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

In the Matter of **ECHOSTAR SATELLITE OPERATING CORPORATION** Application for Minor Modification to Operate EchoStar 15 at the Nominal 45º W.L. Orbital Location	File No. SAT-MOD-_____ Call Sign S2811

APPLICATION FOR MINOR MODIFICATION

EchoStar Satellite Operating Corporation ("ESOC," and with its affiliates, "EchoStar") requests a minor modification of its authorization for the EchoStar 15 Broadcasting-Satellite Service ("BSS") satellite to operate at the nominal 45º W.L. orbital location.[1] Specifically, EchoStar seeks authority to locate EchoStar 15 at the 45.1° W.L. location in the 45° W.L. BSS cluster instead of the currently authorized 44.9° W.L. location.[2]

I. OVERVIEW

HNS Americas Comunicações Ltda. ("HNSA"), a wholly owned, indirect subsidiary of EchoStar Corporation, ESOC's ultimate parent company, holds an authorization to provide BSS services to Brazil from the nominal 45º W.L. orbital location.[3] Accordingly, EchoStar has

[1] Concurrent with this application, EchoStar is filing applications to modify authorizations for five of its transmit/receive earth stations to provide the necessary telemetry, tracking, and control ("TT&C") and feeder-link services to EchoStar 15 during its operation at 45.1º W.L. (Call Signs E070014, E080007, E080120, E980005, and E020248).

[2] *Stamp Grant*, File No. SAT-MOD-20120814-00130 (granted Dec. 13, 2012) (authorizing operations at 44.9° W.L.). EchoStar will maintain EchoStar 15 within a ±0.05º station-keeping box.

[3] A certified translation of the Brazilian authorization is attached. *See* Exhibit 1, Term of Right of Exploration at 2 (referencing "45° W").

agreed to operate the EchoStar 15 satellite in accordance with Brazil's Region 2 BSS plan for the 45° W.L. cluster, as well as in conformity with HNSA's authorization and applicable Brazilian laws, rules, and regulations, while HNSA designs and constructs a purpose-built satellite for the orbital location, consistent with HNSA's Brazilian authorization.

In late 2012, the Commission authorized EchoStar to relocate EchoStar 15 to, and operate it at, 44.9º W.L.[4] However, because EchoStar's permanent operations are now intended to take place at the 45.1º W.L. orbital location, EchoStar's operational preference is to position EchoStar 15, our interim satellite, at that orbital location.[5] As shown in Exhibit 1, HNSA's authorization from the Brazilian telecommunications regulator, Agência Nacional de Telecomunicações ("Anatel"), extends to the nominal 45° W.L. orbital location, and is not confined to 44.9° W.L.[6] Moreover, EchoStar has coordinated with Anatel, which represents the administration of Brazil with the International Telecommunication Union ("ITU"), on the precise location of operations within the cluster. Accordingly, EchoStar submitted to Anatel, and Anatel has filed with the ITU, materials for the B-SAT-3A-3 space network at the 45.1° W.L. location with the cluster. EchoStar 15 will operate under the B-SAT-3A-3 network at 45.1° W.L. This change in the precise orbital location for EchoStar 15 within the 45° W.L. cluster is the sole change it seeks to the EchoStar 15 satellite authorization. All other conditions and terms remain the same. A

[4] *See* EchoStar Satellite Operating Corp., *Stamp Grant*, File No. SAT-STA-20121022-00185 (granted Nov. 19, 2012) (authorizing relocation to 44.9° W.L. pursuant to STA); EchoStar Satellite Operating Corp., *Stamp Grant*, File No. SAT-MOD-20120814-00130 (granted Dec. 13, 2012) (authorizing operations at 44.9° W.L.).

[5] EchoStar cannot operate at the 45.0º W.L. orbital location due to an existing Fixed-Satellite Service ("FSS") space station at that location. Grant of the requested modification would be without prejudice to the Commission's potential action on EchoStar's outstanding application to launch and operate an FSS satellite at the 45.1° W.L. orbital location. *See* EchoStar Satellite Operating Corp., File No. SAT-LOA-20120921-00152 (filed Sept. 21, 2012)

[6] *See* Exhibit 1, Term of Right of Exploration at 2.

revised Schedule S and Technical Annex to reflect this minor change in orbital locations are attached to this modification application,[7] providing the information required pursuant to Section 25.114 of the Commission's rules.[8]

For the reasons set forth herein, grant of this application is in the public interest, is consistent with past precedent, and will not cause harmful interference to any authorized user of spectrum.

II. THIS REQUEST IS IN THE PUBLIC INTEREST, IS CONSISTENT WITH PAST PRECEDENT, AND WILL NOT CAUSE HARMFUL INTERFERENCE

The grant of authority to operate EchoStar 15 at 45.1° W.L. will serve the public interest. It has long been the Commission's policy that the public interest is generally furthered by leaving fleet management decisions to satellite operators. As the International Bureau has explained:

> [T]he Commission attempts, when possible, to leave spacecraft design decisions to the space station licensee because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customers. Consequently the Commission will generally grant a licensee's request to modify its system, provided there are no compelling countervailing public interest considerations.[9]

As a result, the Commission has routinely authorized "satellite operators to rearrange satellites in their fleet to reflect business and customer considerations where no public interest factors are adversely affected."[10] This includes permitting fleet reconfigurations designed to

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[7] *See* Exhibit 2, Technical Annex.

[8] 47 C.F.R. § 24.114.

[9] AMSC Subsidiary Corp., *Order and Authorization*, 13 FCC Rcd. 12316, 12318 ¶ 8 (1998).

[10] *See* SES Americom, Inc., *Order and Authorization*, 21 FCC Rcd. 3430, 3433 ¶ 8 (2006) (citing Amendment of the Commission's Space Station Licensing Rules and Policies, *Second Report and Order*, 18 FCC Rcd. 12507, 12509 ¶ 7 (2003)).

meet demands for capacity outside the United States.[11] Grant of this application is in the public interest by the same token that grant of the original modification to allow EchoStar 15 to operate in the 45° W.L. cluster was in the public interest.[12] Grant of this application will enable an American company to leverage its resources to expand its service offering to Brazil.[13] Further, grant of this application provides a new potential avenue for U.S. programming to reach an audience in Brazil, a significant South American market.

Similarly, there are no countervailing public interest considerations. No customers will be negatively affected by the relocation, as the customers previously served by EchoStar 15 have been transferred to EchoStar 16. Nor will grant cause harmful interference to any authorized user of the spectrum. During EchoStar 15's operations at the nominal 45º W.L. orbital location, EchoStar will follow standard industry practices for coordination of TT&C and feeder link

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[11] *See* EchoStar Satellite Operating Corp., *Stamp Grant*, File No. SAT-MOD-20120814-00130 (granted Dec. 13, 2012) (granting modification of the authorization for EchoStar 15 to provide service to Brazil); Intelsat License LLC, *Stamp Grant*, File No. SAT-MOD-20110420-00073 (granted Mar. 3, 2012) (granting modification of the authorization for the Galaxy 26 satellite to provide service to the Middle East pursuant to a Turkish ITU filing); SES Americom, Inc., *Stamp Grant*, File No. SAT-MOD-20111025-00209 (granted Feb. 24, 2012) (granting modification of the authorization for AMC-2 to provide service exclusively into Sweden pursuant to a Swedish ITU filing); *see also* Intelsat North America LLC, *Stamp Grant*, File No. SAT-T/C-20100112-00009 (granted July 30, 2010); PanAmSat Licensee Corp., *Stamp Grant*, File No. SAT-MOD-20080225-00051 (granted July 22, 2008).

[12] EchoStar Satellite Operating Corp., *Stamp Grant*, File No. SAT-MOD-20120814-00130 (granted Dec. 13, 2012) (authorizing operations at 44.9° W.L.).

[13] This application does not implicate the freeze on new DBS applications, because the freeze applies only to applications for authorization to provide service in the United States. *See* Public Notice, Direct Broadcast Satellite (DBS) Auction Nullified: Commission Sets Forth Refund Procedures for Auction No. 52 Winning Bidders and Adopts a Freeze on All New DBS Service Applications, 20 FCC Rcd. 20618, 20619 (2005) ("The freeze on DBS applications applies to any application for authority to provide DBS service *to the United States* using the 12.2-12.7 GHz band . . . .") (emphasis added). For the same reason, there is no need to assess the effective competitive opportunities for U.S. DBS service providers in Brazil. *See* 47 C.F.R. § 25.137 (requiring earth station applicants seeking to communicate with a foreign-licensed satellite "to serve the United States" to demonstrate effective competitive opportunities to provide analogous service).

transmissions to ensure that operations do not cause harmful interference to any nearby satellite, and will abide by the operational parameters set forth below.

As the administration under whose frequency reservation EchoStar 15 will be operating, Brazil is the responsible administration for coordination. Appendix 1 of the attached Technical Annex demonstrates that EchoStar 15 can operate at 45.1° W.L. without causing harmful interference to any Region 2 Plan network as well as to any operational BSS network, and that it can operate without exceeding the power-flux density limits under Appendix 30/30A for any FSS satellites operating in Regions 1 or 2. Further, while The Netherlands and Russia have filed modifications for the ITU Region 2 BSS Plan for satellite systems within 9 degrees of 45.1° W.L., EchoStar has found no evidence that these satellite systems are under construction and progressing towards launch.

III. OPERATIONAL PARAMETERS

While EchoStar 15 is at 45.1° W.L., EchoStar will operate the satellite subject to the following conditions:

1. EchoStar will maintain full operational control of EchoStar 15 at all times.
2. EchoStar will operate pursuant to Brazil's ITU Appendix 30/30A Plan Assignment and associated plan modifications, in accordance with Brazil's agreement with HNSA.
3. EchoStar will comply with the applicable laws, regulations, rules, and licensing procedures of Brazil.

IV. WAIVER PURSUANT TO SECTION 304 OF THE ACT

In accordance with Section 304 of the Communications Act of 1934, as amended, 47 U.S.C. § 304, EchoStar hereby waives any claim to the use of any particular frequency or use of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.

V. CONCLUSION

For the foregoing reasons, EchoStar respectfully requests grant of the requested modification, beginning on the date on which EchoStar 15 arrives at the nominal 45.1° W.L. orbital location, so that EchoStar 15 may operate pursuant to the Brazilian frequency reservations and its Brazilian authorization.

Respectfully submitted,

/s/

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Counsel for EchoStar Satellite Operating Corporation

May 3, 2013

EXHIBIT 1

TERM OF RIGHT OF EXPLORATION

CARLOS ALBERTO FERREIRA DO AMARAL JUNIOR
Tradutor Público e Intérprete Comercial
Inglês

Matriculado na Junta Comercial do Estado de São Paulo sob nº 1863
CPF 135.584.188-75 - RG 18.605.711-8 SSP/SP - CCM 4.215.987-3 - INSS 18087669008

LIVRO Nº 003 FOLHA 244 TRADUÇÃO Nº 276

I, Carlos Alberto Ferreira do Amaral Junior, Public Translator and Commercial Interpreter, enrolled with the Board of Trade of the State of São Paulo under No. 1863, in compliance with my duty, translated from Portuguese into English, to the best of my knowledge, a document entitled "Term of Exploration Right PVSS/SPV No. 157/2012", as follows:

TERM OF EXPLORATION RIGHT PVSS/SPV No. 157/2012

EXPLORATION RIGHT OF BRAZILIAN SATELLITE

HNS AMÉRICAS COMUNICAÇÕES LTDA.

ANATEL

National Telecommunications Agency

Private Service Superintendence

Bidding No. 002/2011/PVSS/SPV-ANATEL

TERM OF EXPLORATION RIGHT PVSS/SPV No. 157/2012-ANATEL

TERM OF EXPLORATION RIGHT OF BRAZILIAN SATELLITE ENTERED INTO BY AND BETWEEN THE NATIONAL TELECOMMUNICATIONS AGENCY - ANATEL AND HNS AMÉRICAS COMUNICAÇÕES LTDA.

Hereby, on one hand, the **NATIONAL TELECOMMUNICATIONS AGENCY - ANATEL**, hereinafter referred to as Anatel, an entity of the FEDERAL GOVERNMENT, pursuant to Federal Law No. 9472 of July 16, 1997, General Law of Telecommunications - LGT, enrolled with CNPJ/MF under No. 02.030.715/0001-12, herein represented by its Superintendent of Private Services, BRUNO DE CARVALHO RAMOS, Brazilian, married, bearer of the Identity Card No. 17.385.071-6 issued by SSP-SP and enrolled with CPF/MF under No. 129.999.758-99, according to approval from the Board of Directors comprised in Act No. 1797 of March 28, 2012, published in the Official Gazette of the Union of April 05, 2012, and, on the other hand, **HNS AMÉRICAS COMUNICAÇÕES LTDA.**, enrolled with CNPJ/MF under No. 33.804.832/0001-10, hereinafter referred to as SATELLITE EXPLORER, herein represented by its Chief Executive Officer DELIO MORAIS, Brazilian, married, bearer of the Identity Card No. 164.932 issued by SSP-GO and enrolled with CPF/MF under No. 113.481.191-87, enter into this **TERM OF SATELLITE EXPLORATION RIGHT**, upon the following clauses and conditions:

Chapter I - Object, Area and Term of the Satellite Exploration Right

1.1. The object hereof is to provide the SATELLITE EXPLORER with the Exploration Right of Brazilian Satellite for Transport of Telecommunications Signals, in fair competition regime, through the non-exclusive occupation of geostationary orbital position that is in process of coordination or notification by Brazil in the International Telecommunication Union - ITU and the use of the associated radio-frequencies, both listed below.

I. Orbital position 45°W;

II. Frequency ranges:

a) Intended to via satellite telecommunication:

Earth to space frequency bands	Space to Earth frequency bands
17.30 GHz to 17.80 GHz	12.20 GHz to 12.70 GHz
27.00 GHz to 30.00 GHz	17.70 GHz to 20.20 GHz
1,980.00 MHz to 2,025.00 MHz	2,160.00 MHz to 2,200.00 MHz
	2,483.50 MHz to 2,500.00 MHz

b) Intended to the control and monitoring:

Earth to space frequency bands	Space to Earth frequency bands
17,303.00 MHz 17,305.00 MHz 17,795.00 MHz	12,203.00 MHz 12,204.00 MHz 12,694.00 MHz 12,695.00 MHz 12,696.50 MHz 12,697.50 MHz
27,503.00 MHz 27,505.00 MHz	17,804.00 MHz 17,806.00 MHz
28,602.00 MHz	18,202.00 MHz

1.1.1. The satellite will be explored according to Anatel regulations and, especially, to the provisions of the Regulations on the Right of Satellite Exploration for Transport of Telecommunications Signals.

1.2. Exploration Right of Brazilian Satellite Exploration for Transport of Telecommunications Signals is what ensures the occupation of the orbit and the use of the radiofrequencies intended to the control and monitoring of the satellite and the via satellite telecommunication.

1.3. The geographic area of coverage corresponding to this Exploration Right is that one comprised in the Performance Methodology.

1.4. The Exploration Right set forth herein will be effective for a term of fifteen (15) years, from the date of publishing of the abstract of the Term in the Official Gazette of the Union, extendable only once, for the same period.

1.5. The extension of the term of exploration right and use of the radiofrequencies associated to the object hereof will be at onerous title.

1.6. This Term does not grant to the SATELLITE EXPLORER any exclusive right or prerogative, or privilege in the provision of space capacity.

Chapter II - Amount of the Satellite Exploration Right

2.1. The amount of the Brazilian Satellite Exploration Right is of R$ 145,200,000.00 (one hundred and forty-five million and two hundred thousand Reais), to be paid to the Telecommunications Inspection Fund - FISTEL, according to the conditions set forth in the Call for Bid.

2.1.1. The proposed price or 10% (ten percent) of such value shall be paid on a date to be established in the collection slip, before the date of execution hereof, and the amount to be paid shall be adjusted by the variation of the IST (Telecommunications Industry Index), from the date of delivery of the Identification Documents, Price Bids and Qualification Documentation until the date of effective payment, in case the payment is made after twelve (12) months from the delivery of the Identification Document, Price Bids and Qualification Documentation.

2.1.2. The remaining 90% (ninety percent) will be paid in six equal annual installments, due respectively within thirty-six (36), forty-eight (48), sixty (60), seventy-two (72) and ninety-six (96) months from the date of publishing in the Official Gazette of the Union - DOU of the abstract of this Term and the amount to be paid shall be adjusted according to the variation of the IST (Telecommunications Industry Index), from the date of delivery of the Identification Documents, Price Bids and Qualification Documentation, in case the payment is made twelve (12) months after such date, added of simple interest of 1% (one percent) per month, incurred on the adjusted value, from the date of publishing in the DOU of the Term abstract.

2.1.3. The delay in the payment of any installments within the terms set forth in item 2.1.2, in addition to the late penalty of 0.33% (thirty-three hundredths percent) per day, up to the limit of 10% (ten percent), added of interest equivalent to the reference rate of the Special System of Settlement and Custody - SELIC, accumulated on a monthly basis, from the month subsequent to the expiry of the term and of 1% (one percent) in the payment month, may imply termination of the Satellite Exploration Right, through application of lapse penalty.

Chapter III - Technical Project

3.1. The SATELLITE EXPLORER binds itself to inform Anatel in advance on technical changes to the project, in relation to the provisions of the Performance Methodology, under penalty of termination of the Exploration Right and los of the value paid for such right, a provided for in item 2.1.

3.2. No changes will be admitted:

a)of the term of five (5) years for the start of operation of the space segment, counting from the date of publishing of the Term abstract in the Official Gazette of the Union, except in force majeure events or acts of God;

b)of the technical requirements of the project set forth in Attachment I hereto (Call for Bid No. 002/2011/PVSS/SPV-ANATEL).

3.2.1. The non-compliance with those obligations subject the SATELLITE EXPLORER to the lapse of the Exploration Right and loss of the values of the installments paid for the right referred to in item 2.1.

3.2.2. In addition to the provisions of item 3.2.1, the non-compliance with the commitment to place the space segment in operation within the established term implies the execution by Anatel of the performance bond of said commitment.

Chapter IV - Mode, Form and Conditions for Satellite Exploration

4.1. The space segment will be commercially explored in compliance with the terms of the concerning regulations and in compliance with the conditions set forth in the Performance Methodology.

4.2. The SATELLITE EXPLORER will not have vested right to the keeping of the conditions existing on the date of execution hereof, being required to comply with the new provisions of law and of the regulations, within the established terms.

4.3. The SATELLITE EXPLORER shall ensure that the access to its satellite, in the Brazilian territory, is made only by entities holding concession, permission or authorization for exploration of telecommunications services or by the organs identified in item 5.1.6.

4.4. The SATELLITE EXPLORER will explore the provision of the space capacity on its own account and risk, being fully and solely responsible for any losses arising from its exploration.

4.5. The SATELLITE EXPLORER is the sole responsible for any damage it may cause to the providers or to third parties as a result of the exploration of the space capacity provision, excluding all and any responsibility to Anatel.

4.6. While this Exploration Right is in force, the SATELLITE EXPLORER binds itself to ensure the effective existence, in Brazilian territory, of the deliberation and implementation centers of the strategic, managerial and technical decisions involved in the compliance with this Term, including causing such obligation to be reflected in the composition and in the decision procedures of its management bodies.

4.6.1. The SATELLITE EXPLORER shall show, by means of provisions in its Corporate Bylaws, that it complies with the provisions of item 4.6, within a term of up to six (6) months from the date of publishing of the abstract of this Term in the Official Gazette of the Union.

4.7. Taking into consideration the community interest, the interruption of the provision of space capacity, in emergency situation or after prior notice, for reasons of technical character or safety of people and assets or in case of default from the provider, is not characterized as interruption of the provision.

4.7.1. The interruption in the provision of space capacity due to predictable astronomic events, and ephemeris, does not characterize interruption of such provision, however the SATELLITE EXPLORER binds itself to inform in advance all providers about the occurrence of those events.

4.8. The SATELLITE EXPLORER may transfer this Exploration Right or make any change that may characterize transfer of control only after getting the consent from Anatel, in compliance with the regulatory requirements.

Chapter V - Rights and Duties of the SATELLITE EXPLORER

5.1. The rights and duties of the SATELLITE EXPLORER are those provided for in Law No. 9472/97, in the regulations and in this Term.

5.2. SATELLITE EXPLORER binds itself to keep, during the Exploration Right period, the commitments undertaken in the Performance Methodology, in addition to all other conditions that permitted its qualification, including to respect and comply with all conditions and limitations imposed to

the space segment, as provided for herein and accepted by Anatel, arising from the international and national coordination processes.

5.3. The SATELLITE EXPLORER may, only in the performance of activities related to the granted Exploration Right, take advantage of information related to the individual use of capacity in the space segment by provider, being also permitted to disclose to third parties aggregate information on the use of its space segment, provided that this does not mean the direct or indirect identification of provider of infringement of its business secrecy.

5.3.1. The disclosure of individual information of provider will depend on express and specific consent from the provider.

5.4. The SATELLITE EXPLORER shall keep available to Anatel, at any time, up-to-date registration of all providers that contract the provision of space capacity, containing at least the name or the corporate name of the provider and its domicile or headquarters.

5.5. When requested by Anatel, the SATELLITE EXPLORER will provide data on the provision of space capacity to the providers.

5.6. The SATELLITE EXPLORER will keep Brazilian human resources, in Brazilian territory, in quantity sufficient to the full operation, on a 24 hours per day, 7 days per week basis, of the Control Station, located in Brazilian territory, of its satellite.

5.7. The SATELLITE EXPLORER is entitled to the free exploration of the satellite set forth herein and shall comply, like any explorer of economic activity, with the principles and rules related to the free initiative, free competition, social function of the ownership, consumer defense and restraint with the abuse of economic power.

5.8. The SATELLITE EXPLORER, always when it deems itself as victim of unfair competition or abuse of economic power, will be entitled to submit a petition to Anatel.

5.9. In situations of public calamity or catastrophe, the SATELLITE EXPLORER undertakes the commitment to comply in priority with the applications for provision for space capacity made by the Government bodies.

5.10. The SATELLITE EXPLORER cannot give in guarantee or dispose of the equipment required to the compliance with the obligations set forth herein, without the consent from Anatel.

5.11. In the contracting of services and in the acquisition of equipment and materials linked to the provision of space capacity set forth herein, SATELLITE EXPLORER binds itself to take into consideration the offers from independent suppliers, including the Brazilian ones, and take its decision, concerning the several submitted offers, based on the compliance with objective criteria of price, delivery conditions and technical specifications provided for in the applicable regulations.

5.11.1. In the contracting hereof, the procedures of the Regulations on Procedures for Contracting of Services and Acquisition of Equipment or Materials by the Telecommunications Service Providers shall apply, as approved by Resolution No. 155 of August 16, 1999, as amended by Resolution No. 421 of December 02, 2005.

5.12. The SATELLITE EXPLORER shall ensure that the installation of its telecommunications stations, as well as their enlargement, are in compliance with the regulatory provisions, especially complying with

the limits related to the distance from airports, aerodromes, radiogoniometry stations and Indigenous areas.

5.13. The SATELLITE EXPLORER binds itself, under penalty of lapse of the exploration right, in addition to other penalties, to ensure the continuity of the provision of space capacity throughout the validity period hereof.

5.14. SATELLITE EXPLORER binds itself to continue the process of coordination, notification and registration of the orbital position and associated radiofrequencies, according to the procedures of the ITU Radiocommunication Regulations.

5.15. The SATELLITE EXPLORER is also responsible for the following:

a) to permit the Anatel inspection Agents to have free access, at any time, to the works, equipment and facilities related to the Exploration Right, as well as its accounting records;

b) to keep up-to-date the inventory and registration of the assets used in the satellite exploration;

c) to receive and settle the claims and complaints from the providers;

d) to attend, always when called by Anatel, the meetings related to processes of coordination of the orbit resources and radio electric spectrum.

5.16. The SATELLITE EXPLORER, pursuant to Article 135 of Law No. 9472/97, undertakes the commitment to provide preferred space capacity to the following bodies:

a) Essential Bodies of the Presidency of the Republic;

b) Ministry of the Defense;

c) Ministry of the Justice;

d) Federal Police Department;

e) Military Police and Fire Departments.

5.16.1. The commitment detailed in this item will comprise the bodies or entities that may undertake, fully or partially, the functions of the bodies appointed in item 5.16.

5.17. Once the commitment to the commissioning of the space segment is complied with, SATELLITE EXPLORER is entitled to redeem the value given as performance bond of said commitment.

Chapter VI - Anatel Prerogatives

6.1. Without prejudice to the other regulatory provisions, Anatel is responsible, in the compliance with its attributions as regulatory body, for the following:

a) to inspect the satellite exploration set forth herein, applying the regulatory penalties;

b) to terminate the Satellite Exploration Right, set forth herein, in the cases provided for in this instrument and in the regulations;

c) to cause the regulations to be complied with, including those that may be enacted during the whole term hereof;

d) to watch for the good quality of the provision of space capacity, to receive, ascertain and settle claims and complaints from the providers;

e) to restrain behaviors harmful to the free competition;

f) to prevent the economic concentration, including by the imposition of restrictions, limits or conditions for the transfer hereof;

g) to pay the fees related to FISTEL, taking the measures provided for in the laws;

h) to enforce the performance bond of the commitment to place the space segment in operation, in case the commitment is not complied with on a timely basis.

Chapter VII - Rights and Duties of the Providers

7.1. The rights and duties of the providers are those set forth in Law No. 9472/97 and in the regulations, especially:

a) the access and enjoyment of the provision of space capacity according to the standards of quality, regularity and effectiveness provided for in the regulations;

b) the non-discriminatory treatment concerning the conditions of access and enjoyment of the provision of space capacity;

c) the obtaining and use of space capacity, with free choice, complying with the technical limitations and with the regulations;

d) the inviolability and secrecy of the communication, complying with the constitutional and legal hypothesis and conditions of breach of telecommunications secrecy;

e) the prior knowledge of all and any change in the conditions for the provision of space capacity that may affect it either directly or indirectly;

f) the receiving, within reasonable terms, of effective answers to its complaints;

g) the forwarding of complaints or charges against the SATELLITE EXPLORER to Anatel;

h) the remediation for the damages caused by the infringement of its rights;

i) not to be obliged to consume services or acquire assets or equipment that is not of its interest.

Chapter VIII - Penalties

8.1. The non-compliance with conditions or undertaken commitments, associated to the Exploration Right, will subject the SATELLITE EXPLORER to the penalties established in specific regulations, without prejudice to the penalties of civil and criminal nature.

Chapter IX - Termination of the Satellite Exploration Right

9.1. The Exploration Right set forth herein will be terminated through revocation, lapse, bilateral termination or annulment and according to the procedures set forth in the regulations.

9.2. The revocation of the Exploration Right can be declared when there is loss of the conditions essential to the keeping of the Exploration Right by the SATELLITE EXPLORER.

9.3. The lapse of this Exploration Right can be declared in the following hypotheses:

a) practice of serious infringement;

b) irregular transfer of the Exploration Right;

c) reiterated non-compliance with the commitments undertaken herein or with the provisions of the regulations;

d) non-payment of the fees incurred on the Exploration Right.

9.4. The annulment of the Exploration Right will arise from the recognition, by the administrative or court authority, of irremediable irregularity of this Term.

9.5. The bilateral termination will be effective from an application, duly justified, made by the SATELLITE EXPLORER, appointing the period in which it intends to continue exercising the Exploration Right before its definitive interruption, which cannot be lower than thirty-six (36) months.

9.5.1. The application will be analyzed by Anatel, which made impose conditions to its granting, aiming at the preservation of continuity of the telecommunications services that use the spectrum and the orbital position set forth herein, especially those involving the interests of the federal government.

9.5.2. The bilateral termination does not exclude the obligatory responsibility of the SATELLITE EXPLORER for the damages caused to the providers arising from the interruption of the provision of space capacity contracted before.

9.5.3. The bilateral termination instrument will contain provisions about the conditions and terms of such termination.

9.6. The termination of the exploration right shall be declared in a proper administrative procedure, ensuring the adversary proceeding and the full defense from the SATELLITE EXPLORER.

9.7. Anatel cannot be held liable to the providers or third parties for any charges, burdens, obligations or commitments with third parties or with the employees of the SATELLITE EXPLORER arising from the termination occurred as provided for in the regulations and herein.

Chapter X - Governing Law and Applicable Documents

10.1. This term is governed by Law No. 9472/97 and regulations arising therefrom, especially the Regulations on the Satellite Exploration Right for Transport of Telecommunications Signals.

10.2. The Performance Methodology is an integral part of this Term, as if it was transcribed herein.

10.2.1. Any change in the Performance Methodology will become effective only upon the execution of an Amendment to this Term.

Chapter XI - Venue

11.1. The parties hereto elect the judiciary chapter of the Federal Justice of Brasília, Distrito Federal, as the proper venue to settle any disputes arising from this Term of Exploration Right.

Chapter XII - Final Provisions

12.1. This Term of Exploration Right will become effective and in force from the publishing of its abstract in the Official Gazette of the Union.

In witness whereof, the parties hereto caused this Term of Exploration Right to be executed in two (2) copies of equal contents and tenor, before the undersigned witnesses, for its due and legal effects.

Brasília, Distrito Federal, May, 04 2012.

By Anatel:

(sgd.) *(illegible)*
BRUNO DE CARVALHO RAMOS
Superintendent of Private Services

By the SATELLITE EXPLORER:

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Abstract of Term of Satellite Exploration Right PVSS/SPV No. 157/2012

PARTIES: NATIONAL TELECOMMUNICATIONS AGENCY - Anatel and HNS AMÉRICAS COMUNICAÇÕES LTDA.

KIND: Term of Brazilian Satellite Exploration Right corresponding to Act No. 1797 of March 28, 2012.

OBJECT: Exploration of Brazilian Satellite for Transport of Telecommunications Signals.

TERM: 15 (fifteen) years, as provided for in Article 172 of Law No. 9472 of July 16, 1997.

SIGNATURE DATE: May 04, 2012.

SIGNATORIES:
By Anatel: Bruno de Carvalho Ramos - Superintendent of Private Services
By the Satellite Explorer: Delio Morais - Chief Executive Officer

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These are the contents of said document, which I faithfully translated into the English language.

São Paulo - SP, July 18, 2012.

Carlos Alberto Ferreira do Amaral Junior

Receipt No.: 127

ECHOSTAR-15

EXHIBIT 2, TECHNICAL ANNEX
Technical Information to Supplement Schedule S

A.1 Scope

This Exhibit contains the information required by Part 25 of the FCC rules that cannot be captured by the Schedule S software.

A.2 General Description of Overall System Facilities, Operations and Services (§ 25.114(d)(1))

The ECHOSTAR-15 satellite will operate at 45.1° W.L., within the nominal 45° W.L. orbital cluster, and consistent with the International Telecommunication Union ("ITU") Region 2 Broadcasting-Satellite Service ("BSS") Plan. The satellite will provide BSS to Brazil. A large area coverage beam will be used to downlink towards Brazil and a high gain spot beam covering Arizona will be used to receive feeder link transmissions from EchoStar's feeder link earth station facilities located in Gilbert, AZ.

The ECHOSTAR-15 satellite will operate in the 17.3-17.8 GHz BSS feeder uplink band (ITU Appendix 30A) and the 12.2-12.7 GHz BSS downlink band (ITU Appendix 30). The satellite's frequency plan is identical to that prescribed in the ITU's Region 2 BSS Plan. Full frequency re-use is achieved through the use of dual orthogonal polarizations. EchoStar, through its wholly owned subsidiary, HNS Americas Comunicações Ltda, is licensed by the Brazilian regulator, Agência Nacional de Telecomunicações, to operate on all 32 BSS channels at the nominal 45° W.L. orbital location.

The ECHOSTAR-15 satellite includes 84 TWTAs, each of 150 Watt saturated power capability. When operated at the 45.1° W.L. orbital location, ECHOSTAR-15 will either use up to 32 active transponders in "high power" mode (using 2 x 150 Watt TWTAs combined for each transponder) or up to 19 active transponders in "super high power" operation (using 3 x 150 Watt TWTAs combined for each transponder), producing peak EIRP levels as high as 58.1 dBW in super high power mode.

Spacecraft telemetry, tracking and command ("TT&C") functions will take place from EchoStar's TT&C earth station and satellite control facilities located in Gilbert, AZ. TT&C center frequencies are located at the edges of the 17.3-17.8 GHz uplink band and 12.2-12.7 GHz downlink band, for all phases of the mission.

A.3 Predicted Space Station Antenna Gain Contours (§ 25.114(d)(3))

The ECHOSTAR-15 antenna gain contours for the receive and transmit beams, as required by § 25.114(d)(3), are provided in GXT format and embedded in the associated Schedule S submission.

A.4 Services to be Provided (§ 25.114(d)(4))

The ECHOSTAR-15 satellite will provide BSS to millions of small and inexpensive subscriber receive-only earth terminals in Brazil.

There will be one wideband digitally modulated signal transmitted in each of the active transponders, supporting a range of information data rates depending on the order of the modulation (e.g., QPSK, 8PSK) and the type and degree of forward error correction coding used. Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule

S form. The representative modulation/coding schemes provided in the associated Schedule S submission are as follows:

a) QPSK, Turbo rate 5/6 inner coding (24 MHz bandwidth).

b) 8PSK, Turbo rate 2/3 inner coding (25.8 MHz bandwidth).[1]

A.5 TT&C Characteristics (§ 25.114(c)(4)(i) and § 25.114(c)(9))

The information provided in this section complements that provided in the associated Schedule S submission.

The ECHOSTAR-15 TT&C sub-system provides for communications during transfer orbit and on-station operations, as well as during spacecraft emergencies. The TT&C sub-system operates at the edges of the communications uplink and downlink frequency ranges during all phases of the mission. TT&C operations will be conducted from EchoStar's Gilbert, AZ facilities. During normal on-station operation, command signals will be received by the satellite's spot beam antenna. During any on-station emergency, the command signals will be received by the satellite's near omni-directional antenna. During normal on-station and emergency operations, the telemetry signals are transmitted by the near omni-directional antenna.

A summary of the TT&C subsystem characteristics is given in Table A5-1.

[1] The 25.8 MHz carriers will be transmitted in the 24 MHz channels. These emissions can be accommodated within the useful bandwidth of the channel filters.

Table A5-1: TT&C Performance Characteristics at 45.1° W.L.

Command Modulation	PCM/PSK
Command/Ranging Frequencies	17,791.5 MHz 17,793.5 MHz
Uplink Flux Density (Minimum)	Omni Rx antenna: -83 dBW/m^2 (Command) -78 dBW/m^2 (Ranging) Comms Rx antenna: -93 dBW/m^2 (Command) -87 dBW/m^2 (Ranging)
Satellite Receive Antenna Types and Modes of Operation	Omni antenna during transfer orbit and on-station emergencies, and for telecommand from earth stations other than Gilbert, AZ. Communications antenna during normal on-station operations for telecommand from earth stations at Gilbert, AZ.
Polarization of Satellite Rx/Tx Antennas	RHCP for omni antenna RHCP for communications antenna
Peak Deviation (Command/Ranging)	± 400 kHz
Telemetry/Ranging Frequencies	12,692.0 MHz 12,693.0 MHz 12,694.5 MHz 12,698.5 MHz
Satellite Transmit Antenna Types and Modes of Operation	Omni antenna during transfer orbit, on-station emergencies and normal on-station operations for telemetry to earth stations at Gilbert, AZ.
Maximum Downlink EIRP	15.2 dBW (Omni antenna)
Telemetry/Ranging Modulation Index: 1 sub-carrier 2 sub-carriers 3 sub-carriers	 1.0 ± 0.2 rad pk 0.7± 0.2 rad pk 0.58± 0.2 rad pk

A.6 Satellite Transponder Frequency Response (§ 25.114(c)(4)(vii))

Typical receive and transmit channel filter response performance is given in Table A.6-1 below. The receive response is measured from the satellite receive antenna up to the input of the TWTA. The transmit response is measured from the input of the TWTA to the satellite transmit antenna.

Table A6-1 - Typical Receiver and Transmitter Filter Responses

Frequency offset from channel center	Gain relative to channel center frequency (dB)		Comments
	Receive	Transmit	
CF±6 MHz	0.15	0.10	In-Band Value does not exceed these p-p values
CF±7.7 MHz	0.19	0.15	
CF±9.6 MHz	0.30	0.22	
CF±12 MHz	1.00	0.38	
CF±13 MHz	2.20	0.50	
CF±16.5 MHz	-3.0		Out-of-Band Attenuation is not less than these values
CF±20.0 MHz		-3.0	
CF±27.0 MHz		-25.0	
CF±29.1 MHz	-30.0		

A.7 Cessation of Emissions (§ 25.207)

Each active satellite transmission chain (channel amplifiers and associated TWTA's) can be individually turned on and off by ground telecommand, thereby causing cessation of emissions from the satellite, as required.

A.8 Orbital Debris Mitigation Plan (§ 25.114(d)(14))

A.8.1 Debris Release Assessment (§ 25.144(d)(14)(i))

Space Systems/Loral ("Loral") is the manufacturer of the ECHOSTAR-15 satellite. Loral's assessment determined that no debris will be released by the satellite during the remainder of its mission.

To protect the spacecraft from small body collisions, the design of the ECHOSTAR-15 spacecraft allows for individual faults without losing the entire spacecraft. All critical components (i.e., computers and control devices) have been built within the structure and shielded from external influences. Items that could not be built within the spacecraft nor shielded (such as antennas) are redundant and/or are able to withstand impact. The ECHOSTAR-15 spacecraft can be controlled through both the normal payload antenna and wide angle antennas. The likelihood of both being damaged during a small body collision is minimal. The wide angle antennas on this spacecraft are basically open waveguides that point towards the Earth (there is one set on each side of the spacecraft; either set could be used to successfully de-orbit the spacecraft). These wide angle antennas would continue to operate even if struck and bent.

A.8.2 Accidental Explosion Assessment (§ 25.144(d)(14)(ii))

Loral has reviewed failure modes for all equipment to assess the possibility of an accidental explosion onboard the spacecraft. In order to reduce the potential of an accidental explosion of the spacecraft, EchoStar will follow specific satellite operational precautions and satellite manufacturer recommended procedures. All batteries and fuel tanks are monitored for pressure or temperature variations. Alarms in the Satellite Control Center ("SCC") inform controllers of any variations. Additionally, long term trending analysis will be performed to monitor for any unexpected trends.

Operationally, batteries are operated utilizing the manufacturer's automatic recharging scheme. Doing so ensures that charging terminates normally without building up additional heat. As this process occurs wholly within the spacecraft, it also affords protection from ground command link failures.

In order to protect the propulsion system, fuel tanks have been operated in a "blow down" mode, meaning that, at the completion of the orbit raising phase of the mission, the pressurant was isolated from the fuel system, thereby causing the pressure in the tanks to decrease over the life of the spacecraft. This also protects against a pressure valve failure causing the fuel tanks to become over pressurized.

In order to ensure that the spacecraft has no explosive risk after it has been successfully de-orbited, all stored energy onboard the spacecraft will be removed. Upon successful de-orbit of the spacecraft, all propulsion lines and latch valves will be vented and left open. All battery chargers will be turned off and batteries will be left in a permanent discharge state. These steps will ensure that no buildup of energy can occur that could result in a potential explosion of the spacecraft in the years after it is de-orbited.

A.8.3 Safe Flight Profiles (§ 25.144(d)(14)(iii))

In considering current and planned satellites that may have a station-keeping volume that overlaps the ECHOSTAR-15 satellite, EchoStar has reviewed the lists of FCC-licensed satellite networks, as well as those that are currently under consideration by the FCC. In addition, networks for which a request for coordination has been published by the ITU within ±0.15° of 45.1° W.L. have been reviewed. The Intelsat 14 ("IS-14") satellite operates at 45.0° W.L. with an east-west station-keeping tolerance of ±0.05°. DIRECTV has a pending application before the Commission for the DIRECTV KU-45W satellite, which is to be operated at 45.2° W.L. with

an east-west station-keeping of ±0.05°.[2] EchoStar has a pending application before the Commission to operate the ECHO-45W satellite at 45.1° W.L.[3] In the event the future ECHO-45W satellite is collocated with the ECHOSTAR-15 satellite, EchoStar will use the proven inclination-eccentricity technique to ensure adequate separation between its two satellites.

With respect to ITU networks, EchoStar is not aware of any satellite with an overlapping station-keeping volume with the ECHOSTAR-15 satellite that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

Based on the preceding, EchoStar seeks to locate the ECHOSTAR-15 satellite at 45.1° W.L. and operate it with an east-west station-keeping tolerance of ±0.05°, which eliminates the possibility of any station-keeping volume overlap with the IS-14 satellite and the proposed DIRECTV KU-45W satellite. Therefore, physical coordination of the ECHOSTAR-15 satellite with another party is not required at the present time.

A.8.4 Post Mission Disposal Plan (§ 25.144(d)(14)(iv))

At the end of the operational life of the ECHOSTAR-15 satellite, EchoStar will maneuver the satellite to a disposal orbit with a minimum perigee of 330 km above the normal GSO operational orbit. This proposed disposal orbit altitude exceeds the minimum required by § 25.283, which is calculated below.

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[2] *See* SAT-LOA-20130205-00016.

[3] *See* SAT-LOA-20120921-00152

The input data required for the calculation is as follows:

Total Solar Pressure Area "A" = 110 m^2
(includes area of solar array, satellite body and deployed antennas)
"M" = Dry Mass of Satellite = 2479 kg
"C_R" = Solar Pressure Radiation Coefficient (worst case) = 2

Using the formula given in § 25.283, the Minimum Disposal Orbit Perigee Altitude is calculated as follows:

= 36,021 km + 1000 x C_R x A/M
= 36,021 km + 1000 x 2 x 110/2479
= 36,110 km
= 324 km above GSO (35,786 km)

As mentioned, the designed disposal orbit for ECHOSTAR-15 is 330 km above GSO, 6 km above the minimum required pursuant to the calculation under § 25.283, a calculation that moreover already accounts for adequate margin. Attaining the altitude of 330 km above the GSO orbit will require approximately 15.6 kg of propellant, which will be reserved, taking account of all fuel measurement uncertainties, to perform the final orbit raising maneuvers.

Propellant tracking is accomplished using a bookkeeping method. Using this method, the ground control station tracks the number of jet seconds utilized for station keeping, momentum control and other attitude control events. From the number of jet seconds, the amount of fuel used is determined. This process has been calibrated using data collected from thruster tests conducted on the ground and has been found to be accurate to within a few months of life on the spacecraft.

One year from the end of life of the spacecraft, a Propellant Gauging System ("PGS") test is to be performed. This test uses heaters and heat transfer curves to determine the actual fuel still aboard the spacecraft. As the amount of fuel in the tanks decrease, the accuracy of the test results increases. Operationally, the test is scheduled to be performed one year before end of life

as it provides more than adequate margin to compensate for any bookkeeping uncertainty as well as maximum accuracy for fuel remaining.

The PGS test is also conducted periodically while the satellite is on-orbit to confirm the amount of fuel used and verify the results of the bookkeeping method. Only at the final year mark is it used as the mechanism to determine the amount of remaining fuel.

A.9 Additional Information Concerning Certain Data in the Schedule S Form

Owing to limitations in the permitted data for certain fields in the Schedule S software, it has not been possible to enter the correct value for the noise temperature of receive beam TCOS. In S7 of the Schedule S form (Space Station Antenna Beam Characteristics), column "n", the Schedule S software will not accept a noise temperature higher than approximately 32,000 K and so a value of 32000 K has been entered in the Schedule S form. Because of the input attenuator, the correct value for the noise temperature of beam TCOS is 63,096 K.

A.10 Interference Analyses - Annexes 1 to Appendices 30 and 30A

The ECHOSTAR-15 satellite at 45.1° W.L. will operate under authority of the Brazilian administration. Brazil has original Region 2 BSS Plan assignments at the 45° W.L. cluster location, including the recently submitted B-SAT-3A-3 network at 45.1° W.L., which is a modification to the Region 2 BSS Plan. The ECHOSTAR-15 satellite network will operate under the B-SAT-3A-3 network. The Brazilian administration will be responsible for coordinating the operation of the ECHOSTAR-15 satellite following the Appendix 30 and 30A ITU procedures.

Each of the Annex 1 to Appendices 30 and 30A provides criteria to determine if another administration is affected by a proposed modification to the Region 2 BSS Plan. Appendix 1 to this Exhibit provides the results of the analyses required by Annex 1 to Appendices 30 and 30A using the transmission parameters of the ECHOSTAR-15 satellite network. The transmission

parameters of the ECHOSTAR-15 satellite network are less interference-producing than those of the B-SAT-3A-3 ITU network.

As demonstrated in Appendix 1, the ECHOSTAR-15 satellite network can be operated at 45.1° W.L. without causing unacceptable interference to any Region 2 Plan network or to any operational BSS network.

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application and that it is complete and accurate to the best of my knowledge and belief.

/s/

Stephen D. McNeil
Telecomm Strategies Canada, Inc.
Ottawa, Ontario, Canada
(613) 270-1177

Appendix 1 to
Exhibit 2 (Technical Information to Supplement Schedule S)

Analysis of ANNEX 1 of Appendix 30

1 Limits for the interference into frequency assignments in conformity with the Regions 1 and 3 Plan or with the Regions 1 and 3 List or into new or modified assignments in the Regions 1 and 3 List

Not applicable to Region 2.

2 Limits to the change in the overall equivalent protection margin for frequency assignments in conformity with the Region 2 plan

With respect to § 4.2.3 c) of Article 4, an administration in Region 2 is considered as being affected if the overall equivalent protection margin corresponding to a test point of its entry in the Region 2 Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- *the Region 2 Plan as established by the 1983 Conference; or*
- *a modification of the assignment in accordance with this Appendix; or*
- *a new entry in the Region 2 Plan under Article 4; or*
- *any agreement reached in accordance with this Appendix. (WRC-03)*

The ECHOSTAR-15 satellite will operate under Brazil's B-SAT-3A-3 network. Using the transmission parameters of the ECHOSTAR-15 satellite network, an MSPACE analysis was performed utilizing the Region 2 BSS Plan as contained in IFIC 2742. The results of the analysis are contained in Annex 1 to this Appendix. As shown, there are four affected networks that were filed on behalf of Holland and Russia. These networks are modifications to the Region 2 BSS Plan. The results are discussed below for each of these networks:

- Holland's NSS-BSS 58W and NSS-BSS 59W networks at 58° W.L. and 59° W.L., respectively, are deemed to be affected. We can find no evidence that either network is under construction or scheduled for launch although it is expected that coordination could be achieved given the large orbital separation between the networks and the low OEPM degradation into Holland's networks.
- Holland's NSS-BSS 47.5W network at 47.5°W.L. is deemed to be affected. We can find no evidence that this network is under construction or scheduled for launch. Further, Holland's network is required to be coordinated with Brazil's Plan networks at the nominal 45° W.L. location.

- Russia's INTERSPUTNIK-47.5W-B network at 47.5°W.L. is deemed to be affected. We can find no evidence that this network is under construction or scheduled for launch. Further, the Russian network is required to be coordinated with Brazil's Plan networks at the nominal 45° W.L. location.

3 Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2-12.5 GHz and in Region 3 in the band 12.5-12.7 GHz

With respect to § 4.2.3 a), 4.2.3 b) or 4.2.3 f) of Article 4, as appropriate, an administration in Region 1 or 3 is considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the following power flux-density values, at any test point in the service area of its overlapping frequency assignments:

-147 dB(W/(m^2 · 27 MHz))	for $0° \le \theta < 0.23°$
$-135.7 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.23° \le \theta < 2.0°$
$-136.7 + 1.66\ \theta^2$ dB(W/(m^2 · 27 MHz))	for $2.0° \le \theta < 3.59°$
$-129.2 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.59° \le \theta < 10.57°$
-103.6 dB(W/(m^2 · 27 MHz))	for $10.57° \le \theta$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies. (WRC-03)

The analysis shows that there are no affected adjacent networks.

4 Limits to the power flux-density to protect the terrestrial services of other administrations

With respect to § 4.1.1 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the consequence of the proposed modified assignment in the Regions 1 and 3 List is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Plan or List for Regions 1 and 3 as established by WRC-2000. The same administration is considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed below.

With respect to § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the consequence of the proposed modification to an existing assignment in the Region 2 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference. The same

administration is considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed below.

With respect to § 4.1.1 d) or § 4.2.3 d) of Article 4, an administration in Region 1, 2 or 3 is considered as being affected if the proposed new assignment in the Regions 1 and 3 List, or if the proposed new frequency assignment in the Region 2 Plan, would result in exceeding a power flux-density, for any angle of arrival, at any point on its territory, of:

$$\begin{aligned} &-148 \quad dB(W/(m^2 \cdot 4\ kHz)) && \text{for} \quad \theta \le 5^\circ \\ &-148 + 0.5\,(\theta - 5) \quad dB(W(m^2 \cdot 4\ kHz) && \text{for} \quad 5^\circ < \theta \le 25^\circ \\ &-138 \quad dB(W/(m^2 \cdot 4\ kHz)) && \text{for} \quad 25^\circ < \theta \le 90^\circ \end{aligned}$$

where θ represents the angle of arrival. (WRC-03)

The analysis shows that there are no affected adjacent networks.

5 Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan or List to protect the fixed-satellite service (space-to-Earth) in the band 11.7-12.2 GHz in Region 2 or in the band 12.2-12.5 GHz in Region 3, and of assignments in the Region 2 Plan to protect the fixed-satellite service (space-to-Earth) in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3

With respect to § 4.1.1 e) of Article 4, an administration is considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List would result in an increase in the power flux-density over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 2 or Region 3 of 0.25 dB or more above that resulting from the frequency assignments in the Plan or List for Regions 1 and 3 as established by WRC-2000.

With respect to § 4.2.3 e), an administration is considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1 or 3 of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts of the 1985 Conference.

With respect to § 4.1.1 e) or 4.2.3 e) of Article 4, with the exception of cases covered by Note 1 below, an administration is considered as not being affected if the proposed new or modified assignment in the Regions 1 and 3 List, or if a proposed modification to the Region 2 Plan, gives a power flux-density anywhere over any portion of the service area of its overlapping frequency assignments in the fixed-satellite service in Region 1, 2 or 3 of less than:

$$\begin{aligned} &-186.5 \quad dB(W/(m^2 \cdot 40\ kHz)) && \text{for} \quad 0^\circ \le \theta < 0.054^\circ \\ &-164.0 + 17.74 \log \theta \quad dB(W/(m^2 \cdot 40\ kHz)) && \text{for} \quad 0.054^\circ \le \theta < 2.0^\circ \end{aligned}$$

$-165.0 + 1.66\ \theta^2$ dB(W/(m^2 · 40 kHz))	for $2.0° \leq \theta < 3.59°$
$-157.5 + 25 \log \theta$ dB(W/(m^2 · 40 kHz))	for $3.59° \leq \theta < 10.57°$
-131.9 dB(W/(m^2 · 40 kHz))	for $10.57° \leq \theta$

where θ is the minimum geocentric orbital separation in degrees between the wanted and interfering space stations, taking into account the respective East-West station-keeping accuracies.

The analysis shows that there are no affected adjacent networks.

6 Limits to the change in equivalent noise temperature to protect the fixed-satellite service (Earth-to-space) in Region 1 from modifications to the Region 2 Plan in the band 12.5-12.7 GHz

With respect to § 4.2.3 e) of Article 4, an administration of Region 1 is considered as being affected if the proposed modification to the Region 2 Plan would result in:

- *the value of $\Delta T / T$ resulting from the proposed modification is greater than the value of $\Delta T / T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts of the 1985 Conference; and*
- *the value of $\Delta T / T$ resulting from the proposed modification exceeds 6%, using the method of Appendix **8** (Case II). (WRC-03)*

The analysis shows that there are no affected adjacent networks.

Annex 1 to Appendix 1 to Exhibit 1

ECHOSTAR-15 MSPACE Results

Admin	Orbital Position (°W)	Network	Max. OEPM Degradation (dB)
HOL	59.0	NSS-BSS 59W	0.252
HOL	58.0	NSS-BSS 58W	0.296
HOL	47.5	NSS-BSS 47.5W	12.399
RUS	47.5	INTERSPUTNIK-47.5W-B	8.494

Appendix 2 to
Exhibit 1 (Technical Information to Supplement Schedule S)

Analysis of ANNEX 1 of Appendix 30A

1 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link Plan (WRC-2000)

*With respect to the modification to the Region 2 feeder-link Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 2, except in cases covered by Resolution **42 (Rev.WRC-03)**, an administration is considered as being affected if the overall equivalent protection margin corresponding to a test point of its entry in that Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:*

- *the feeder-link Plan as established by the 1983 Conference; or*
- *a modification of the assignment in accordance with this Appendix; or*
- *a new entry in the feeder-link Plan under Article 4; or*
- *any agreement reached in accordance with this Appendix except for Resolution **42 (Rev.WRC-03)**. (WRC-03)*

See the results described under Section 2 of the Appendix 30 Annex 1 Analysis.

2 Limits to the interference into frequency assignments in conformity with the Regions 1 and 3 feeder-link Plan or with the Regions 1 and 3 feeder-link List or proposed new or modified assignments in the Regions 1 and 3 feeder-link List (WRC-03)

Not applicable to Region 2.

3 Limits applicable to protect a frequency assignment in the bands 17.3-18.1 GHz (Regions 1 and 3) and 17.3-17.8 GHz (Region 2) to a receiving space station in the fixed-satellite service (Earth-to-space)

*An administration in Region 1 or 3 is considered as being affected by a proposed modification in Region 2, with respect to § 4.2.2 a) or 4.2.2 b) of Article 4, or an administration in Region 2 is considered as being affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List, with respect to § 4.1.1 c) of Article 4, when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link would cause an increase in the noise temperature of the feeder-link space station which exceeds the threshold value of $\Delta T / T$ corresponding to 6%, where $\Delta T / T$ is calculated in accordance with the method given in Appendix **8**, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the feeder-link carriers. (WRC-03)*

The analysis shows that there are no affected adjacent networks.

4 Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (Earth-to-space) (WRC-03)

*With respect to § 4.1.1 d) of Article 4, an administration is considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link in Region 2 of that administration would cause an increase in the noise temperature of the receiving feeder-link space station which exceeds the threshold value of $\Delta T/T$ corresponding to 6%, where $\Delta T/T$ is calculated in accordance with the method given in Appendix **8**, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the feeder-link carriers. (WRC-03)*

Not applicable to Region 2.