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

In the Matter of	)	
	)	File No. SES-MFS-_____-_____
ECHOSTAR CORPORATION	)	Call Sign E070015
	)	
Application for Modification of Licenses for Two Ku-band Transmit/Receive Earth Stations to Communicate with EchoStar 8, a Mexican-Licensed Satellite, at 77.05º W.L. Using 14003 MHz	)	File No. SES-MFS-_____-_____ Call Sign E980127

APPLICATION FOR MODIFICATION

By this Application, and pursuant to Sections 25.117 and 25.137 of the Commission's rules,[1] EchoStar Corporation ("EchoStar")[2] requests modification of its licenses for two "ALSAT" Fixed-Satellite Service ("FSS") transmit/receive earth stations (Call Signs E070015 and E980127) to transmit command instructions to the Mexican-licensed EchoStar 8 satellite at 77.05° W.L. using the 14003 MHz frequency.[3] To the extent necessary, EchoStar is also requesting a waiver of Section 25.202(g) of the Commission's rules[4] to allow EchoStar to

[1] 47 C.F.R. §§ 25.117, 25.137.

[2] On February 24, 2011, EchoStar Corporation filed an application requesting consent to the *pro forma* assignment of its authorization to operate the above-referenced earth stations to EchoStar Broadcasting Corporation. *See* File No. SES-ASG-INTR2011-00567 (filed Feb. 24, 2011).

[3] The Commission has previously authorized EchoStar to provide service into the United States from the EchoStar 8 satellite operating under Mexican authority at the 77° W.L. orbital location recognizing that the requirements of Section 25.137(a) of the Commission's rules have been met. *See* Stamp Grant, File No. SES-MFS-20080724-00977 (granted Sept. 13, 2010).

[4] 47 C.F.R. § 25.202(g).

provide those command signals outside the edges of the allocated DBS bands. EchoStar recently filed for special temporary authority to operate these earth stations.[5]

I. BACKGROUND

As EchoStar has previously reported to the Commission, the EchoStar 8 satellite, which is currently operating under Mexican authority at the 77.05° W.L. orbital location, experienced a single event upset ("SEU") in January 2011.[6] Since that time, EchoStar has conducted testing to determine whether and how the satellite was affected by the SEU.[7] EchoStar has determined that the SEU did not have a major effect on the health or the longevity of the satellite, and it has not impaired the functionality of the payload. But the SEU did result in the partial disabling of the satellite's remaining 17 GHz receiver.[8] While that receiver can provide ranging functions, it cannot receive command instructions, which therefore must be conveyed over the 14003 MHz

[5] File Nos. SES-STA-20110328-00371 (Call Sign E070015), SES-STA-20110328-00370 (Call Sign E980127) (filed Mar. 28, 2011) ("EchoStar 8 Earth Station STA Applications").

[6] *See* Letter from Petra A. Vorwig, Counsel for EchoStar Corporation, to Marlene H. Dortch, Secretary, FCC, *filed in* File No. SAT-T/C-20090217-00026 (Feb. 1, 2011).

[7] EchoStar is simultaneously filing an interim report of these test results under a request for confidential treatment. *See* Letter from Petra A. Vorwig, Counsel for EchoStar Corporation, to Marlene H. Dortch, Secretary, FCC, *filed in* File Nos. SAT-MOD-20101124-00244, SAT-T/C-20090217-00026 (Mar. 30, 2011).

[8] In compliance with Section 25.137 of the Commission's rules, EchoStar is submitting a revised Technical Narrative (Attachment A) to reflect the fact that the satellite will use the 14003 MHz frequency for command signals and the 17799 MHz frequency only for ranging and to update the safe flight profile. The Schedule S submitted in File No. SAT-STA-20080616-00121 identified the 14003 MHz frequency as one frequency over which EchoStar 8 is capable of operating; therefore, there are no changes to the Schedule S. *See* File No. SAT-STA-20080616-00121 (filed June 16, 2008). Please note that the Schedule S was created based on an orbital location of 77.0º W.L.; however, EchoStar 8 is operating at 77.05º W.L. The 0.05 degree offset from the orbital position described in the Schedule S will affect the interference analysis provided in the Schedule S by only 0.003 dB for a 50 cm antenna, which in practical terms is negligible.

frequency.[9] EchoStar seeks modification authority to provide these instructions over two FSS transmit/receive earth stations located in Cheyenne, Wyoming, and Gilbert, Arizona, respectively.[10] These earth stations are ALSAT stations and will operate within their licensed parameters.

Grant of this Application will serve the public interest because it will ensure the continued safe operation of EchoStar 8 at the 77.05° W.L. orbital location while it continues to provide U.S. consumers direct-to-home satellite television service, including local-into-local programming in certain markets.

II. REQUEST TO WAIVE SECTION 25.202(g)

Section 25.202(g) of the Commission's rules[11] requires that telemetry, tracking and control ("TT&C") functions be conducted at the edges of a satellite's allocated bands. To the extent applicable for this earth station modification application, EchoStar requests a waiver of this rule in order to provide command signals to its DBS satellite, EchoStar 8, over the 14003 MHz frequency at the 77.05° W.L. orbital location.

Commission rules may be waived if there is good cause to do so.[12] Good cause can be shown by demonstrating that the waiver "would not undermine the policy objective of the rule or order in question, special circumstances warrant a deviation from the general rule, and such a

[9] EchoStar is also adapting a flight software patch previously employed in other in-orbit satellites to allow EchoStar to provide emergency command instructions over the 17 GHz feeder link frequency in the event the 14 GHz receiver experiences a problem. EchoStar plans to complete this adaptation prior to the proposed relocation of the satellite to 86.5° W.L.

[10] EchoStar understands that its partner, QuetzSat, S. de R.L. de C.V. ("QuetzSat"), has communicated with the Mexican administration and confirmed that the administration does not object to the use of EchoStar 8's Ku-band command carrier at the 77° W.L. orbital location.

[11] 47 C.F.R. § 25.202(g).

[12] *See* 47 C.F.R. § 1.3; *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

deviation will serve the public interest."[13] In this case, there is good cause to waive the requirements of Section 25.202(g) to allow the satellite to receive command signals over the 14003 MHz frequency. The recent SEU experienced by EchoStar 8 partially disabled the satellite's remaining 17 GHz receiver, necessitating this waiver request.

Allowing EchoStar to provide TT&C outside of the edges of its allocated bands would not undermine the purpose of Section 25.202(g), which is to maximize efficient use of the radio frequency spectrum and encourage competition.[14] Specifically, EchoStar proposes to use a small sliver of FSS spectrum to provide command instructions to the satellite.

The proposed operations also will not cause harmful interference. EchoStar has surveyed the satellites operating near EchoStar 8 at 77° W.L. and identified the Simón Bolivar satellite, operated by VeneSat and located at 78.0° W.L., as the nearest Ku-band satellite. EchoStar's Ku-band operations will not cause harmful interference to Simón Bolivar because its Ku-band service is directed towards South America. Specifically, Simón Bolivar's Ku-band beam covers Cuba and South America and does not cover the U.S. Consequently, the VeneSat satellite-receive antenna gain contours roll off over the United States, resulting in decreasing receive gain. As a result, the satellite's receive antenna gain will be sufficiently reduced at EchoStar's earth station locations in Cheyenne, Wyoming, and Gilbert, Arizona, to ensure the earth stations do not cause harmful interference to the satellite. Furthermore, the technical characteristics of

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[13] Telephone Number Portability; Sprint Local Telephone Companies Petition for Waiver, *Order*, 19 FCC Rcd. 23962 ¶ 4 (2004); *see also* U.S. West Petition for Waiver of the Tariff Review Plan Rules, *Memorandum Opinion and Order*, 12 FCC Rcd. 8343 ¶ 10 (1997); *WAIT Radio*, 418 F.2d at 1159.

[14] *See* Applications of Intelsat LLC; For Authority to Operate, and to Further Construct, Launch, and Operate C-band and Ku-band Satellites that Form a Global Communications System in Geostationary Orbit, *Memorandum Opinion Order and Authorization*, 15 FCC Rcd. 15460 ¶ 66 (2000).

EchoStar's TT&C antennas further reduce the potential interference into VeneSat's satellite. Specifically, EchoStar 8's command carrier transmissions will be performed from these two TT&C antennas, which have a ground transmit antenna gain isolation of at least 32.5 dB towards the VeneSat satellite.

The combined isolation of the Simón Bolivar receive contours, the satellites' spatial separation of one degree and the technical characteristics of EchoStar's antenna will result in an isolation or C/I level of at least -57 dB. Therefore, the EchoStar 8 command carrier operation over the 14 GHz will not interfere with Simón Bolivar's operations.

The next closest Ku-band satellites are Horizons 2, located at 74.0° W.L., and AMC 2 at 78.9° W.L. EchoStar's earth stations are operating according to the Commission's two-degree spacing requirements, and therefore will not cause harmful interference into either satellite. Furthermore, EchoStar is able to change the command carrier's polarization to further protect against interference.

The requested waiver also responds to special circumstances that are outside EchoStar's control. EchoStar could not foresee the effects of the SEU, but it has worked diligently to mitigate those effects and ensure that the satellite can operate safely while it provides service from 77.05° W.L to U.S. subscribers. Both the continued safe operation of the satellite and the service the satellite provides are in the public interest, further supporting grant of the requested waiver.

III. CONCLUSION

For the foregoing reasons, EchoStar respectfully requests the grant of its application for a modification of its two ALSAT FSS transmit/receive earth station licenses (Call Signs E070015 and E980127) to provide only TT&C for the EchoStar 8 satellite at 77.05° W.L. over the 14003

MHz frequency and, to the extent necessary, a waiver of Section 25.202(g) to allow such operations.

Respectfully submitted,

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ATTACHMENT A

ATTACHMENT A

Technical Information to Supplement Schedule S

1. GENERAL DESCRIPTION

The ECHOSTAR-8 satellite will provide DBS services to the Continental United States and Mexico from the 77° W.L. geostationary orbital position. It will be used to provide HD Local into Local services and to supplement HD services into the United States using up to 32 DBS channels. Additionally ECHOSTAR-8 may be used to provide DBS service to Mexico by using up to 8 transponders. The satellite can provide 32 channels in medium power mode or 16 channels in high power mode. Full frequency re-use is achieved through the use of dual circular polarization.

2. SATELLITE TRANSMIT PERFORMANCE

The downlink beam coverage of the ECHOSTAR-8 satellite from the 77°W.L. location is shown in Figures 2-1, 2-2, and 2-3.[1] The satellite employs two shaped reflectors, each operating in both

[1] These beam coverages are achieved by applying appropriate pointing bias to the ECHOSTAR-8 satellite, which was originally designed for operation at the 110°W.L. orbital location, to provide CONUS coverage. The coverage shown also takes into account international coordination requirements applicable to the Mexican registered satellite network filing at 77°W.L. Note that service to Hawaii and Alaska is not possible using ECHOSTAR-8 from the 77°W.L. orbital location owing to the fact that Hawaii is below 3° elevation angle and the highest elevation angle towards Alaska from the 77°W.L. orbital location is less than 10°.

RHCP and LHCP. The performance in both polarizations is nominally the same. The cross-polar isolation of the satellite transmit antennas exceeds 30 dB at all transmit frequencies. The peak antenna gain is 36.1 dBi.

Each transponder will use either a single 126 Watt Traveling Wave Tube Amplifier (TWTA) ("medium power" mode) or two parallel 126 Watt TWTAs ("high power" mode) giving approximately a 2.5 dB increase in transmit EIRP. The losses between the TWTA output and the antenna input amount to 2.5 dB in medium power mode and 3 dB in high power mode. The maximum beam peak saturated EIRP level for the transponders in medium power mode is 54.6 dBW and 57.1 dBW in high power mode.

Figure 2-1: ECHOSTAR-8 Medium Power Downlink CONUS Beam Coverage from 77°W.L.

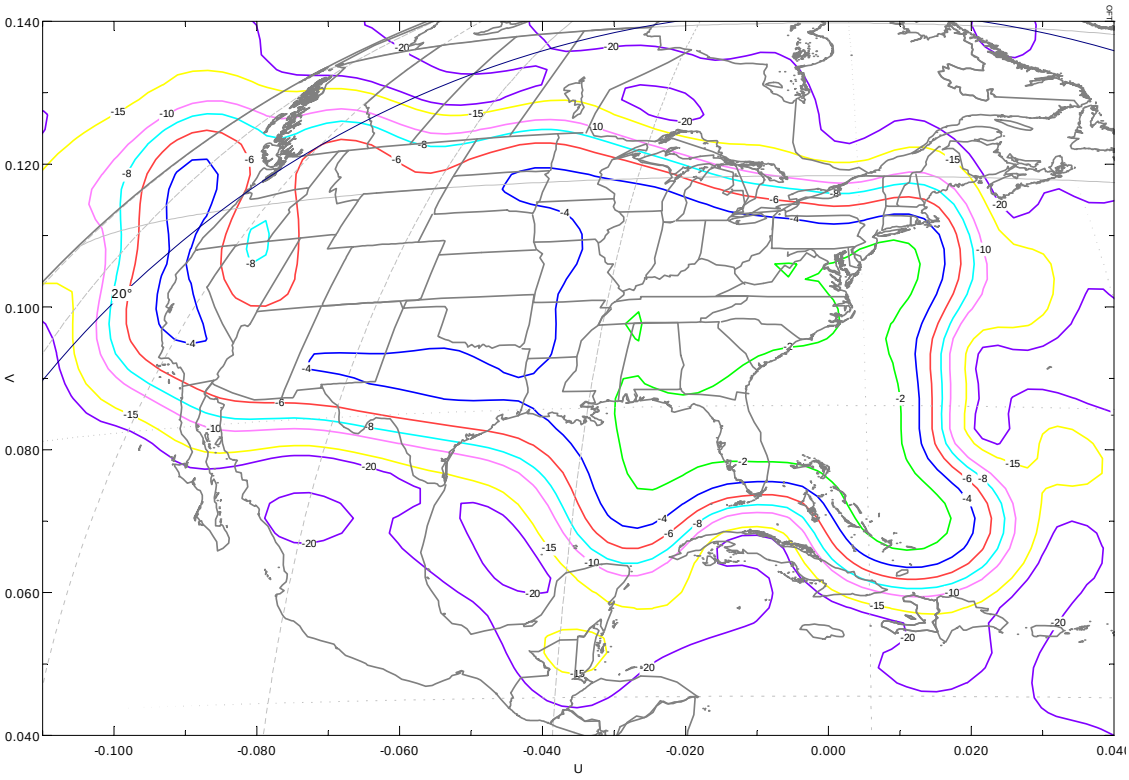


Figure 2-2: ECHOSTAR-8 High Power Downlink CONUS Beam Coverage from 77°W.L.

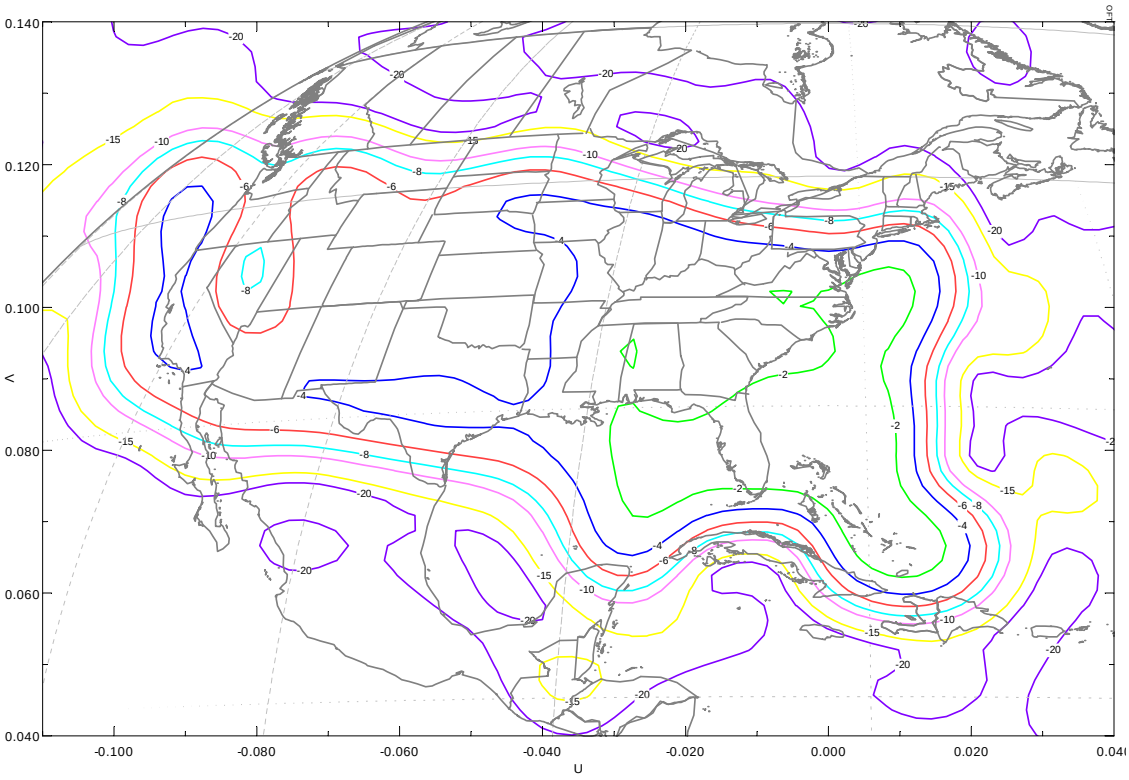
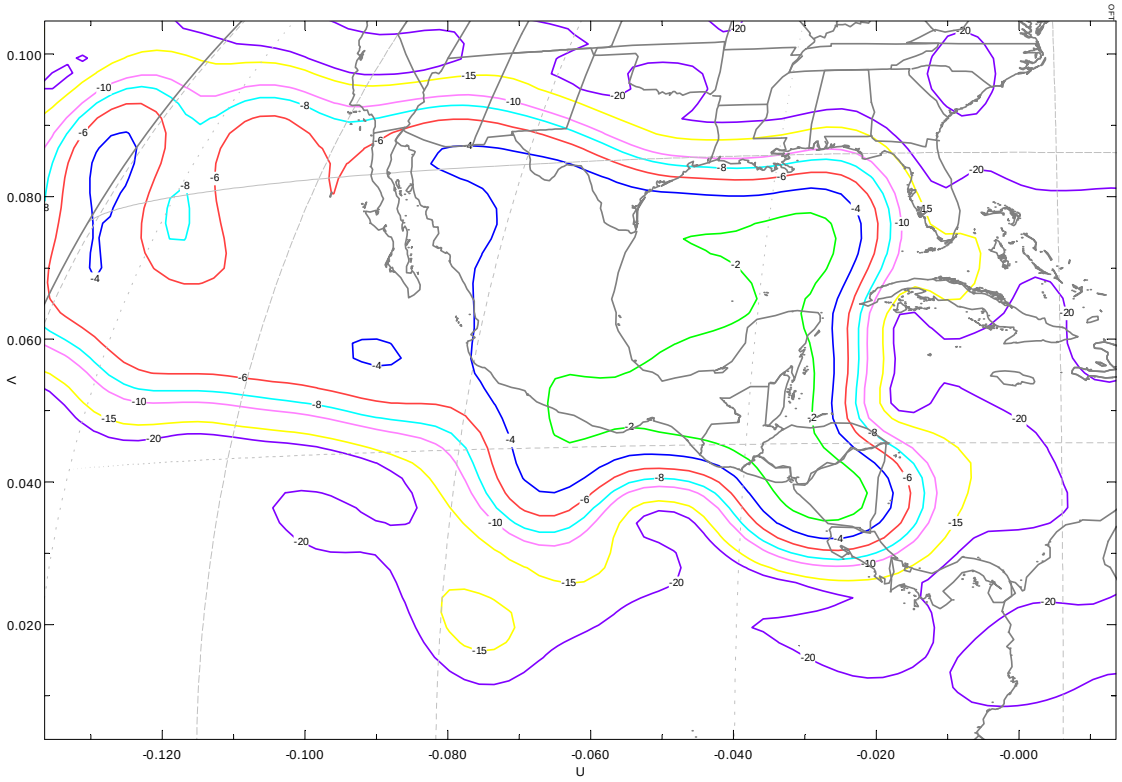


Figure 2-3: ECHOSTAR-8 Medium Power Downlink Mexico Beam Coverage from 77°W.L.



3. SATELLITE RECEIVE PERFORMANCE

The uplink beams use spot beam technology. They will operate from EchoStar uplink sites in either Gilbert, AZ or Cheyenne, WY. The receive spot beams operate in both RHC and LHC polarizations. The spot beam gain contours are shown in Figure 3-1 and 3-2 for Gilbert and Cheyenne respectively. The performance in both polarizations is nominally the same. The cross-polar isolation of the satellite spot beam receive exceeds 30 dB at all receive frequencies. The

peak gain of the beam is 49.5 dBi, with a noise temperature of 3550K, for a peak G/T of 14 dB/K.

Figure 3-1: ECHOSTAR-8 Gilbert Uplink Beam Coverage from 77°W.L.

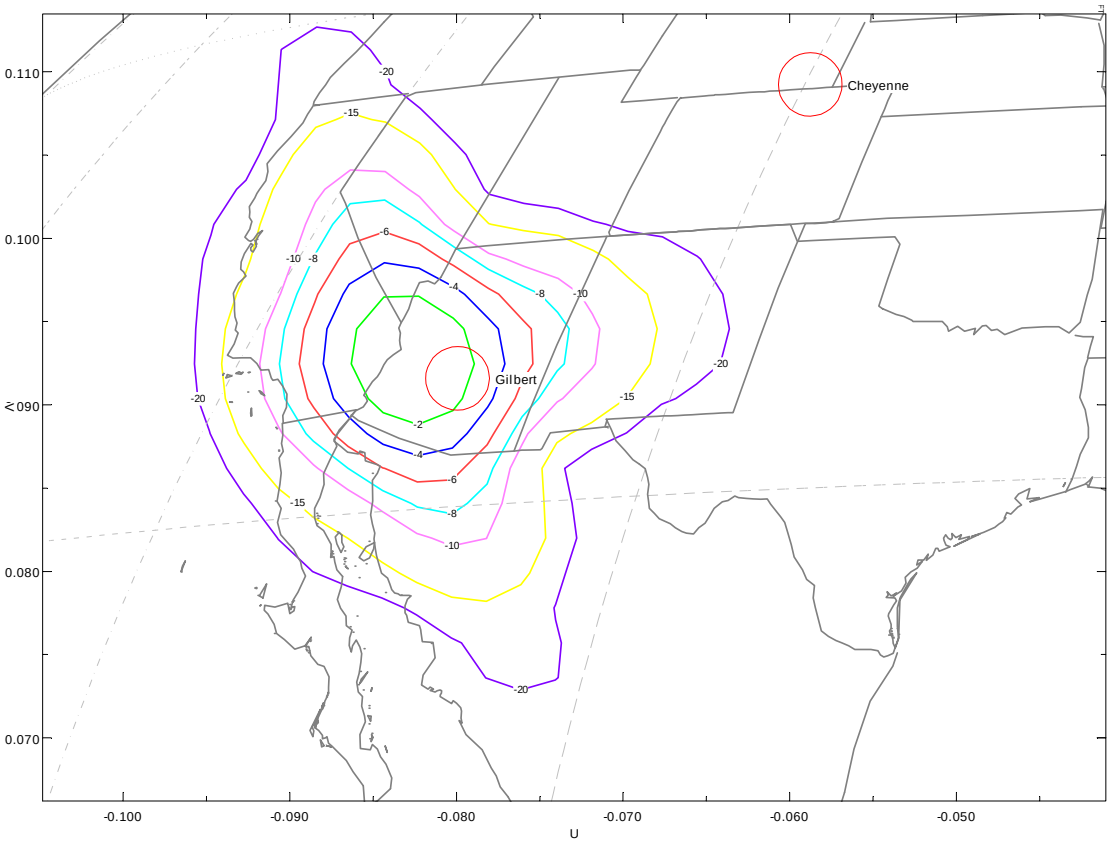
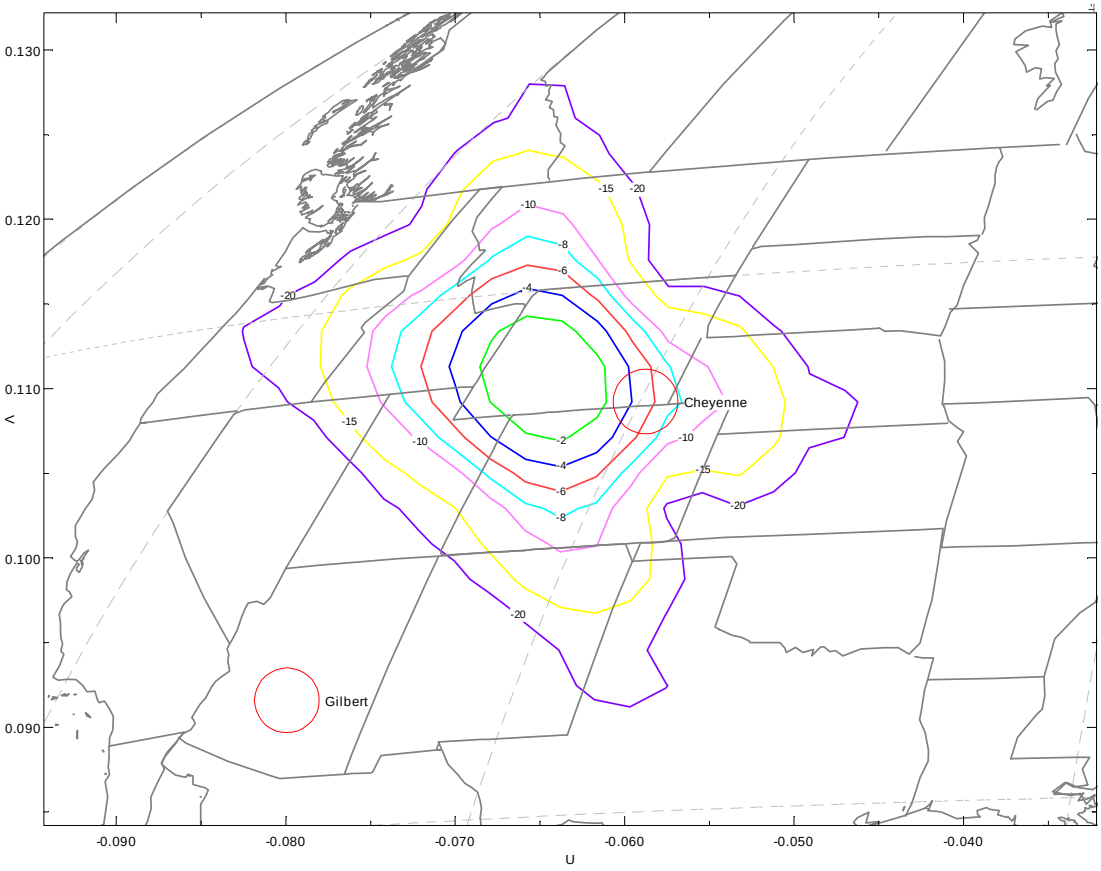


Figure 3-2: ECHOSTAR-8 Cheyenne Uplink Beam Coverage from 77°W.L.



4. FREQUENCY AND POLARIZATION PLANS

The ECHOSTAR-8 satellite uses the standard channel center frequencies and channel bandwidths prescribed in the ITU's Region 2 BSS Plan.[2] Circular polarization is used on both the uplink and downlink.

5. COMMUNICATIONS PAYLOAD CONFIGURATION

The uplink signals are received in both polarizations by the satellite receive antenna beams. Two active receivers are used on the satellite – one for each polarization. After appropriate down-conversion, channel filtering and amplification, the signals are transmitted from the satellite using a single 126 Watt TWTA per channel in the case of medium power mode operation. Each channel can be configured to use two parallel TWTAs for high power mode operation, giving a corresponding increase in the EIRP level of approximately 2.5 dB. In total, the communications payload can support 32 channels in medium power mode, or 16 channels in high power mode, or the corresponding number of a mixture of high power and medium power mode transponders. The reconfiguration of all transponders is switchable by ground telecommand. The outputs of the TWTAs are then multiplexed into the appropriate downlink antenna ports.

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[2] Channel bandwidth is 24 MHz. Spacing between center frequencies of adjacent cross-polar channels is 14.58 MHz. Thus, the center frequencies of co-polar channels are offset by 29.16 MHz.

6. SATURATION FLUX DENSITY AND TRANSPONDER GAIN

The Saturation Flux Density (SFD) of the uplink receive beam ranges between –87 dBW/m^2 (low gain) to –108 dBW/m^2 (high gain) at receive beam peak and is adjustable in 1 dB steps. The transponder gain is controlled by an Automatic Level Control (ALC) system which automatically adjusts the transponder gain to give a constant satellite transmit power level for each transponder. The maximum transponder gain is 129.1 dB.

7. RECEIVER AND TRANSMITTER CHANNEL FILTER RESPONSE CHARACTERISTICS

The typical receiver and transmitter frequency responses of each RF channel, as measured between the receive antenna input and transmit antenna, fall within the limits shown in Table 7-1 below.

In addition, the frequency tolerances of §25.202(e) and the out-of-band emission limits of §25.202(f) (1), (2) and (3) will be met.

Table 7-1: Typical Receiver and Transmitter Filter Responses

Offset from Channel Center Frequency (MHz)	Receiver Filter Response (dB)	Transmitter Filter Response (dB)
± 5	> -0.5	> -0.4
± 7	> -0.7	> -0.5
±9	> -1.0	> -0.8
± 11	> -1.5	> -1.7

±12	> -2.0	> -3.6
±17.5	< -18	< -8
±20.2	< -38	< -18
±27.2	< -50	< -35

8. EMISSION DESIGNATORS AND ALLOCATED BANDWIDTH OF EMISSION

The emission designator for the uplink and downlink is 24M0G7W. This emission has an allocated bandwidth of 24 MHz.

For TT&C, the emission designators and allocated bandwidths will be as follows:

Telecommand (including ranging): 800KG2D (800 kHz)
Telemetry (including ranging): 800KG2D (800 kHz)

9. SPACECRAFT DESCRIPTION

The ECHOSTAR-8 satellite's physical characteristics, electrical characteristics, etc., are contained in the associated Schedule S form.[3]

[3] Please note that the Schedule S was created based on an orbital location of 77.0° W.L.; however, EchoStar 8 is operating at 77.05° W.L. The 0.05 degree offset from the orbital position described in the Schedule S will affect the interference analysis provided in the Schedule S by only 0.003 dB for a 50 cm antenna, which in practical terms is negligible.

10. EARTH STATIONS

The primary subscriber earth station antennas to be used with the ECHOSTAR-8 satellite will range between 45 cm and 60 cm, although slightly larger antennas might be used in certain circumstances.

The feeder link earth stations will be located at EchoStar's existing facilities in Cheyenne, WY and Gilbert, AZ. EchoStar will file any necessary earth station modification applications with the FCC for the feeder link earth stations that will operate with ECHOSTAR-8 at the 77°W.L. orbital location.

11. TT&C

EchoStar will command and range the ECHOSTAR-8 satellite at the 77° W.L. orbital position using the 14.003 GHz telecommand carrier and the 17.799 GHz ranging carrier, both receiving in the right hand circular polarization. The ranging carrier does not conflict with any adjacent satellites that potentially might be affected. The telecommand carrier will be uplinked in linear polarization and fully coordinated with any adjacent Ku FSS operators.

A summary of the TT&C subsystem performance is given in Table 11-1.

Table 11-1: Summary of the TT&C Subsystem Performance

Parameter	Performance
On-Station Command Frequency	14003 MHz
On-Station Ranging Frequency	17799 MHz
Uplink Flux Density	Between -70.5 and -91.5 dBW/m^2
Uplink Tx Earth Station Polarization	RHCP

On-Station Telemetry Frequencies	12,206 MHz 12,207 MHz
Maximum Downlink EIRP	13.5 dBW
Downlink Polarization	LHCP

Note that the satellite antennas used for TT&C are low gain (+2 dBi peak gain) and as such the gain variation over the surface of the Earth is less than 2 dB. Therefore it is not possible to provide a GXT file showing the beam contours for these antennas, and no such GXT files are included in the associated Schedule S.

12. LINK BUDGETS

Representative link budgets for the DBS transmissions, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission. Link budgets for the TT&C transmissions are also included therein.

13. ORBITAL DEBRIS MITIGATION PLAN

EchoStar notes that several sections of Section 25.114(d) require a statement that the station operator has made certain assessments.[4] These assessments are set forth below.

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[4] 25 C.F.R. §§25.114(d)(14)(i-iii).

13.1 Spacecraft Hardware Design

The ECHOSTAR-8 satellite was designed and manufactured by Space Systems/Loral and was launched in 2002. The satellite is not expected to undergo any planned release of debris during its operation.

EchoStar has assessed and limited the probability of the satellite becoming a source of debris by collisions with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. Such probability has been limited through component placement and the use of redundant systems.

The ECHOSTAR-8 satellite has separate TT&C and propulsion subsystems that are necessary for end-of-life disposal. The spacecraft TT&C system, vital for orbit raising, is extremely rugged with regard to meteoroids smaller than 1 cm, by virtue of its redundancy, shielding, separation of components and physical characteristics. An omni-directional antenna and wide angle horn system are used principally during orbit raising. The redundant command receivers and decoders and telemetry encoders and transmitters are located within a shielded area and physically separated. A single rugged thruster and shielded propellant tank provide the energy for orbit raising. Otherwise, there are no single points of failure in the system.

13.2 Minimizing Accidental Explosions

EchoStar has assessed and limited the probability of accidental explosions during and after completion of mission operations. A Failure Mode Verification Analysis has also been conducted, and the probability of accidental explosions has been limited through extensive monitoring of the ECHOSTAR-8 satellite's batteries and fuel tanks for pressure and temperature.

Furthermore, bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. Excessive battery charging or discharging is limited by a monitoring and control system which will automatically limit the possibility of fragmentation. Corrective action, if not automatically undertaken, will be immediately undertaken by the spacecraft operator to avoid destruction and fragmentation. Thruster temperatures, impulse and thrust duration are carefully monitored, and any thruster may be turned off via redundant valves. At the end of the satellite's life, all energy sources will be depleted. Specifically, the batteries will be left in a permanent state of discharge, chemical propulsion systems will be depleted, and the electrical propulsion system will be disabled.

13.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the ECHOSTAR-8 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 in the vicinity of 77°W.L. have also been reviewed.

The ECHOSTAR-4 satellite currently operates at 76.85°W.L. The ECHOSTAR-6 satellite currently operates at 76.95°W.L. The ECHOSTAR-1 satellite currently operates at 77.15°W.L. The ECHOSTAR-8 satellite will then be operated at the 77.05°W.L. location, with an east-west station-keeping tolerance of ±0.05°.

The orbital locations for operational satellites, authorized satellites and satellites for which there are pending (and future) applications before the Commission in the vicinity of 77°W.L. are summarized below:

- The ECHOSTAR-1 satellite will operate at 77.15°W.L. with an east-west station-keeping tolerance of ±0.05°
- The ECHOSTAR-8 satellite will operate at 77.05°W.L. with an east-west station-keeping tolerance of ±0.05°
- The ECHOSTAR-6 satellite will operate at 76.95°W.L. with an east-west station-keeping tolerance of ±0.05°
- The ECHOSTAR-4 satellite will operate at 76.85°W.L. with an east-west station-keeping tolerance of -0.1° on the east side of its allocated box and +0.05° on the west side of its box;
- ViaSat is authorized to operate a Ka-band satellite at 77.3°W.L. with an east-west station-keeping tolerance of ±0.05°;

Of these, only the three locations immediately adjacent to 77.05°W.L. need be considered (i.e., 76.85°W.L., 76.95°W.L. and 77.15°W.L.). Given the east-west station-keeping of the current and future adjacent satellites, there is no possibility of any station-keeping volume overlap with these and the ECHOSTAR-8 satellite.

There are numerous FSS and BSS networks filed with the ITU in the vicinity of 77°W.L. Several of these were filed on behalf of the operational and planned satellites listed above. For the remaining ones, EchoStar can find no evidence that they are being constructed.

Based on the preceding, EchoStar concludes there is no requirement to physically coordinate the ECHOSTAR-8 satellite with another satellite operator at the present time.

13.4 Post Mission Disposal

At the end of the operational life of the ECHOSTAR-8 satellite, EchoStar will maneuver the satellite to a disposal orbit with a minimum perigee of 360 km above the normal GSO operational orbit. This proposed disposal orbit altitude exceeds the minimum required by §25.283, which is calculated below.

The input data required for the calculation is as follows:

Total Solar Pressure Area "A" = 112 m^2

(includes area of solar array, satellite body and deployed antennas)

"M" = Dry Mass of Satellite = 1807 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 112/1807

= 36,145 km

= 359 km above GSO (35,786 km)

Thus, the designed disposal orbit of 360 km above GSO exceeds the required minimum by a margin of 1 km. Maneuvering the satellite to the disposal orbit will require 6 kg of propellant, and this quantity of fuel, taking account of all fuel measurement uncertainties, will be reserved to perform the final orbit raising maneuvers. The fuel reserve was calculated using two methods. The first method applied was the pressure-volume temperature method, which uses tank pressure

and temperature information to determine remaining propellant. The second method applied was the bookkeeping method, which evaluates the flow rate at average pressure and total thruster on-time of orbital maneuvers to determine the amount of propellant used. EchoStar has assessed fuel gauging uncertainty and has provided an adequate margin of fuel to address such uncertainty.

14. INTERFERENCE ANALYSES - ANNEXES 1 TO APPENDICES 30 AND 30A

The analyses required by Annex 1 to Appendix 30 and Annex 1 to Appendix 30A of the International Radio Regulations were performed and are contained in Appendix 1 hereto. As the 77°W.L. slot is allotted to Mexico, and ECHOSTAR-8, while a U.S. satellite, will operate at that location only on a temporary basis and indeed under Special Temporary Authorization, there is no need for the U.S. Administration to make any submission to the ITU in connection with this proposed operation.

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/

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Dated: June 13, 2008

Appendix 1 to

Attachment A (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-8 satellite will operate under Mexico's QUETZSAT-77 network. The Administration of Mexico is responsible for coordination of this network. The QUETZSAT-77 network is a modification to the Region 2 BSS Plan and was published in AP30-30A/E/434. Its filed beam coverage consists of a large Central and North American + Caribbean beam (excluding Canada). The results of the MSPACE analysis for this filed network, as published in AP30-30A/E/434, are contained in Annex 1 to this Appendix. As expected with such a broad filed beam, there are a number of affected networks, which in practice will not be a problem using the smaller actual beam of the ECHOSTAR-8 satellite. Note also that the closest U.S. BSS satellite network is 15.5° away (at 61.5°W), with the next closest one being 24° away at 101°W. With such large orbital separation, and bearing in mind that the ECHOSTAR-8 satellite peak EIRP is only 57.1 dBW, there will be no harmful interference in practice to these U.S. BSS networks. In addition, there will be no harmful interference to any Canadian filed networks that are providing service to the U.S. because the operation of the ECHOSTAR-8 satellite will be consistent with the satellite coordination agreements that are in place between Mexico and Canada.

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:

$$-147 \quad dB(W/(m^2 \cdot 27\ MHz)) \qquad for \ \ 0° \leq \theta < 0.23°$$

$$-135.7 + 17.74 \log \theta \quad dB(W/(m^2 \cdot 27\ MHz)) \qquad for \ \ 0.23° \leq \theta < 2.0°$$

$$-136.7 + 1.66\ \theta^2 \quad dB(W/(m^2 \cdot 27\ MHz)) \qquad for \ \ 2.0° \leq \theta < 3.59°$$

$$-129.2 + 25 \log \theta \quad dB(W/(m^2 \cdot 27\ MHz)) \qquad for \ \ 3.59° \leq \theta < 10.57°$$

$$-103.6 \quad dB(W/(m^2 \cdot 27\ MHz)) \qquad for \ \ 10.57° \leq \theta$$

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. (WRC-03)

No networks in the Regions 1 and 3 Plans will be affected, as demonstrated by the QUETZSAT-77W publication (AP30-30A/E/324).

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:

$$-148 \quad \text{dB}(W/(m^2 \cdot 4\ \text{kHz})) \qquad \text{for} \qquad \theta \leq 5°$$

$$-148 + 0.5\,(\theta - 5) \quad \text{dB}(W(m^2 \cdot 4\ \text{kHz}) \quad \text{for} \quad 5° < \theta \leq 25°$$

$$-138 \quad \text{dB}(W/(m^2 \cdot 4\ \text{kHz})) \qquad \text{for} \quad 25° < \theta \leq 90°$$

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

No administrations in Regions 1, 2 and 3 will be affected, as demonstrated by the QUETZSAT-77W publication (AP30-30A/E/324).

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:

$$-186.5 \quad dB(W/(m^2 \cdot 40\ kHz)) \qquad for\ \ 0° \leq \theta < 0.054°$$

$$-164.0 + 17.74 \log \theta \quad dB(W/(m^2 \cdot 40\ kHz)) \qquad for\ \ 0.054° \leq \theta < 2.0°$$

$$-165.0 + 1.66\ \theta^2 \quad dB(W/(m^2 \cdot 40\ kHz)) \qquad for\ \ 2.0° \leq \theta < 3.59°$$

$$-157.5 + 25 \log \theta \quad dB(W/(m^2 \cdot 40\ kHz)) \qquad for\ \ 3.59° \leq \theta < 10.57°$$

$$-131.9 \quad dB(W/(m^2 \cdot 40\ kHz)) \qquad for\ \ 10.57° \leq \theta$$

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.

No administrations in Regions 1 and 3 were affected as demonstrated by the QUETZSAT-77W publication (AP30-30A/E/434).

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 ΔT / T resulting from the proposed modification is greater than the value of ΔT / 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 ΔT / T resulting from the proposed modification exceeds 6%, using the method of Appendix 8 (Case II). (WRC-03)*

No administrations in Region 1 will be affected, as demonstrated by the QUETZSAT-77W publication (AP30-30A/E/324).

Annex 1 to Appendix 1 to Attachment A

QUETZSAT-77 MSPACE Results

Notifying Admin	Network Name	Id. No.	Orbital Location (°W)	Max EPM/OEPM Degradation
ATG	ATGSJN01	86550011	79.7	7.564
BAH	BAHIFRB1	86550038	87.2	1.24
CAN	CAN01606	86550069	70.7	1.026
	CAN01606	86550070	70.3	1.325
	CAN03606	86550095	70.7	1.027
	CAN03606	86550096	70.3	1.255
	CAN-BSS1	96555002	82	5.553
	CAN-BSS1X	106555001	82	5.391
	CAN-BSS2	96555003	91.1	0.778
	CAN-BSS2X	106555002	91.1	0.798
	CAN-BSS3	96555010	72.7	5.311
	CAN-BSS6	103555006	72.7	4.79
	CAN-BSS7	105555004	129	0.259
CUB	CUB00001	86550109	89.2	0.696
DMA	DMAIFRB1	86550111	79.3	6.878
DOM	DOMIFRB2	86550112	83.3	3.538
F	SPMFRAN3	86550160	53.2	0.256
G	INTELSAT KUEXT 304.5	96555016	55.5	0.453
	INTELSAT KUEXT 304.5	97555003	55.5	0.269

	INTELSAT KUEXT 304.5	98555008	55.5	0.392
	IOMBSS-2	104555001	123.5	0.877
	MSR00001	86550147	79.7	7.295
	USAT-S3	103555003	86.5	1.056
	USAT-S3 MOD-A	103555005	86.5	0.613
	USAT-S3 MOD-B	104555004	86.5	1.347
	USAT-S3 MOD-C	106555007	86.5	1.75
	USAT-S4	104555002	68.5	3.129
	USAT-S5	104555006	66.3	0.808
	USAT-S8	106555003	133.5	0.318
	VRG00001	86550185	79.7	7.89
GRD	GRD00003	86550120	79.3	4.637
HOL	NSS-BSS 59W	106555005	59	0.619
	NSS-BSS 78W	106555004	78	16.31
HTI	HTI00002	86550128	83.3	4.074
JMC	CRBBAH01	86550103	92.3	0.489
	CRBBLZ01	86550105	92.3	0.653
	CRBJMC01	86550107	92.3	0.593
	JMC00002	86550137	92.7	0.472
KNA	KNA00001	86550158	79.7	7.708
LCA	LCAIFRB1	86550139	79.3	6.62
USA	USABSS-13	101555003	101.2	0.281
	USABSS-15	102555004	110	0.629
	USABSS-16	104555005	110	0.324
	USABSS-17	102555002	61.5	0.953
	USABSS-18	103555002	119	0.269
	USABSS-19	104555007	100.85	0.255

	USABSS-1R	99555001	101.2	0.624
	USABSS-21	105555003	101	0.281
	USABSS-25	106555008	109.8	0.346
	USABSS-26	106555009	110	0.62
	USABSS-5	97555001	109.8	0.357
	USABSS-6	97555002	110.2	0.353
	USABSS-7A	101555001	119	0.303
	USABSS-8	98555001	61.5	2.311
	USABSS-9	98555002	148	0.635
	USAEH001	86550165	61.7	0.388
	USAEH001	86550166	61.3	0.38
	USAWH101	86550177	148.2	0.258
	USAWH101	86550178	147.8	0.261
VCT	VCT00001	86550181	79.3	6.709

Appendix 2 to

Attachment A (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)*

No administrations in Regions 1 and 3 will be affected, as demonstrated by the QUETZSAT-77W publication (AP30-30A/E/324).

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 ΔT/T corresponding to 6%, where ΔT/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.