antenna patterns for the TT&C subsystem are discussed in Section 7.3. The emission designators associated with the TT&C subsystem are

1M30F9D for command and 106KG9D for telemetry, with associated allocated bandwidths of 1.3 MHz and 106 kHz for each of these emissions, respectively.

6. Orbital Locations

The DIRECTV KU-79W satellite will operate at the nominal 79^{o} W.L. orbital location, which has recently become available for licensing in the Ku-band.[3] DIRECTV seeks authority to operate at 79.0° W.L (*see also* Section 18 and GSO Orbit tab of Schedule S).

7. Predicted Spacecraft Antenna Gain Contours

7.1 Uplink Beams

The satellite will receive communications signals from within Mexico and from DIRECTV uplink locations within the U.S. in the 14.0-14.5 GHz frequency band using both vertical and horizontal polarizations (*see also* Sections 5.1 and 5.2.1). Typical DIRECTV KU-79W receive antenna gain contours are provided in GXT format in the accompanying Schedule S and are also included in Appendix B. All uplink beams will have a minimum cross-polarization isolation of 30 dB.

7.2 Downlink Beams

The national coverage beams for DIRECTV KU-79W will cover all of Mexico and CONUS+Puerto Rico using both vertical and horizontal polarizations. The peak transmit gain, and the antenna gain contours in GXT format, are given in the accompanying Schedule S. These gain contours are also graphically depicted in Appendix B. The downlink beams will have a minimum cross-polarization isolation of 30 dB. (*See also* discussion in Sections 5.1 and 5.2.2.)

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[3] *See* Public Notice, Rep. No. SAT-00848, DA 12-268, at 2 (rel. Feb. 24, 2012).

7.3 TT&C Beams

The TT&C coverage during transfer orbit and on-station contingency will be provided by the wide angle TT&C antennas, which will be oriented around the nominal +Z direction and the nominal –Z direction. The TT&C on-station coverage will be provided by the receive communications antenna for command and by the transmit communications antenna for telemetry. The receive antenna pattern for on-station command and the transmit antenna beam pattern for on-station telemetry are given in GXT format in the accompanying Schedule S (*see also* Sections 7.1 and 7.2 above). The wide beam TT&C antenna coverage pattern is shown in Appendix B as Figure B-4.

8. Service Description, Link Description and Performance Analysis, Earth Station Parameters

8.1 Service Description

As discussed more fully in Section I of this application, DIRECTV will use the DIRECTV KU-79W satellite to transmit HD digital video and audio entertainment, and educational and informational programming to customers throughout Mexico and the United States, including Puerto Rico, who will receive this programming using small dish antennas.

8.2 Link Performance

Representative link budgets are shown in Appendix A as Tables A-1 and A2. This analysis assumes a receive antenna size of 65 cm and also includes the interference contribution for adjacent satellite interference from neighboring Ku-band satellite networks nominally spaced at 2°, 4°, 6° and 8° away. It is further assumed that all of these neighboring networks use 1.2m transmit earth stations with transmit power spectral density comparable to that of DIRECTV KU-79W and that these neighboring satellites

operate with transmit power density comparable to that of DIRECTV KU-79W. Note that an availability of 99.7% has been assumed for these link budgets.

Representative link budgets for the telemetry and command links are shown in Appendix C as Tables C-1 and C-2, respectively.

8.3 Earth Station Parameters

There are essentially two types of earth stations that will be used with the DIRECTV KU-79W satellite; feeder-link earth stations and subscriber terminals. The feeder-link stations will be relatively large transmit antennas, typically 8 to 9.1 meters, that track the satellite electronically and are used for transmitting national HD programming material to the satellite. The subscriber terminals are effectively 65 cm receive antennas that are installed at the customers' premises and have fixed pointing, which is optimized at installation, although in some areas these antennas may need to be somewhat larger (approximately 1 meter).

9. Satellite Orbit Characteristics

The DIRECTV KU-79W satellite will be maintained in geosynchronous orbit at its nominal orbital location with a North-to-South drift tolerance of ± 0.05 degrees and an East-to-West drift tolerance of ± 0.05 degrees. The antenna axis attitude will be maintained so as to keep the beam pointing error to within 0.1 degrees.

10. Power Flux Density

There are no power flux density limits in the 11.7-12.2 GHz space-to-Earth frequency band to be use by DIRECTV KU-79W.

11. Arrangement for tracking, telemetry, and control

DIRECTV has not yet contracted for the construction of the DIRECTV KU-79W satellite, and therefore has not yet finalized arrangements for tracking, telemetry and control. DIRECTV does, however, currently maintain a fleet of eleven satellites as part

of its existing business, and it is envisioned that TT&C for DIRECTV KU-79W would be handled in a manner similar to that of DIRECTV's existing satellites. DIRECTV will evaluate its options and take all necessary steps to ensure that proper arrangements are in place, well before satellite launch, to control the DIRECTV KU-79W satellite through its launch and transfer orbit phase and into and during the operational lifetime phase of the satellite mission, including post-operation disposal.

12. Physical Characteristics of the Space Station

DIRECTV has not yet contracted for the construction of the DIRECTV KU-79W satellite and therefore has not yet settled upon exact specifications for the physical characteristics of the satellite. Accordingly, the payload envelope has been sized to allow more than one spacecraft currently available with extensive heritage and fully qualified technology to serve as the design platform. With this proviso, DIRECTV anticipates that the key spacecraft characteristics for DIRECTV KU-79W could be as summarized in the appropriate sections of the accompanying Schedule S.

13. Spacecraft Bus Subsystem

As discussed in Section 12 above, DIRECTV has not yet contracted with a manufacturer for the construction of the DIRECTV KU-79W satellite and DIRECTV does not wish to show a preference by providing data specific to any one manufacturer. As such, it is difficult to discuss any specific characteristics of what may comprise the spacecraft bus subsystem beyond that already included in the accompanying Schedule S.

DIRECTV will provide the Commission with any and all required spacecraft bus characteristics once a final spacecraft provider has been selected and a final satellite design has been adopted.

14. Common Carrier Status

DIRECTV intends to operate DIRECTV KU-79W on a non-broadcast, non-common carrier basis. DIRECTV may sell and/or lease a portion of its capacity on a non-common carrier basis for complementary business purposes.

15. Schedule

DIRECTV will contract for, begin construction of, and launch and operate DIRECTV KU-79W in accordance with any Commissions imposed satellite construction milestones, such as those specified in Section 25.164 of the Commission's rules.

16. Public Interest Considerations

See Section I above.

17. Interference Analysis

The link budgets included in Appendix A demonstrate that the DIRECTV KU-79W satellite design described in this application will operate successfully within the two-degree spacing environment established by the Commission's policy and implementing rules. Additionally, the proposed DIRECTV KU-79W satellite will remain in compliance with the relevant technical rules established by the Commission.

In terms of uplink interference compatibility, it is assumed that the transponder gains of the DIRECTV KU-79W satellite and its neighboring satellites can be matched to result in similar input signal spectral density levels at the satellites. In this case, the uplink C/I will be a function of the difference between the gain of the transmitting earth stations at boresight and the gain at the topocentric off-axis angle. The topocentric off-axis angle for a geocentric separation of 2° is approximately 2.2°. The off-axis gain at 2.2° for an antenna that just meets the 29-25 log(Θ) reference pattern is 20.4 dBi. The boresight gain will be a function of the antenna size of the transmitting earth station.

Table 17-1 illustrates the C/I that would result from different size transmitting earth stations.

Antenna size (m)	On-axis Gain (dBi)	Off-axis Gain	C/I (dB)
1.2	43.2	20.4	22.8
1.8	46.7	20.4	26.3
2.4	49.2	20.4	28.8

Table 17-1. Uplink C/I for 2° Geocentric Spacing

Assuming that the minimum worst case required C/N for a digital service is 8 dB, the effect of the worst case C/I from a 1.2m earth station (*i.e.*, 22.8 dB) would only degrade the C/N by 0.15 dB, equivalent to an increase of 3.5% in the interfered-with signal's noise floor. This increase is less than the 6% coordination trigger specified in the ITU Radio Regulations.

In terms of downlink interference compatibility, it is assumed that the EIRP density of the DIRECTV KU-79W satellite and its neighboring satellites are equal. Similar to the uplink case, the downlink C/I will be a function of the difference between the gain of the receiving earth stations at boresight and the gain at the topocentric off-axis angle. The topocentric off-axis angle for a geocentric separation of 2° is approximately 2.2°. The off-axis gain at 2.2° for an antenna that just meets the 29-25 log(Θ) reference pattern is 20.4 dBi. The boresight gain will be a function of the antenna size of the receiving earth station. Table 17-2 illustrates the C/I that would result from different size receiving earth stations.

Antenna size (m)	On-axis Gain (dBi)	Off-axis Gain	C/I (dB)
0.65	36.3	20.4	15.9
1.2	41.7	20.4	21.2
1.8	45.2	20.4	24.7
2.4	47.7	20.4	27.2

Table 17-2. Downlink C/I for 2° Geocentric Spacing vs. Receive Antenna Size

Assuming that the minimum receive earth station size and minimum required C/N for a digital service for neighboring networks is 1.2 m and 8 dB, respectively, the worst case C/I for a 1.2m earth station (*i.e.*, 21.2 dB) would only degrade the C/N by 0.2 dB, equivalent to an increase of 4.7% in the interfered-with signal's noise floor. This increase is less than the 6% coordination trigger specified in the ITU Radio Regulations. Note that DIRECTV intends to use 65 cm receive earth stations (first line in Table 17-2 above) and that the worst case potential C/I from immediately adjacent satellites would be 15.9 dB. This has been accounted for in arriving at the value of aggregate receive C/I in the link budgets of Appendix A. As these link budgets clearly show, even with this aggregate C/I the DIRECTV link budgets close with adequate margin.

18. Orbital Debris Mitigation

DIRECTV intends to incorporate the material objectives set forth in this application into the technical specifications established for procurement and construction of DIRECTV KU-79W. DIRECTV will include provisions for review of orbit debris mitigation as part of the preliminary design review and critical design review for the spacecraft, and for incorporation of these objectives, as appropriate, into its test plan, including a formal analysis of orbital debris risks associated with the TT&C, propulsion, and power generation and storage systems. Because this mitigation statement is necessarily forward looking, the process of procuring, designing, building, and testing

may result in minor changes to the parameters discussed herein. If appropriate, DIRECTV will modify this mitigation statement to reflect such changes.

Spacecraft Hardware Design

DIRECTV has assessed and limited the amount of debris released in a planned manner during normal operations. DIRECTV KU-79W will not be a source of debris during launch, drift, or operating mode, as DIRECTV does not intend to release debris during the planned course of operations of the satellite.

DIRECTV will also consider the possibility of DIRECTV KU-79W becoming a source of debris by collisions with small debris or meteoroids that could cause loss of control of the spacecraft and prevent post-mission disposal. As such, DIRECTV will take 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 will be 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 will be fully redundant, physically separated, and located within a shielded area to minimize the probability of the spacecraft becoming a source of debris due to a collision. DIRECTV will continue to review these aspects of on-orbit operations with the spacecraft manufacturer and will make such adjustments and improvements as appropriate to assure that its spacecraft will not become a source of debris during operations or become derelict in space due to a collision.

Minimizing Accidental Explosions

DIRECTV will contract for an overall spacecraft design that limits the probability of accidental explosion. The key areas reviewed for this purpose will include 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 a central cylinder which provides a high level of shielding), propulsion subsystem component construction, preflight verification through both proof testing and analysis, and quality standards will be designed to ensure a very low risk of propellant leakage and fuel and oxidizer mixing that can result in subsequent explosions. During the mission, batteries and various critical areas of the propulsion subsystem will be continually monitored (for both pressure and temperature) to preclude conditions that could result in the remote possibility of explosion and subsequent generation of debris.

After DIRECTV KU-79W reaches its final disposal orbit, all on-board sources of stored energy will be depleted, all fuel line valves will be left "open," any pressurized system will be vented, 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.

Through this process, DIRECTV will assess and limit the possibility of accidental explosions during mission operations and assure that all stored energy at the end of the satellite's operation will be removed.

Safe Flight Profiles

DIRECTV will assess and limit the probability of DIRECTV KU-79W becoming a source of debris by collisions with large debris or other operational space stations through detailed and conscientious mission planning. DIRECTV has reviewed the list of licensed systems and systems that are under consideration by the Commission for the 79.0° W.L. orbital location it has requested. In addition, in order to address non-U.S. licensed systems, DIRECTV has reviewed the list of satellite networks in the vicinity of

79.0° 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° have been taken into account in this review.

As a consequence of this review, it has been determined that no other system is currently licensed by the Commission for, or is currently operating at, the nominal 79° W.L. location. Accordingly, DIRECTV intends to operate DIRECTV KU-79W at the 79.0º W.L. position.

With regard to ITU filings within ±0.2 degrees of 79.0° W.L., the only request for coordination the ITU has published is for a Luxemburg satellite network (LUX-G5-63) at 79º W.L. DIRECTV can find no evidence that a satellite construction contract has been awarded for this network, nor does the most recently available Federal Aviation Administration Commercial Space Station Report show any pending satellite launch for this network.

Given the current absence of a construction contract for DIRECTV KU-79W, it is difficult to assess what satellites will actually be operating at the nominal 79° W.L. position at the time that the satellite is to be launched. As such, DIRECTV will certainly revisit this issue once a satellite construction contract is in place.

Frequency and physical coordination during orbital drift cannot be undertaken until the spacecraft and launch vehicle manufacturers are selected and a launch plan has been developed. No pre-operational orbits requiring special temporary authority are currently anticipated.

Post-Mission Disposal

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 DIRECTV

KU-79W into a disposal orbit with an altitude no less than that calculated using the IADC formula:

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

Based on its experience with other satellites in its fleet, DIRECTV anticipates that, once the satellite's actual characteristics have been determined, this calculation will lead to a disposal orbit with a minimum perigee of somewhat less than 300 km above the normal GSO operational orbit.[4] Accordingly, DIRECTV currently anticipates that it will maneuver DIRECTV KU-79W to an altitude 300 km above GSO orbit at the end of its operational life, which should provide additional margin above the results of the IADC formula.

DIRECTV currently intends to allocate and reserve approximately 10 kg of propellant for final orbit raising maneuvers to this altitude. This value was determined through a detailed launch vehicle propellant budget analysis applied to the parameters of one of DIRECTV's most recently designed satellites. 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 despite such uncertainty.

III. ITU COST RECOVERY

DIRECTV is aware that, as a result of the actions taken at the 1998 Plenipotentiary Conference, as modified by the ITU Council in 2005, processing fees are now charged by the ITU for satellite network filings. As a consequence, Commission applicants are responsible for any and all fees charged by the ITU. DIRECTV hereby

[4] For example, the disposal orbit perigee calculated for the DIRECTV 12 satellite was approximately 289 km above GSO orbit altitude, which DIRECTV rounded up to 300 km to provide adequate margin.

states that it is aware of this requirement and accepts responsibility to pay any ITU cost recovery fees associated with this application. Invoices for such fees may be sent to the contact representative listed in the accompanying FCC Form 312.

IV. CONCLUSION

In summary, the satellite proposed in this application will provide DIRECTV with a highly capable spacecraft that will support a significant amount of additional high quality HD multichannel video programming for millions of Mexicans and Americans. This new capability will expand opportunities for a diverse array of HD programming, advance the HDTV transition, and enhance DIRECTV's ability to offer a powerful alternative to incumbent cable operators. For these reasons, DIRECTV submits that the proposed satellite will serve the public interest and respectfully requests that the Commission expeditiously grant this application.

Respectfully submitted,

DIRECTV ENTERPRISES, LLC

By: __\s_____
Romulo Pontual
Executive Vice President

ENGINEERING CERTIFICATION

The undersigned hereby certifies to the Federal Communications Commission as follows:

(i) He is the technically qualified person responsible for the engineering information contained in the foregoing Application,

(ii) He is familiar with Part 25 of the Commission's Rules, and

(iii) He has either prepared or reviewed the engineering information contained in the foregoing Application, and it is complete and accurate to the best of his knowledge and belief.

Signed:

/s/

Jack Wengryniuk
Senior Director
DIRECTV Engineering

February 28, 2012
Date

APPENDIX A

DIRECTV KU-79W LINK BUDGET ANALYSIS

DIRECTV KU-79W	Miami	Clear Sky	Rain Dn
Uplink C/N (thermal), dB	Transmit power, dBW	15.0	17.0
	Transmit power density dBW/Hz	-60.6	-58.6
	Transmit losses, dB	-2.0	-2.0
	Ground antenna gain, dB	59.8	59.8
	Antenna pointing loss, dB	-0.5	-0.5
	Free space loss, dB	-207.6	-207.6
	Atmospheric loss, dB	-0.2	-0.2
	Uplink rain loss, dB	0.0	-2.0
	Satellite G/T, dB/K	8.0	8.0
	Bandwidth, dB-Hz	74.8	74.8
	Boltzmann's constant, dBW/Hz K	228.6	228.6
Total Uplink C/N		**26.3**	**26.3**
Downlink C/N (thermal),dB	Satellite EIRP, dBW/36 MHz	54.0	54.0
	Free space loss, dB	-206.0	-206.0
	Atmospheric loss, dB	-0.2	-0.2
	Downlink rain loss, dB	0.0	-3.3
	Rain temp increase, dB	0.0	-2.6
	Rcv. antenna pointing loss, dB	-0.5	-0.5
	Ground G/T, dB/K	14.0	14.0
	Bandwidth, dB-Hz	74.8	74.8
	Boltzmann's constant, dBW/Hz K	228.6	228.6
Total Downlink C/N		**15.1**	**9.2**
		Clear Sky	**Rain Dn**
Totals	Uplink C/N (thermal), dB	26.3	26.3
	Downlink C/N (thermal), dB	15.1	9.2
	x-pol interference, dB	99.0	99.0
	C/I from ASI	14.9	14.9
	Total C/(N+I), dB	**11.8**	**8.1**
	Required C/(N+I), dB	**3.8**	**3.8**
	Margin, dB	**8.0**	**4.3**

Table A-1. DIRECTV KU-79W Link Budget – U.S. National Coverage

DIRECTV KU-79W	Mexico	Clear Sky	Rain Dn
Uplink C/N (thermal), dB	Transmit power, dBW	15.0	17.0
	Transmit power density dBW/Hz	-60.6	-58.6
	Transmit losses, dB	-2.0	-2.0
	Ground antenna gain, dB	59.8	59.8
	Antenna pointing loss, dB	-0.5	-0.5
	Free space loss, dB	-207.6	-207.6
	Atmospheric loss, dB	-0.2	-0.2
	Uplink rain loss, dB	0.0	-2.0
	Satellite G/T, dB/K	8.0	8.0
	Bandwidth, dB-Hz	74.8	74.8
	Boltzmann's constant, dBW/Hz K	228.6	228.6
Total Uplink C/N		**26.3**	**26.3**
Downlink C/N (thermal),dB	Satellite EIRP, dBW/36 MHz	54.0	54.0
	Free space loss, dB	-206.0	-206.0
	Atmospheric loss, dB	-0.2	-0.2
	Downlink rain loss, dB	0.0	-2.5
	Rain temp increase, dB	0.0	-2.2
	Rcv. antenna pointing loss, dB	-0.5	-0.5
	Ground G/T, dB/K	14.0	14.0
	Bandwidth, dB-Hz	74.8	74.8
	Boltzmann's constant, dBW/Hz K	228.6	228.6
Total Downlink C/N		**15.1**	**10.4**
		Clear Sky	**Rain Dn**
Totals	Uplink C/N (thermal), dB	26.3	26.3
	Downlink C/N (thermal), dB	15.1	10.4
	x-pol interference, dB	99.0	99.0
	C/I from ASI	11.0	11.0
	Total C/(N+I), dB	**9.5**	**7.6**
	Required C/(N+I), dB	**3.8**	**3.8**
	Margin, dB	**5.7**	**3.8**

Table A-2. DIRECTV KU-79W Link Budget – Mexican National Coverage

APPENDIX B

Antenna Beam Contours

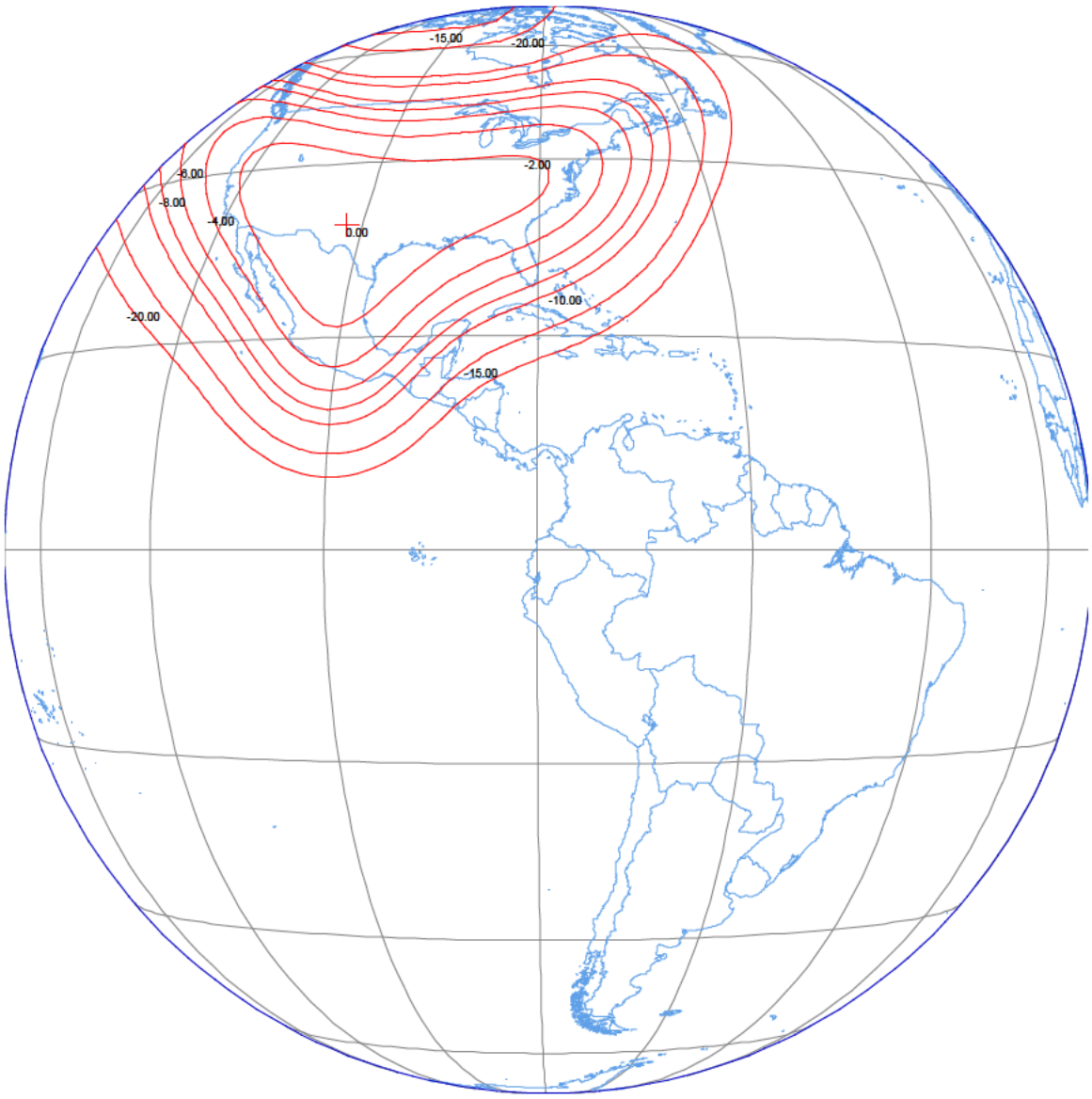

Figure B-1. DIRECTV KU-79W Receive Beam

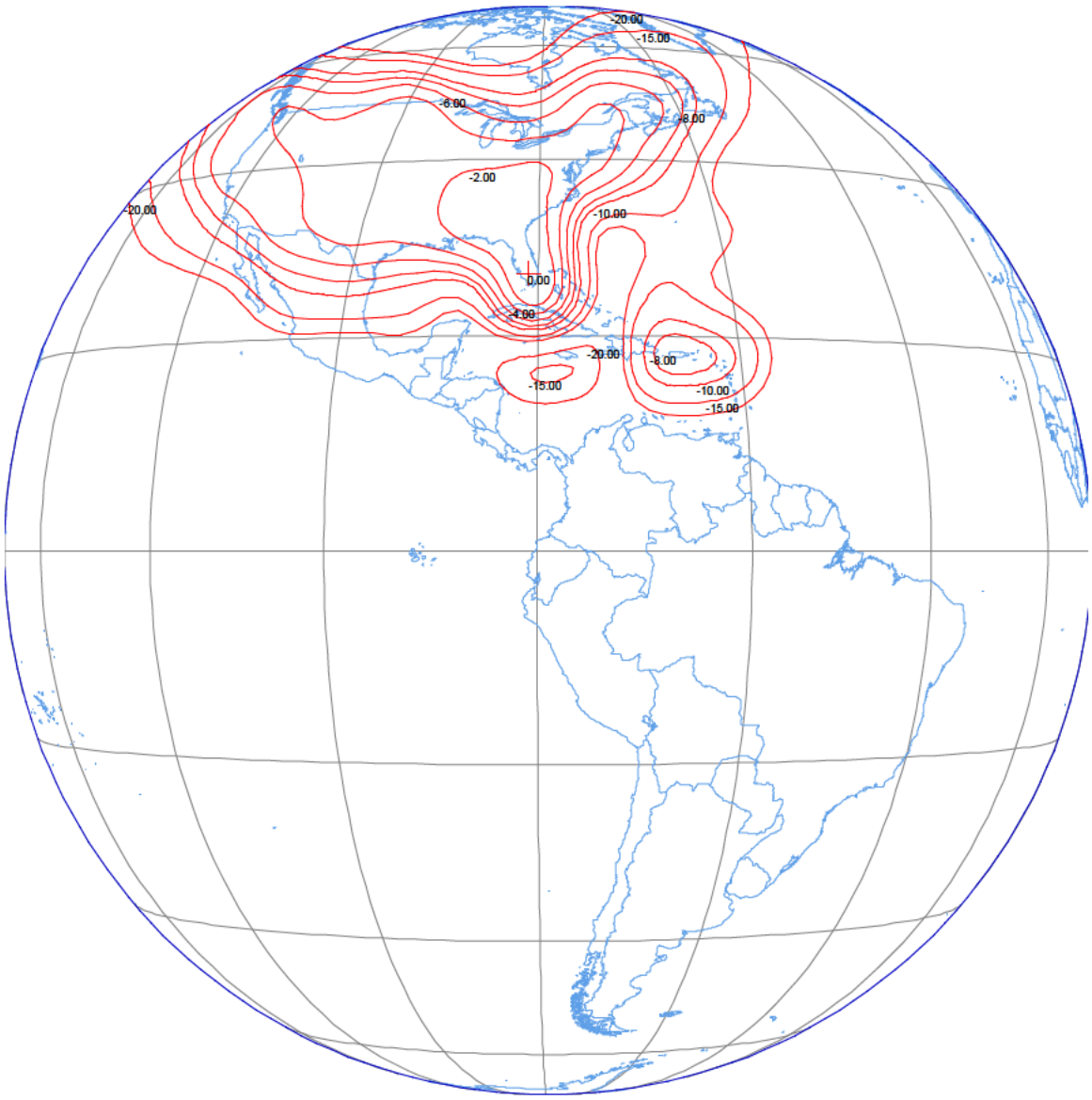

Figure B-2. DIRECTV KU-79W US National Transmit Beam

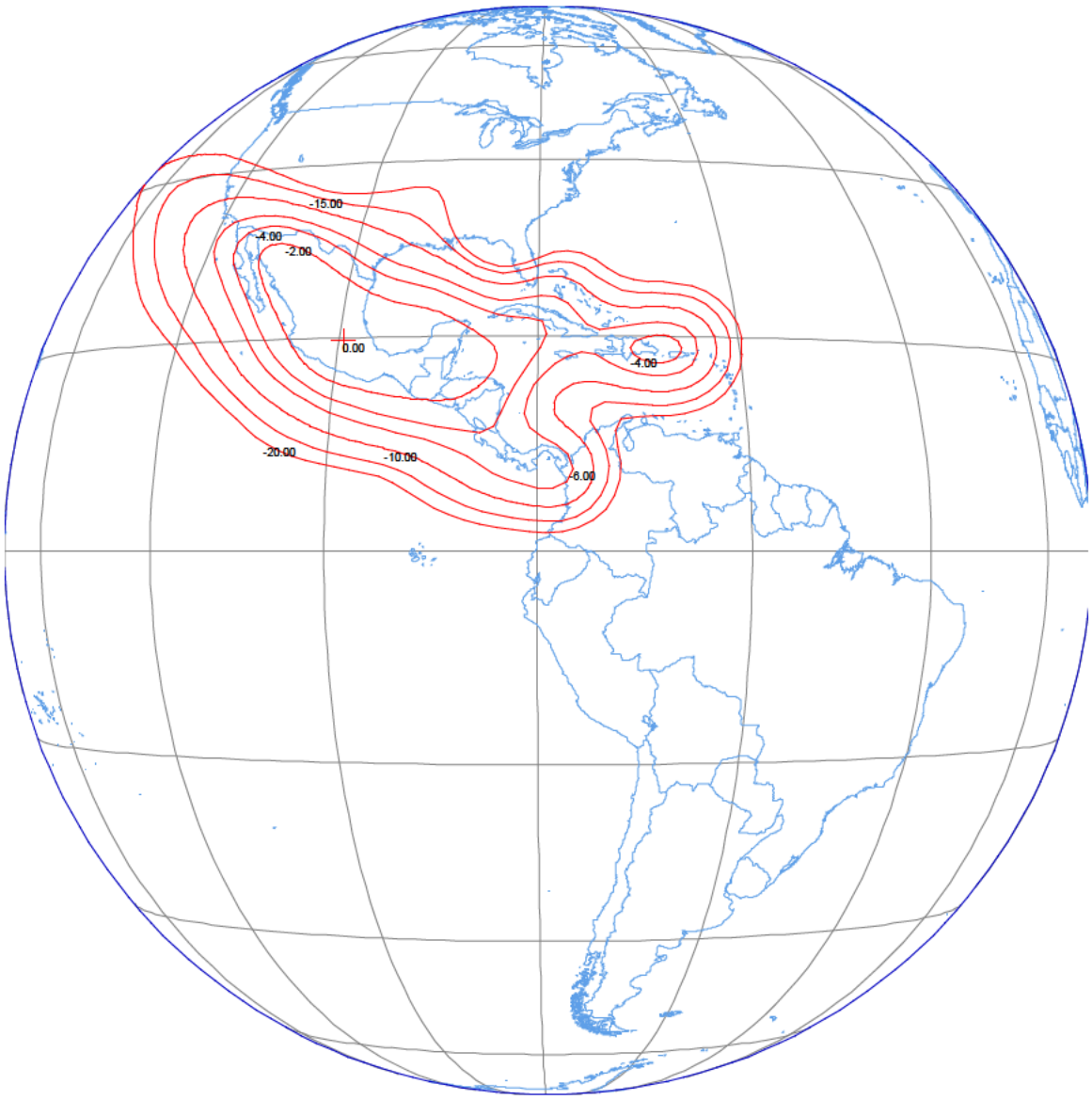

Figure B-3. DIRECTV KU-79W Mexican National Transmit Beam

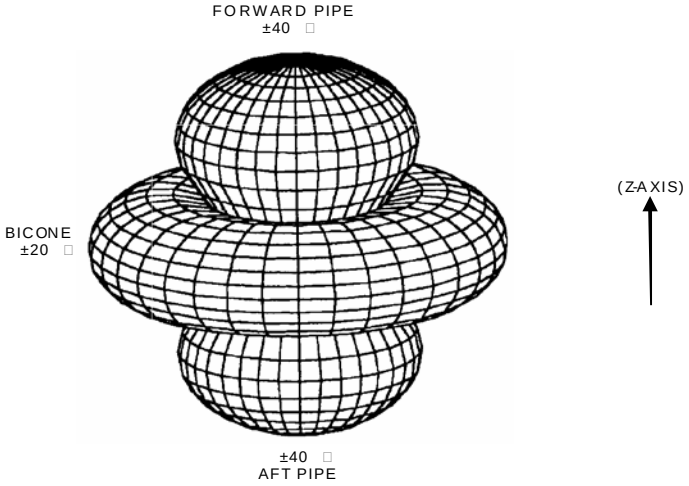

Figure B-4. DIRECTV KU-79W Wide Beam TT&C Antenna Coverage

APPENDIX C

TT&C Link Budgets

Frequency	11705	MHz
Transmit power	-7.5	dBW
Transmit losses	5.0	dB
Antenna gain at EOC in CONUS	27.8	dBi
EIRP	15.3	dBW
Spec.	12.0	dBW
Margin	3.3	dB

Table C-1. DIRECTV KU-79W On-Station Telemetry Link Budget

Frequency	14005	MHz
Flux density at S/C	-90.5	dBW/m^2
Isotropic area	-44.4	dB-m^2
Antenna gain	36.5	dB
Receive losses	19.0	dB
Command receiver input power	-87.4	dBm
Command receiver threshold	-122.0	dBm
Margin	34.6	dB

Table C-2. DIRECTV KU-79W On-Station Command Link Budget