

S2742
Star One S.A.
STAR ONE C5

SAT-PPL-20071113-00159

IB2007002740

Approved by OMB
3060-0678

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APPLICATION FOR SATELLITE SPACE STATION AUTHORIZATIONS FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only
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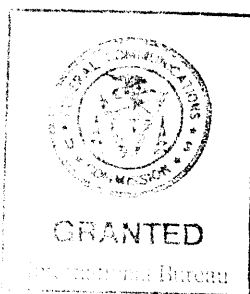
APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Petition for Declaratory Ruling to Add the Star One C5 Satellite to the Permitted Space Station List

1-8. Legal Name of Applicant			
Name:	Star One S.A.	Phone Number:	552121219126
DBA Name:		Fax Number:	552121219321
Street:	Av. Presidente Vargas 1012 —6th floor, Centro	E-Mail:	lprates@starone.com.br
	Rio de Janeiro		
City:		State:	
Country:	Brazil	Zipcode:	-
Attention:	Mr Luiz Prates		

1



w/conditions.

File # SAT-PPL-20071113-00159

Call Sign S2742 Grant Date 2/7/08
(or other identifier)

Term Dates

From _____ To: _____

Approved: [Signature]

Policy Branch Chief

SAT-PPL-20071113-00159
Conditions of Permitted Space Station List Grant
February 7, 2008

Pursuant to Sections 303(r), 308, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 303(r), 308, 309, 310, and Sections 0.261 and 25.137(c) of the Federal Communication Commission's (Commission's) rules, 47 C.F.R. §§ 0.261, 25.137(c), the Petition for Declaratory Ruling filed by Star One SA (File No. SAT-PPL-20071113-00159) to add the hybrid C and Ku-band Star One C5 satellite (Call Sign: S2742) located at the 68° W.L. orbital location, which is licensed by Brazil, to the Commission's Permitted Space Station List is GRANTED. Accordingly, each U.S.-licensed earth station with "ALSAT" designated as a point of communication may provide Fixed Satellite Services (FSS) in the 14000-14500 MHz (Earth-to-space), 11700-12200 MHz (space-to-Earth), 5925-6425 MHz (Earth-to-space) and 3700-4200 MHz (space-to-Earth) frequency bands, to, from, or within the United States, by accessing the Star One C5 satellite (Call Sign: S2742) at the 68° W.L. orbital location, in accordance with the terms, conditions and technical specifications set forth in Star One's Petition for Declaratory Ruling, the Commission's Rules, and subject to the following conditions:

1. Star One C5 is not authorized to provide any Direct-to-Home (DTH) service, Direct Broadcast Satellite (DBS) service, or Digital Audio Radio Service (DARS) to, from, or within the United States;
2. Communications between ALSAT-designated routine earth stations and the Star One C5 satellite shall be in compliance with the satellite coordination agreements reached between Brazil and other administrations;
3. Star One's request for waiver of Section 25.210(a)(3) of the Commission's rules, 47 C.F.R. 25.210(a)(3) is GRANTED as conditioned. Section 25.210(a)(3) requires that all space stations in the FSS in the C-band to be capable of switching polarization sense upon ground command. This design requirement allows space stations to be assigned to different orbital positions and mitigates potential interference between adjacent FSS systems transmitting analog TV signals. Star One acknowledges that the polarization of the C-band payload of the Star One C5 satellite cannot be switched. There are no co-frequency spacecraft located within 2 degrees of 68° W.L. Further, Star One indicates that at this time it is not proposing to offer analog video transmission services in the United States using Star One C5. We grant this waiver on the condition that Star One C5 is prohibited from transmitting or receiving analog TV signals to, from, or within the United States. This waiver is also limited to this orbital location. Further, Star One must accommodate future satellite networks serving the United States that are two-degree compliant. Grant of this waiver request is consistent with our precedent.¹


¹ See Mabuhay Philippines Satellite Corp. Petition for Declaratory Ruling, Application of Loral CyberStar, Inc. for Authority to Operate Two Transmit/Receive Earth Stations at Kapolei, Hawaii, for Use in Conjunction with the Mabuhay Satellite Located at 146 E.L., *Order and Authorization*, 15 FCC Rcd

4. Star One's request for waiver of Section 25.210(i) of the Commission's rules, 47 C.F.R. 25.210(i), IS GRANTED. Section 25.210(i) directs, "Space station antennas in the Fixed-Satellite Service must be designed to provide a cross-polarization isolation such that the ratio of the on axis co-polar gain to the crosspolar gain of the antenna in the assigned frequency band shall be at least 30 dB within its primary coverage area." Star One indicates that the cross-polarization isolation of the Star One C1 satellite's antennas will not be lower than 27 dB within the primary coverage area. We find that these shortfalls will not produce a significant increase in interference, except to the applicant itself, and will not adversely affect any other operator. As a condition of the grant of this waiver, Star One must accommodate future satellite networks serving the United States that are two-degree compliant. Grant of this waiver request is consistent with our precedent.²

5. Unless extended by the Commission for good cause shown, Star One C5 shall be removed from the Permitted Space Station List in the event the space station is not constructed, launched, and successfully placed into operation in accordance with the technical parameters in its Petition for Declaratory Ruling and the terms and conditions of this grant, by the following dates:

- a. Enter Non-contingent Satellite Manufacturing Contract: February 7, 2009;
- b. Complete Critical Design Review: February 7, 2010;
- c. Begin Physical Construction: February 7, 2011;
- d. Launch and Operate: February 7, 2013.
- e. Star One S. A. must file a bond within 30 days of the date of this action with the Commission in the amount of \$ 3 million pursuant to the procedures set forth in Public Notice, DA 03-602, 18 FCC Rcd 16283 (2003).

6. This action is taken pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective immediately. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106, 1.115, may be filed within 30 days of the date of the public notice indicating that this action was taken.

 GRANTED International Bureau <i>w/conditions</i>	File # <u>SAT-PPL-20071113-00159</u>
	Call Sign <u>S2754</u> Grant Date <u>2/7/05</u>
	(or other identifier) Term Dates
	From _____ To: _____
Approved: <i>[Signature]</i>	Policy Branch Chief

23671, 23676 para. 13 (2000) (granting a waiver of section 25.210(a)(3) and imposing the same condition imposed here).

² Star One S.A.; Petition for Declaratory Ruling to Add The Star One C1 Satellite at 65° W.L. to the Permitted Space Station List, *Order*, 19 FCC Rcd 16334 (Sat. Div. 2004) (finding that the impact on neighboring satellite systems of a 3-5 dB difference from the required cross polarization isolation ratio would be negligible).

9-16. Name of Contact Representative

Name:	Alfred Mamlet	Phone Number:	202-429-3000
Company:	Steptoe & Johnson LLP	Fax Number:	202-429-3902
Street:	1330 Connecticut Avenue NW	E-Mail:	amamlet@steptoe.com
City:	Washington	State:	DC
Country:	USA	Zipcode:	20036 -1795
Attention:		Relationship:	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the buttonnext to the classification that applies to thisfiling for both questions a. and b. Choose only one for 17a and only one for 17b.

- a.
(N/A) a1. Earth Station
 a2. Space Station

- b.
 b1. Application for License of New Station
(N/A) b2. Application for Registration of New Domestic Receive-Only Station
(N/A) b3. Amendment to a Pending Application
(N/A) b4. Modification of License or Registration
(N/A) b5. Assignment of License or Registration
(N/A) b6. Transfer of Control of License or Registration
(N/A) b7. Notification of Minor Modification
(N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite

 b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States
 b10. Replacement Satellite Application - no new frequency bands
 b11. Replacement Satellite Application - new frequency bands (Not eligible for streamlined processing)
 b12. Petition for Declaratory Ruling to be Added to the Permitted List
(N/A) b13. Other (Please specify)

<p>17c. Is a fee submitted with this application?</p> <p><input type="radio"/> If Yes, complete and attach FCC Form 159.</p> <p>If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114).</p> <p><input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee</p> <p><input checked="" type="radio"/> Other (please explain): No fee for petitions for declaratory ruling</p>				
<p>17c. Fee Classification BNY – Space Station (Geostationary)</p>				
<p>18. If this filing is in reference to an existing station, enter:</p> <p>(a) Call sign of station: Not Applicable</p>				
<p>19. If this filing is an amendment to a pending application enter:</p> <table border="0"> <tr> <td>(a) Date pending application was filed:</td> <td>(b) File number of pending application:</td> </tr> <tr> <td>Not Applicable</td> <td>Not Applicable</td> </tr> </table>	(a) Date pending application was filed:	(b) File number of pending application:	Not Applicable	Not Applicable
(a) Date pending application was filed:	(b) File number of pending application:			
Not Applicable	Not Applicable			

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:	
<input checked="" type="checkbox"/> a. Fixed Satellite <input type="checkbox"/> b. Mobile Satellite <input type="checkbox"/> c. Radiodetermination Satellite <input type="checkbox"/> d. Earth Exploration Satellite <input type="checkbox"/> e. Direct to Home Fixed Satellite <input type="checkbox"/> f. Digital Audio Radio Service <input type="checkbox"/> g. Other (please specify)	
21. STATUS: Choose the button next to the applicable status. Choose only one. <input type="radio"/> Common Carrier <input checked="" type="radio"/> Non-Common Carrier	22. If earth station applicant, check all that apply. Not Applicable
23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities: <input type="radio"/> Connected to a Public Switched Network <input type="radio"/> Not connected to a Public Switched Network <input checked="" type="radio"/> N/A	
24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s). <input checked="" type="checkbox"/> a. C-Band (4/6 GHz) <input checked="" type="checkbox"/> b. Ku-Band (12/14 GHz) <input type="checkbox"/> c. Other (Please specify upper and lower frequencies in MHz.) Frequency Lower: Frequency Upper: (Please specify additional frequencies in an attachment)	

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

(N/A) a. Fixed Earth Station
(N/A) b. Temporary-Fixed Earth Station
(N/A) c. 12/14 GHz VSAT Network
(N/A) d. Mobile Earth Station
 e. Geostationary Space Station.
 f. Non-Geostationary Space Station
 g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY: Not Applicable

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an "X" in the box(es) next to all that apply.) Not Applicable

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as an exhibit to this application. A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments. Yes No

ALIEN OWNERSHIP
Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30-34.

29. Is the applicant a foreign government or the representative of any foreign government?	<input type="radio"/> Yes <input checked="" type="radio"/> No
30. Is the applicant an alien or the representative of an alien?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	

BASIC QUALIFICATIONS

<p>35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
<p>36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explanation of circumstances.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explanation of circumstances.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition? If Yes, attach as an exhibit, an explanation of circumstances</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhibit, an explanation of the circumstances.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>

40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.

41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application"; for these purposes. Yes No

42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. 25.137, as appropriate. If No, proceed to question 43. Yes No

42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station? Brazil

43. Description. (Summarize the nature of the application and the services to be provided). (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

See narrative and attachments thereto for responses to Questions 34, 35, 40, 42a and 43.

Narrative

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.

A

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.

B

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

C

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or 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, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Choose the button next to applicable response.)		
<input type="radio"/> Individual <input type="radio"/> Unincorporated Association <input type="radio"/> Partnership <input checked="" type="radio"/> Corporation <input type="radio"/> Governmental Entity <input type="radio"/> Other (please specify)		
45. Name of Person Signing Luiz Otavio Vasconcelos Prates	46. Title of Person Signing Director of External Affairs	
47. Please supply any need attachments.		
1:	2:	3:
WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).		

Completed Schedule S

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

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THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

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

_____)
In the Matter of)
)
Star One S.A.) File No. _____
)
Petition for Declaratory Ruling To Add)
the Star One C5 Satellite at 68° W.L. to)
the Permitted Space Station List)
_____)

To: The Commission

PETITION FOR DECLARATORY RULING

Star One S.A. (“Star One”), by its attorneys, respectfully petitions the Commission, pursuant to Section 25.137 of the Commission’s rules,¹ to add the Star One C5 satellite at 68° W.L. to the Permitted Space Station List (“Permitted List”). The Star One C5 satellite will supplement the services to be provided by Star One using the soon-to-be-launched Star One C1 satellite at 65° W.L.² and the planned Star One C2 satellite at the 70° W.L.³

¹ See 47 C.F.R. §25.137; *see also Amendment of the Commission’s Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, First Order on Reconsideration, 15 FCC Rcd 7207 (1999) (“*DISCO II First Reconsideration Order*”); *Amendment of the Commission’s Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 02-34, FCC 03-102 (rel. May 19, 2003) (“*Space Station Licensing Reform Order*”).

² Stamp Grant, File No. SAT-PPL-20050706-00143 (granted March 29, 2006) (“*Star One C1 Stamp Grant*”). An earlier Petition for Declaratory Ruling for the Star One C1 satellite had been granted, but was subsequently surrendered by Star One due to complications relating to the performance bond requirement. *See Star One S.A. Petition for Declaratory Ruling to Add the Star One C1 Satellite at 65° W.L. to the Permitted Space Station List*, DA 04-2614, Order, 19 FCC Rcd 16334 (2004) (“*Star One C1 Order*”).

³ Stamp Grant, SAT-PPL-20050708-00144 (granted Sept. 9, 2005) (“*Star One C2 Stamp Grant*”).

Star One has been licensed by Brazil to operate the Star One C5 satellite at the 68° W.L. orbit location. The Star One C5 satellite will provide a wide array of Fixed-Satellite Service (“FSS”) services using the C-band and Ku-band frequencies throughout North, Central and South America, including the continental United States. Star One proposes to offer satellite communications services on routes to, from and within the United States in conventional C-band and Ku-band spectrum,⁴ and grant of this petition will permit U.S.-licensed earth stations with an “ALSAT” designation to access the Star One C5 satellite to provide these important communications services in the United States.⁵ As demonstrated herein, adding the Star One C5 satellite to the Permitted Space Station List would strongly serve the public interest.

I. PLACEMENT OF THE STAR ONE C5 SATELLITE ON THE PERMITTED SPACE STATION LIST WOULD SERVE THE PUBLIC INTEREST

In the *DISCO II Order*, the Commission set forth the public interest analysis applicable in evaluating requests to use non-U.S. licensed space stations to provide satellite service in the United States.⁶ This analysis considers the effect on competition in the United States, spectrum availability, eligibility and operating (*e.g.*, technical) requirements, and national security, law

⁴ The conventional C-band includes the 3700-4200 MHz (downlink) and 5925-6425 MHz (uplink) bands, and the conventional Ku-band includes the 11.7-12.2 GHz (downlink) and 14.0-14.5 GHz (uplink) bands. Although the communications payload of the Star One C5 satellite includes certain extended C-band and Ku-band frequencies, Star One is requesting Permitted List authority to provide service in the United States using the conventional C- and Ku-bands only.

⁵ In the *DISCO II First Reconsideration Order*, the Commission determined that U.S.-licensed earth stations with an “ALSAT” (all U.S.-licensed space stations) designation may communicate with U.S.-licensed satellites and non-U.S. licensed satellites on the Permitted Space Station List in conventional C-band and Ku-band frequencies.

⁶ See *Amendment of the Commission’s Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, 12 FCC Rcd. 24094 (1997) (“*DISCO II Order*”).

enforcement, foreign policy and trade concerns.⁷ Star One fully satisfies the Commission's criteria for inclusion of the Star One C5 satellite on the Permitted Space Station List.

A. Competition Considerations

Star One will operate the Star One C5 satellite at the 68° W.L. orbital location pursuant to an authorization granted by the Brazilian National Telecommunications Agency ("Anatel").⁸ Brazil is a member of the WTO and Star One seeks access to the U.S. market to provide satellite services covered by the WTO Basic Telecommunications Agreement. Accordingly, the Commission applies a presumption in favor of entry to Star One's request to place the Star One C5 satellite on the Permitted Space Station List, and Star One is not required to make the effective competitive opportunities demonstration set forth in Section 25.137(a)(2) of the Commission's rules.⁹

Significantly, the Commission has already authorized Star One to access the U.S. market through placement of three other Star One satellites on the Permitted Space Station List -- Brasilsat A2 at 63° W.L.,¹⁰ Star One C1 at 65° W.L.¹¹ and Star One C2 at 70° W.L.¹² Nothing

⁷ See generally *id.*, ¶¶ 30-182.

⁸ See Anatel Term of Right (attached as Attachment B).

⁹ See 47 C.F.R. § 25.137(a)(2); see also *DISCO II Order*, ¶ 39 ("We adopt our proposal to apply a presumption in favor of entry in considering applications to access non-U.S. satellites licensed by WTO Members to provide services covered by the U.S. commitments under the WTO Basic Telecom Agreement."), ¶ 64 ("[W]e will not evaluate the effective competitive opportunities in the route market for non-U.S. satellites licensed by a WTO Member providing WTO-covered services. Thus, we will not perform an ECO-Sat test on any route, whether a WTO route market or a non-WTO route market.").

¹⁰ At that time, the Brasilsat A2 satellite was operated by Empresa Brasileira de Telecomunicações S.A. ("Embratel") but was subsequently transferred to Star One. See Permitted Space Station List at < <http://www.fcc.gov/ib/sd/se/permitted.html>>; see also *Empresa Brasileira de Telecomunicações S.A., Petition for Declaratory Ruling on Access to Brasilsat A2 Satellite via U.S. Earth Stations*, Order, DA 00-2878 (rel. Jan. 16, 2001) ("*Brasilsat A2 Order*"). On March 1, 2001, Embratel filed a letter with the Commission indicating that 19.9 percent of its

has changed that would alter the Commission's prior conclusions with respect to the pro-competitive benefits of Star One's access to the U.S. market via the Permitted Space Station List. Indeed, when the Commission first added the Star One C1 satellite to the Permitted List, it found that "[t]here is no evidence to rebut the proposition that Star One C1's entry into the U.S. market is pro-competitive."¹³ Star One has proven itself as a reliable satellite operator over the years, as evidenced by its successful operation of Brasilsat A2 for 18 years (three of which as a Permitted List satellite) and the recent successful launch of the Star One C1 satellite, which further supports inclusion of the Star One C5 satellite at 68° W.L. on the Permitted Space Station List.

Moreover, the Commission has added other Brazilian-licensed satellites to the Permitted Space Station List, including Amazonas-1 at 61° W.L. and Estrela Do Sul at 63° W.L., , concluding that such action should stimulate competition in the United States by providing consumers more alternatives in choosing communications providers and services.¹⁴ The addition of the Star One C5 satellite to the Permitted List would further stimulate such competition

satellite services subsidiary had been purchased by Societe Europeenne des Satellites S.A. ("SES"), and that the operator of the Brasilsat A2 satellite would be Star One. *See* Satellite Policy Branch Information, Public Notice, Report No. SAT-00076 (rel. July 20, 2001). *See also* *Star One C1 Order* (placing the Star One C1 satellite on the Permitted Space Station List). The Brasilsat A2 satellite was de-orbited in 2004 and is no longer operating at the 63° W.L. orbit location. *See* Letter from Alfred M. Mamlet to Marlene H. Dortch, File No. SAT-PDR-20000111-00047 (dated April 27, 2004).

¹¹ *See Star One C1 Stamp Grant*.

¹² *See Star One C2 Stamp Grant*.

¹³ *Star One C1 Order* at ¶ 5.

¹⁴ *See Loral Skynet do Brasil Petition for Declaratory Ruling to Add Estrela do Sul 1, a Ku-band Satellite, to the Permitted Space Station List*, Order, File Nos. SAT-PDR-20021010-00196, SAT-WAV-20031202-00352, DA 03-4095 (rel. Dec. 23, 2003) ("*Estrela do Sul Order*"); Stamp Grant, in File No. SAT-PPL-20040402-00073 and SAT-MOD-20040628-00124 (granted Aug. 26, 2004) ("*Amazonas-1 Stamp Grant*"). *See also* <http://www.fcc.gov/ib/sd/se/permitted.html>.

Access to the U.S. market for the Star One C5 satellite will also help continue to fulfill the promise of the WTO Basic Telecommunications Agreement with respect to satellite communications services. The ability of all U.S. earth stations with an ALSAT designation to communicate with the Star One C5 satellite would enhance competition in the FSS market, thereby stimulating lower rates, improving service quality, increasing service options and fostering technological innovation. The Commission has consistently relied on these same public interest benefits in granting similar requests for foreign satellites to access the U.S. market via the Permitted Space Station List.¹⁵

B. Spectrum Availability

In the *DISCO II Order*, the Commission determined that, given the scarcity of geostationary orbit locations and spectrum resources, it would consider spectrum availability as a factor in determining whether to allow a foreign satellite to serve the United States.¹⁶ The Commission further stated that when grant of access would create interference with U.S.-licensed systems, it may impose technical constraints on the foreign system's operations in the United States or, when conditions cannot remedy the interference, deny access.

The Star One C5 satellite will provide service from the 68° W.L. orbit location pursuant to satellite authorizations issued by Anatel and satellite network coordination information filed by Brazil with the International Telecommunication Union. There are no space stations currently authorized or under consideration by the Commission within two degrees of the 68° W.L. orbital location. The closest satellites operating in the C- and Ku-bands are Brasilsat B2 and Star One C1 collocated at 65° W.L., and Brasilsat B4 at 70° W.L., all three of which are under the control

¹⁵ See, e.g., *Brasilsat A2 Order*; *Estrela do Sul Order*.

¹⁶ See *DISCO II Order*, ¶ 150.

of Star One. Star One will operate the Star One C5 in conformity with the Commission's two-degree spacing policy (subject to the technical waivers requested herein).¹⁷ To the best of Star One's knowledge, there are no satellites currently operating at the 68° W.L. orbital location. Star One notes that the United Arab Emirates and the U.S. have submitted ITU filings for several satellite networks at that location. Star One will physically coordinate the operation of its Star One C5 satellite with those satellite networks, as necessary and appropriate. Star One is an experienced satellite operator that has successfully coordinated its operations with other collocated satellites in the past (including, *e.g.*, the collocation of the Brasilsat B1 satellite with NOAA's GOES-12 satellite at 75° W.L.).

C. Eligibility Requirements

The Commission has concluded that it will require non-U.S. space station operators to meet the same qualifications that U.S.-licensed space station operators must meet to obtain a satellite license.¹⁸ The information provided in this Petition, associated Attachments, Schedule S, and the accompanying FCC Form 312 demonstrate that Star One satisfies the Commission's requirements.

a. Legal Requirements

The Commission will grant a petition for declaratory ruling filed by a foreign satellite operator to be added to the Permitted Space Station List where the request is accompanied by the information demonstrating compliance with Sections 25.114 (applications for space station

¹⁷ See Annex 1 to Attachment A ("Interference and PFD Analyses").

¹⁸ See *DISCO II Order*, ¶¶ 154-59.

authorizations) and 25.137 (application requirements for earth stations operating with non-U.S. licensed space stations) of the Commission's rules.¹⁹

The general legal information required by Section 25.114 (*e.g.*, submission of a comprehensive proposal on FCC Form 312 and applicant information)²⁰ is set forth in the accompanying FCC Form 312 and its attachments, and the public interest considerations supporting grant are discussed throughout this Petition.²¹ Star One provides the following additional information required by Section 25.114:

- Star One seeks to add the Star One C5 satellite to the Permitted Space Station List and provide satellite service in the United States using conventional C- and Ku-band frequencies;²²
- Star One seeks to provide service in the United States using any available conventional C and Ku band transponder with U.S. coverage on a non-common carrier basis only through satellite transponder leases and other individual contractual arrangements;²³ and
- Star One plans to implement the Star One C5 satellite well within the Commission's space station milestone requirements;²⁴

<u>Event</u>	<u>FCC Requirement</u>
Contract execution	Grant plus 1 year
Critical Design Review	Grant plus 2 years
Commence construction	Grant plus 3 years
Launch and operation	Grant plus 5 years

¹⁹ See *DISCO II First Reconsideration Order*, ¶¶ 10, 16, 28-30. Section 25.114 sets forth certain technical application requirements which are addressed, *infra*, in Section I.C.b of this Petition and the associated Schedule S and Attachment A.

²⁰ See 47 C.F.R. § 25.114(a), (c)(1)-(2).

²¹ See *id.* at § 25.114(c)(16).

²² See *id.* at § 25.114(c)(3).

²³ See *id.* at § 25.114(c)(11).

²⁴ See *id.* at § 25.164.

With respect to the legal qualification information required by Section 25.137, the Star One C5 satellite is licensed by Brazil, a WTO member nation, and will provide services covered by the WTO Basic Telecommunications Agreement. Accordingly, Star One is not required to make an effective competitive opportunities demonstration and the Commission instead applies a presumption in favor of entry.²⁵ The additional legal information required by Section 25.137 of the Commission's rules is provided in this Petition, the attached ownership attachment²⁶ and in the associated FCC Form 312. In view of the foregoing, Star One plainly meets the Commission's legal requirements for placement of the Star One C5 satellite on the Permitted Space Station List.

b. Technical Requirements

As noted above, the Commission concluded that it will grant a petition for declaratory ruling filed by a foreign satellite operator to be added to the Permitted Space Station List where the request complies with Sections 25.114 and 25.137 of the Commission's rules.²⁷ The Commission also confirmed that:

U.S. earth stations with ALSAT licenses should be permitted to communicate with any non-U.S. satellite just as easily as they communicate with any U.S.-licensed satellite, provided that those communications do not cause harmful interference to or require protection from adjacent satellite operations, and otherwise comply with *DISCO II*.²⁸

²⁵ See 47 C.F.R. § 25.137(a)(1)-(2).

²⁶ See Star One Ownership and Officers and Directors (Attachment C).

²⁷ See *DISCO II First Reconsideration Order*, ¶¶ 10, 16, 28-30.

²⁸ *Id.*, ¶ 16.

Star One provides the information required by Section 25.114(c) on the Schedule S accompanying this Petition, as supplemented by the information in Attachment A. In addition, Star One provides the following information required by Section 25.114(d):

- **General Description of the Star One C5 Satellite.**²⁹ *See* Attachment A (Technical Information to Supplement Schedule S).
- **Orbital Location and Predicted Space Station Antenna Gain Contours.**³⁰ Star One C5 will operate at 68° W.L. pursuant to satellite authorizations issued by Anatel. *See also* Schedule S and Attachment A.
- **Description of Services to be Provided and Areas to be Served.**³¹ The Star One C5 satellite will offer C- and Ku-band FSS satellite services covered by the WTO Basic Telecommunications Agreement throughout the Americas, including substantial portions of the United States, from the 68° W.L. orbit location. At this time, Star One does not seek authority to provide DBS, DTH or DARS service, nor is it proposing to offer analog video transmission services in the United States. The link budgets included in the attached Schedule S provide additional information regarding the transmission characteristics for various proposed carriers, including typical earth station parameters, modulation parameters, overall link performance, etc.
- **Power Flux Density Levels.**³² *See* Attachment A and Schedule S.
- **Interference Analysis.**³³ *See* Annex 1 of Attachment A.
- **Orbital Debris Mitigation.**³⁴ *See* Attachment A.

²⁹ *See* 47 C.F.R. § 25.114(d)(1).

³⁰ *See id.* at § 25.114(d)(3).

³¹ *See id.* at § 25.114(d)(4).

³² *See id.* at § 25.114(d)(5).

³³ *See id.* at § 25.114(d)(7); *see also id.* at § 25.140.

³⁴ *See id.* at § 25.115(d)(14).

c. Waiver Requests

Star One hereby requests a few limited waivers of the rules with respect to certain technical characteristics of the Star One C5 satellite that are not consistent with requirements imposed by the Commission on U.S.-licensed satellites to facilitate two-degree spacing. The Commission has previously granted waivers of such provisions in authorizing foreign satellite access to the U.S. market where a waiver will not cause harmful interference to or require protection from adjacent satellite operations, and would not otherwise undermine the purposes of the rules. Star One requests waivers of two such provisions below and, consistent with the *DISCO II First Reconsideration Order* and past precedent, the Commission should grant these waivers and add Star One C5 to the Permitted Space Station List.

First, Star One is requesting a waiver of Section 25.210(a)(3), which requires that C-band transponders have the capability of switching polarization sense upon ground command to permit flexibility in assignment of U.S. orbital positions and to mitigate potential interference between adjacent satellites transmitting analog video signals.³⁵ At this time, Star One is not proposing to offer analog video transmission services in the United States, so a waiver of the polarity-switchability requirement would not undermine the purpose of the rule. Star One is prepared to undertake not to transmit analog video transmissions to, from or within the United States without further Commission authorization.

Second, Star One is requesting a waiver of Section 25.210(i), which requires satellite antennas to provide cross-polarization isolation of at least 30 dB throughout a satellite's primary coverage area.³⁶ The minimum cross-polarization isolation of the Star One C5 satellite's C- and

³⁵ See *id.* at § 25.210(a)(3); see *Brasilsat A2 Order* at ¶ 10.

³⁶ 47 C.F.R. § 25.210(i).

Ku-band antennas within the primary coverage area will not be lower than 27 dB. This minor discrepancy will not cause harmful interference to any adjacent satellites including U.S.-licensed satellites for a number of reasons: (i) the shortfall is relatively small (3 dB) so any potential impact on neighboring satellites will be negligible; (ii) the cross-polarization isolation performance will have a negligible impact on adjacent U.S. domestic satellites (adjacent satellite cross-polarization interference is dominated by the off-axis cross-polarization gain of the earth stations); and (iii) Star One will coordinate with potentially affected U.S. satellite operators will ensure that this minor cross-polarization isolation discrepancy will not adversely affect U.S.-licensed satellites. The cross-polarization requirement of Section 25.210(i) also serves to limit the level of intra-system interference. The Star One C5 satellite's cross-polarization isolation performance has been fully taken into account in the design of the link budgets for the services that the satellite will provide. The link budgets are sufficiently robust to compensate for the negligible degradation caused by the slightly reduced cross-polarization isolation performance. For all of these reasons, the Commission should waive the cross-polarization isolation requirement for the Star One C5 satellite.³⁷

Finally, the transmission of certain Star One C5 Ku-band carriers may have power levels in excess of the Commission's routine licensing rules. Star One affirms that it will permit the use of these higher power Ku-band carriers with U.S.-licensed earth stations only to the extent such transmissions have been coordinated with potentially affected satellite operators. Such

³⁷ The Commission has waived this requirement before in similar circumstances, and should do so again here. *See New Skies Satellites N.V. Petition for Declaratory Ruling*, Order, File Nos. SAT-PDR-20010309-00020, SAT-PDR-20011016-00137, DA -2-1256 (rel. May 28, 2002) at ¶ 19 (waiving cross-polarization isolation requirement for where exceedance was limited to a portion of the coverage area and isolation was 25-30 dB, with typical isolation better than 27 dB); *see also Star One C1 Order*; *Star One C1 Stamp Grant*; and *Star One C2 Stamp Grant*.

higher power transmissions with U.S. earth stations are authorized through the Commission's earth station licensing process and must be first accepted by adjacent satellite operators before they may be brought into use. Thus, use of any higher power Ku-band carriers on the Star One C5 satellite by a U.S. earth station will be subject to further Commission review, and adjacent operator acceptance, in the context of the relevant earth station licensing proceeding.

In sum, the Star One C5 satellite substantially complies with the Commission's technical requirements and, to the extent the satellite does not comply with certain operational provisions, the Commission should waive such requirements as it has in the past for similar requests to be placed on the Permitted Space Station List (including in the *Star One C1 Order*, the *Star One C1 Stamp Grant* and the *Star One C2 Stamp Grant*).

II. CONCLUSION

Granting Star One access to the U.S. market via placement of the Star One C5 satellite at 68° W.L. on the Permitted Space Station List would strongly serve the public interest. It would enhance competition by providing consumers more alternatives in choosing communications providers and services, thereby stimulating lower rates, improving service quality, increasing service options and fostering technological innovation. In addition, there are no national security, law enforcement, foreign policy or international trade concerns that arise in the context of the instant Petition for Declaratory Ruling; and the operations of the Star One C5 satellite will not adversely affect the operations of any U.S.-licensed satellite nor contravene the Commission's spectrum and frequency management policies.

In view of the positive public interest benefits and the absence of any harm, Star One respectfully requests that the Commission issue a declaratory ruling to add the Star One C5 satellite to the Permitted Space Stations List.

Respectfully submitted,

s/ Alfred M. Mamlet

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ATTACHMENT A
TECHNICAL APPENDIX

Star One C5

ATTACHMENT A

Technical Information to Supplement Schedule S

A.1 Scope

This Attachment contains additional information required by §25.114(c) and other sections of the FCC §25 rules that cannot be entered into the Schedule S submission.

A.2 General Description (§25.114(d)(1))

The Star One C5 satellite will operate at the 68° W.L. orbital location. The Star One C5 is a hybrid satellite which will provide a range of FSS services to various countries within Region 2 using the C- and Ku-band frequencies. The satellite will employ 28 C-band transponders and 48 Ku-band transponders using both linear polarizations thereby providing dual frequency re-use.

The C-band payload consists of 28 transponders. 27 transponders have a bandwidth of 36 MHz and one transponder has a bandwidth of 33 MHz. The satellite uses the conventional C-band (5925-6425 MHz / 3700-4200 MHz) and part of the extended C-band (5850-5925 MHz / 3325-3700 MHz). There is one C-band beam, using both linear polarizations, which provides hemispheric coverage.

The Ku-band payload consists of 48 transponders; each with a bandwidth of 36 MHz. 24 transponders use the conventional Ku-band (14.0-14.5 / 11.7-12.2 GHz) and 24 transponders use the extended Ku-band (13.75-14.0 GHz / 10.95-11.2 GHz and 11.45-11.7 GHz). The satellite has three Ku-band beams, all using both linear polarizations: a South American beam, a North

American beam and a Hemispheric beam. The beam connectivity of the conventional Ku-band is fixed, with the Hemispheric beam being used in both the uplink and downlink directions. Each extended Ku-band transponder can be switched between one of two downlink beams.

Although Star One is currently seeking Commission approval to be placed on the Permitted Space Station List for use of the conventional C- and Ku-band frequencies, the Schedule S form describes the technical characteristics of the entire satellite.

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

The Star One C5 antenna gain contours for all receive and transmit beams, as required by §25.114(d)(3), are given in GXT format and embedded in the associated Schedule S submission.

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

The Star One C5 satellite will provide a variety of FSS services ranging between narrowband to wideband digital services.

Typical emission designators and their allocated bandwidths are:

- 614KG7W (614 kHz)
- 1M64G7W (1.64 MHz)
- 5M50G7W (5.50 MHz)
- 17M9G7W (17.9 MHz)
- 36M0G7W (36 MHz)

Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission.

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 command system will control spacecraft operation through all phases of the mission by receiving and decoding commands to the spacecraft. Additionally, it will serve as the uplink receiver for ranging signals. The command subsystem features two command receivers each one set to receive one of the two Star One C5 command frequencies. Uplink commands are received at the C-band command receivers either via the dedicated on-station C-band antenna or through the omni-directional antenna. The receiving antennas are permanently connected to the command receivers. The receivers demodulate the uplink signal and recover the command data. All receivers are powered and accessible throughout mission life.

The telemetry system will comprise two telemetry beacons. Telemetry data from the spacecraft is collected by the bus and payload remote units or directly from the spacecraft units themselves. The Data Handling subsystem, collects the data, which is forwarded to the telemetry transmitters in a continuous stream. The telemetry transmitters will also serve as the downlink transmitter for ranging. The normal telemetry stream is phase-shifted-keyed onto a sub-carrier. For normal on-station operation, two telemetry transmitters will operate via the C-band communications antenna. During transfer orbit and emergency situations, the omni-directional antenna will be used to transmit the telemetry signals.

Two Ku-band downlink communications beacons will be continuously transmitted by the satellite and used by earth stations operators as a calibrated reference to compensate for rain attenuation and to adjust antenna pointing. These communication beacons will be transmitted via the Hemispheric beam, one for each polarization.

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

The predicted worst case receive and transmit channel filter response performance is given in Tables A.6-1 and A.6-1 for C-band and Ku-band, respectively. 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 A.6-1 - C-Band Typical Receiver and Transmitter Filter Responses

Frequency offset from channel center	Gain relative to channel center frequency (dB)		Comments
	Receive	Transmit	
CF±12 MHz	-0.6	-1.07	<u>In-Band</u> Value does not exceed these p-p values
CF±16 MHz	-0.8	-1.45	
CF±18 MHz	-1.2	-2.5	
CF±22 MHz	-13	-15	<u>Out-of-Band</u> Attenuation is not less than these values
CF±25 MHz	-30	-25	

Table A.6-2 - Ku-Band Typical Receiver and Transmitter Filter Responses

Frequency offset from channel center	Gain relative to channel center frequency (dB)		Comments
	Receive	Transmit	
CF±8 MHz	-0.5	-0.5	<u>In-Band</u> Value does not exceed these p-p values
CF±12 MHz	-0.7	-0.7	
CF±15 MHz	-1.0	-1.0	
CF±18 MHz	-1.8	-2.5	
CF±22 MHz	-19	-8	<u>Out-of-Band</u> Attenuation is not less than these values
CF±27 MHz	-30	-20	

A.7 Cessation of Emissions
(§25.207)

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

A.8 Interference and PFD Analyses
(§25.140(b)(2) and (§25.114(c)(8))

The interference and PFD analyses are contained in Annex 1 of this Attachment.

A.9 Orbital Debris Mitigation Plan

(§25.114(d)(14))

The spacecraft manufacturer for the Star One C5 satellite has not yet been selected and therefore Star One's Orbital Debris Mitigation Plan is necessarily forward looking. Star One will incorporate the material objectives of §25.114(d)(14) of the Commission's Rules into the design of the satellite through the satellite's Technical Specifications, Statement of Work and Test Plans. The Statement of Work will include provisions to review orbital debris mitigation as part of the preliminary design review ("PDR") and the critical design review ("CDR") and to incorporate its requirements, as appropriate, into its Test Plan, including a formal Failure Mode Verification Analysis ("FMVA") for orbital debris mitigation involving particularly the TT&C, propulsion and energy systems. During this process, some changes to the Orbital Debris Mitigation Plan may occur and Star One will provide the Commission with updated information, as appropriate.

A.9.1 Spacecraft Hardware Design

Although the Star One C5 satellite has not been fully designed, based on its experience, Star One does not expect that the satellite will undergo any release of debris during its operation. Furthermore, all separation and deployment mechanisms, and any other potential source of debris are expected to be retained by the spacecraft and launch vehicle.

In conjunction with the spacecraft manufacturer, Star One will assess and limit 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. Star One will take steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems. Star One will incorporate a rugged TT&C system with regard to meteoroids smaller than 1 cm through redundancy, shielding, and appropriate physical separation of components. The TT&C subsystem will have no single points of failure. The TT&C system will be equipped with two omni-directional antennas mounted on

opposite sides of the spacecraft. Each antenna will provide greater than hemispherical coverage for both command and telemetry and each is capable of accomplishing orbit raising independent of the other. The command receivers and decoders and telemetry encoders and transmitters will be totally redundant. While Star One's access to TT&C capability will be reduced in the event one of the omni-directional antennas is damaged by debris, the redundancy that will be built into the antenna system will ensure that Star One will be able to complete disposal of the satellite. Any failure of one TT&C component due to collision with debris or small meteoroids will not impact Star One's ability to control the Star One C5 satellite.

The propulsion subsystem will be designed such that it will not be separated from the spacecraft after de-orbit maneuvers. It will be protected from the effects of collisions with small debris through shielding. Moreover, propulsion subsystem components critical to disposal (e.g. propellant tanks) will be located deep inside the satellite, while other components, such as the thrusters, externally placed, are redundant to allow for de-orbit despite a collision with debris.

A.9.2 Minimizing Accidental Explosions

Star One and its spacecraft manufacturer will assess and limit the probability of accidental explosions during and after completion of mission operations. The satellite will be designed to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite. The propulsion subsystem pressure vessels will be designed with high safety margins. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. All pressures, including those of the batteries, will be monitored by telemetry. At end-of-life and once the satellite has been placed into its final disposal orbit, Star One will remove all stored energy from the spacecraft by depleting any residual fuel, leaving all fuel line valves open, venting the pressure vessels and the batteries will be left in a permanent state of discharge.

A.9.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the Star One C5 satellite, Star One 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 ± 0.2 degrees of 68° W.L. have also been reviewed. Only those networks that either operate, or are planned to operate, and have an overlapping station-keeping volume with the Star One C5 satellite, have been taken into account in the analysis.

Based on the review, there are no networks currently authorized or under consideration by the Commission to operate in the immediate vicinity of 68° W.L. slot.

With regard to ITU filings within ± 0.2 degrees of 68° W.L., the ITU has published requests for coordination for the following FSS networks:

- the UAE's EMARSAT-4I/M network;
- the USA's MILSTAR-8 network;
- the USA's USGAE-7 network;
- the USA's USGAE-7R network.

To the best of Star One's knowledge, there are no satellites currently operating at the 68° W.L. orbital location. With respect to the UAE network, Star One can find no evidence that it is being progressed. In addition, there are no public databases available to confirm whether or not U.S. Government satellites operate in the vicinity of 68° W.L. Star One will physically coordinate the operation of its Star One C5 satellite with other satellite networks at the 68° W.L. orbital location, as necessary and appropriate.

A.9.4 Post Mission Disposal Plan

At the end of the operational life of the Star One C5 satellite, Star One will maneuver the satellite to a disposal orbit with a minimum perigee of 320 km above the normal GSO operational orbit. This proposed disposal orbit altitude is based on the following calculation, as required in §25.283:

$$\begin{aligned}\text{Total Solar Pressure Area "A"} &= 126 \text{ m}^2 \\ \text{"M"} &= \text{Dry Mass of Satellite} = 2250 \text{ kg} \\ \text{"C}_R\text{"} &= \text{Solar Pressure Radiation Coefficient} = 1.5\end{aligned}$$

Therefore the Minimum Disposal Orbit Perigee Altitude:

$$\begin{aligned}&= 36,021 \text{ km} + 1000 \times C_R \times A/m \\ &= 36,021 \text{ km} + 1000 \times 1.5 \times 126/2250 \\ &= 36,105.0 \text{ km} \\ &= 318.8 \text{ km above GSO (35,786.2 km)}\end{aligned}$$

To provide margin, the nominal disposal orbit will be increased to 320 km. This will require 11 kg of propellant that will be reserved, taking account of all fuel measurement uncertainties, to perform the final orbit raising maneuvers.

A.10 Spacecraft Characteristics and Estimated Operational Lifetime and Reliability

The spacecraft manufacturer for the Star One C5 satellite has not yet been selected. Star One will provide the Commission with the precise spacecraft physical and electrical characteristics when the final supplier has been selected and the satellite fully designed. Estimates of these characteristics are included in the Schedule S form.

The spacecraft reliability will be consistent with current manufacturing standards in place for the major suppliers of space hardware. Bus reliability will be greater than 0.8 with overall spacecraft reliability to EOL of greater than 0.7. TWTA and receiver sparing will be consistent

with documented failure rates which allow attaining the overall spacecraft reliability numbers stated above.

**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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ANNEX 1

INTERFERENCE AND PFD ANALYSES

1.0 Interference Analyses

1.1 C-Band

Currently there are no operational C-band satellites two degrees away from the 68° W.L. location. The Star One C2 satellite is scheduled to be launched to the 70° W.L. location in the second quarter of 2008. The satellite does not have the capability of providing C-band service to the U.S. and accordingly the Star One C2 satellite has not been placed on the Commission's Permitted Space Station List ("PSSL") for the transmission of C-band services to, from or within the U.S.

In order to demonstrate two-degree compatibility, the transmission parameters of the Star One C5 satellite have been assumed as both the wanted and victim transmissions. It should be noted that these parameters are very similar to those that will be used with the Star One C2 satellite (for service to South America) and therefore the conclusions reached herein can also be extended with respect to the compatibility between the Star One C5 and Star One C2 satellites.

Table 1 provides a summary of the C-band transmission parameters derived from the Star One C5 link budgets that are embedded in the Schedule S form and which were used in the interference analysis. The interference calculations assumed a 1 dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of $29-25 \log(\theta)$. The C/I calculations were performed on a per Hz basis.

Table 2 shows the results of the C-band interference calculations in terms of the overall C/I margins. The table is provided in a format similar to that of the output of the Sharp Adjacent Satellite Interference Analysis program. It can be seen that all C/I margins are positive.

Table 1. Star One C5 Typical C-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	47.5	51.7	18.4	42.0	17.9
2	1M64G7W	1.64	51.3	56.8	23.2	43.7	20.7
3	5M50G7W	5.5	47.5	62.0	28.6	47.5	21.6
4	17M9G7W	17.9	53.5	67.5	33.5	49.7	24.6
5	36M0G7W	36.0	53.5	75.1	38.0	43.7	20.0

Table 2. Summary of the overall link C/I margins (dB).

		Interfering Carriers					
		Carrier ID	1	2	3	4	5
Wanted Carriers	1	1	2.5	2.6	1.8	2.8	1.1
	2	2	1.6	1.8	0.9	2.1	0.3
	3	3	3.2	4.0	2.4	4.6	2.3
	4	4	1.3	2.5	0.5	3.1	0.5
	5	5	4.4	4.2	3.7	4.4	2.8

1.2 Ku-Band

Currently there are no operational Ku-band satellites two degrees away from the 68° W.L. location. The Star One C2 satellite is scheduled to be launched to the 70° W.L. location in the second quarter of 2008. The satellite is authorized by the Commission to provide Ku-band services to the U.S. and it has been placed on the Commission's PSSL.

Tables 3 and 4 provide summaries of the Ku-band transmission parameters for the Star One C2 and Star One C5 satellites, respectively. The Star One C2 parameters are those previously provided to the Commission¹ and the Star One C5 parameters were derived from the link budgets that are embedded in the associated Schedule S form. The interference calculations assumed a 1

¹ See SAT-MOD-20051014-00200.

dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of $29-25 \log(\theta)$. The C/I calculations were performed on a per Hz basis.

Tables 5 and 6 show the results of the Ku-band interference calculations: Table 5 shows the overall C/I margins with the Star One C5 satellite interfering into the Star One C2 and Table 6 shows the C/I margins with the Star One C2 satellite interfering into the Star One C5 satellite. All C/I margins are positive in both tables.

Table 3. Star One C2 Typical Ku-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	46.6	60.0	26.5	53.2	17.9
2	614KG7W	0.614	54.5	63.5	30.0	45.2	17.9
3	1M64G7W	1.64	49.1	66.0	32.5	55.7	20.7
4	1M64G7W	1.64	57.0	68.0	35.0	47.7	20.7
5	5M50G7W	5.5	57.0	70.0	37.0	55.7	21.6
6	17M9G7W	17.9	59.0	74.5	41.0	57.6	24.6
7	36M0G7W	36.0	59.0	81.0	50.0	45.2	20.0

Table 4. Star One C5 Typical Ku-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	54.7	55.7	29.0	45.2	17.9
2	1M64G7W	1.64	53.0	60.1	33.2	49.6	20.7
3	5M50G7W	5.5	59.1	65.7	39.0	57.6	21.6
4	17M9G7W	17.9	57.2	74.6	43.5	57.6	24.6
5	36M0G7W	36.0	60.7	79.0	48.0	47.7	20.0

Table 5. Summary of the overall link C/I margins (dB). Star One C5 interfering into Star One C2.

		Interfering Carriers				
		Carrier ID	1	2	3	4
Wanted Carriers	1	11.7	11.5	11.6	11.6	10.6
	2	7.7	7.8	7.3	7.8	6.5
	3	12.8	12.4	12.9	12.4	11.8
	4	8.1	8.0	7.7	8.1	6.8
	5	11.0	10.5	11.2	10.6	10.0
	6	8.4	7.8	8.8	7.9	7.5
	7	7.9	7.9	7.5	7.9	6.6

Table 6. Summary of the overall link C/I margins (dB). Star One C2 interfering into Star One C5.

		Interfering Carriers						
		Carrier ID	1	2	3	4	5	6
Wanted Carriers	1	2.9	4.0	2.9	4.1	7.3	8.7	3.1
	2	0.9	3.5	1.3	4.3	7.6	9.3	4.0
	3	0.7	4.8	1.4	6.6	9.9	12.2	8.0
	4	1.3	4.9	1.9	6.3	9.5	11.5	6.8
	5	5.9	6.2	5.7	6.1	9.4	10.7	5.0

2.0 C-Band PFD Analyses

Star One will operate the Star One C5 satellite such that all C-band downlink transmissions will comply with the PFD limits of §25.208. In order to demonstrate compliance with the PFD limits, the carrier with the highest EIRP density is used. Based on the C-band link budgets, the highest downlink EIRP density is 1.4 dBW/4 kHz, which occurs when the transponder is operated at saturation with the 36 MHz carrier.

Table 7 shows the worst-case PFD levels that will occur at various angles of arrival and demonstrates compliance with §25.208.

Table 7. Maximum PFD Levels of the C-Band Beam.

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-165.0	13.0
5°	-152.0	-163.3	-2.9	-164.8	12.8
10°	-149.5	-163.2	-2.7	-164.4	14.9
15°	-147.0	-163.0	-2.4	-164.0	17.0
20°	-144.5	-162.9	-2.1	-163.6	19.1
25°	-142.0	-162.8	-1.9	-163.3	21.3
66° (Peak)	-142.0	-162.2	0	-160.8	18.8

3.0 Extended Ku-Band PFD Analyses

Star One will operate the Star One C5 satellite such that all extended Ku-band downlink transmissions will comply with the PFD limits of §25.208. In order to demonstrate compliance with the PFD limits, the carriers with the highest EIRP density is used for each of the three Ku-band beams. For all beams, these correspond to saturated operation across the entire transponder bandwidth. The worst-case downlink EIRP densities are 13.5 dBW/4 kHz for the North American and South American beams and 11.5 dBW/4 kHz for the Hemispheric beam.

Tables 8, 9 and 10 show the worst-case PFD levels that will occur at various angles of arrival for each of the Ku-band beams and demonstrate compliance with §25.208 in all cases.

Table 8. Maximum PFD Levels of the North American Beams (NADH and NADV).

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-150.0	-163.4	-1.1	-151.0	1.0
5°	-150.0	-163.3	-1.1	-150.9	0.9
10°	-147.5	-163.2	-1.1	-150.8	3.3
15°	-145.0	-163.0	-1.1	-150.7	5.7
20°	-142.5	-162.9	-1.1	-150.6	8.1
25°	-140.0	-162.8	-1.0	-150.4	10.4
44° (Peak)	-140.0	-162.5	0.0	-149.0	9.0

S2742 SAT-PPL-20071113-00159
Star One S.A.
STAR ONE C5

IB2007002740

Approved by OMB
3060-0678

Date & Time Filed: Nov 13 2007 3:07:32:376PM
File Number: SAT-PPL-20071113-00159
Callsign/Satellite ID: S2742

APPLICATION FOR SATELLITE SPACE STATION AUTHORIZATIONS FCC 312 MAIN FORM FOR OFFICIAL USE ONLY	FCC Use Only
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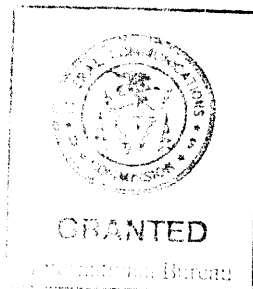
APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Petition for Declaratory Ruling to Add the Star One C5 Satellite to the Permitted Space Station List

1-8. Legal Name of Applicant			
Name:	Star One S.A.	Phone Number:	552121219126
DBA Name:		Fax Number:	552121219321
Street:	Av. Presidente Vargas 1012 — 6th floor, Centro	E-Mail:	lprates@starone.com.br
	Rio de Janeiro		
City:		State:	
Country:	Brazil	Zipcode:	-
Attention:	Mr Luiz Prates		

1



File # SAT-PPL-20071113-00159

Call Sign S2742 Grant Date 2/7/08
(or other identifier)

Term Dates

From _____ To: _____

Approved: [Signature]

w/conditions.

Policy Branch Chief

SAT-PPL-20071113-00159
Conditions of Permitted Space Station List Grant
February 7, 2008

Pursuant to Sections 303(r), 308, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 303(r), 308, 309, 310, and Sections 0.261 and 25.137(c) of the Federal Communication Commission's (Commission's) rules, 47 C.F.R. §§ 0.261, 25.137(c), the Petition for Declaratory Ruling filed by Star One SA (File No. SAT-PPL-20071113-00159) to add the hybrid C and Ku-band Star One C5 satellite (Call Sign: S2742) located at the 68° W.L. orbital location, which is licensed by Brazil, to the Commission's Permitted Space Station List is GRANTED. Accordingly, each U.S.-licensed earth station with "ALSAT" designated as a point of communication may provide Fixed Satellite Services (FSS) in the 14000-14500 MHz (Earth-to-space), 11700-12200 MHz (space-to-Earth), 5925-6425 MHz (Earth-to-space) and 3700-4200 MHz (space-to-Earth) frequency bands, to, from, or within the United States, by accessing the Star One C5 satellite (Call Sign: S2742) at the 68° W.L. orbital location, in accordance with the terms, conditions and technical specifications set forth in Star One's Petition for Declaratory Ruling, the Commission's Rules, and subject to the following conditions:

1. Star One C5 is not authorized to provide any Direct-to-Home (DTH) service, Direct Broadcast Satellite (DBS) service, or Digital Audio Radio Service (DARS) to, from, or within the United States;
2. Communications between ALSAT-designated routine earth stations and the Star One C5 satellite shall be in compliance with the satellite coordination agreements reached between Brazil and other administrations;
3. Star One's request for waiver of Section 25.210(a)(3) of the Commission's rules, 47 C.F.R. 25.210(a)(3) is GRANTED as conditioned. Section 25.210(a)(3) requires that all space stations in the FSS in the C-band to be capable of switching polarization sense upon ground command. This design requirement allows space stations to be assigned to different orbital positions and mitigates potential interference between adjacent FSS systems transmitting analog TV signals. Star One acknowledges that the polarization of the C-band payload of the Star One C5 satellite cannot be switched. There are no co-frequency spacecraft located within 2 degrees of 68° W.L. Further, Star One indicates that at this time it is not proposing to offer analog video transmission services in the United States using Star One C5. We grant this waiver on the condition that Star One C5 is prohibited from transmitting or receiving analog TV signals to, from, or within the United States. This waiver is also limited to this orbital location. Further, Star One must accommodate future satellite networks serving the United States that are two-degree compliant. Grant of this waiver request is consistent with our precedent.¹


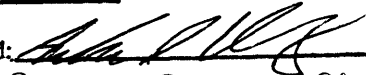
¹ See Mabuhay Philippines Satellite Corp. Petition for Declaratory Ruling, Application of Loral CyberStar, Inc. for Authority to Operate Two Transmit/Receive Earth Stations at Kapolei, Hawaii, for Use in Conjunction with the Mabuhay Satellite Located at 146 E.L., *Order and Authorization*, 15 FCC Red

4. Star One's request for waiver of Section 25.210(i) of the Commission's rules, 47 C.F.R. 25.210(i), IS GRANTED. Section 25.210(i) directs, "Space station antennas in the Fixed-Satellite Service must be designed to provide a cross-polarization isolation such that the ratio of the on axis co-polar gain to the crosspolar gain of the antenna in the assigned frequency band shall be at least 30 dB within its primary coverage area." Star One indicates that the cross-polarization isolation of the Star One C1 satellite's antennas will not be lower than 27 dB within the primary coverage area. We find that these shortfalls will not produce a significant increase in interference, except to the applicant itself, and will not adversely affect any other operator. As a condition of the grant of this waiver, Star One must accommodate future satellite networks serving the United States that are two-degree compliant. Grant of this waiver request is consistent with our precedent.²

5. Unless extended by the Commission for good cause shown, Star One C5 shall be removed from the Permitted Space Station List in the event the space station is not constructed, launched, and successfully placed into operation in accordance with the technical parameters in its Petition for Declaratory Ruling and the terms and conditions of this grant, by the following dates:

- a. Enter Non-contingent Satellite Manufacturing Contract: February 7, 2009;
- b. Complete Critical Design Review: February 7, 2010;
- c. Begin Physical Construction: February 7, 2011;
- d. Launch and Operate: February 7, 2013.
- e. Star One S. A. must file a bond within 30 days of the date of this action with the Commission in the amount of \$ 3 million pursuant to the procedures set forth in Public Notice, DA 03-602, 18 FCC Rcd 16283 (2003).

6. This action is taken pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective immediately. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106, 1.115, may be filed within 30 days of the date of the public notice indicating that this action was taken.

 GRANTED International Bureau <i>w/conditions</i>	SAT-PPL-20071113-00159
	Call Sign <u>S2754</u> Grant Date <u>2/7/05</u> (or other identifier)
	Term Dates From _____ To: _____
	Approved:  Policy Branch Chief

23671, 23676 para. 13 (2000) (granting a waiver of section 25.210(a)(3) and imposing the same condition imposed here).

² Star One S.A.; Petition for Declaratory Ruling to Add The Star One C1 Satellite at 65° W.L. to the Permitted Space Station List, *Order*, 19 FCC Rcd 16334 (Sat. Div. 2004) (finding that the impact on neighboring satellite systems of a 3-5 dB difference from the required cross polarization isolation ratio would be negligible).

9-16. Name of Contact Representative

Name:	Alfred Mamlet	Phone Number:	202-429-3000
Company:	Step toe & Johnson LLP	Fax Number:	202-429-3902
Street:	1330 Connecticut Avenue NW	E-Mail:	amamlet@step toe.com
City:	Washington	State:	DC
Country:	USA	Zipcode:	20036 -1795
Attention:		Relationship:	Legal Counsel

CLASSIFICATION OF FILING

17. Choose the buttonnext to the classification that applies to thisfiling for both questions a. and b. Choose only one for 17a and only one for 17b.

a.

- (N/A) a1. Earth Station
- a2. Space Station

b.

- b1. Application for License of New Station
- (N/A) b2. Application for Registration of New Domestic Receive-Only Station
- (N/A) b3. Amendment to a Pending Application
- (N/A) b4. Modification of License or Registration
- (N/A) b5. Assignment of License or Registration
- (N/A) b6. Transfer of Control of License or Registration
- (N/A) b7. Notification of Minor Modification
- (N/A) b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite
- b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States
- b10. Replacement Satellite Application - no new frequency bands
- b11. Replacement Satellite Application - new frequency bands (Not eligible for streamlined processing)
- b12. Petition for Declaratory Ruling to be Added to the Permitted List
- (N/A) b13. Other (Please specify)

17c. Is a fee submitted with this application?

If Yes, complete and attach FCC Form 159.

If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114).

Governmental Entity Noncommercial educational licensee

Other (please explain): No fee for petitions for declaratory ruling

17c. Fee Classification BNY – Space Station (Geostationary)

18. If this filing is in reference to an existing station, enter:

(a) Call sign of station:
Not Applicable

19. If this filing is an amendment to a pending application enter:

(a) Date pending application was filed:

Not Applicable

(b) File number of pending application:

Not Applicable

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Select all that apply:	
<input checked="" type="checkbox"/> a. Fixed Satellite <input type="checkbox"/> b. Mobile Satellite <input type="checkbox"/> c. Radiodetermination Satellite <input type="checkbox"/> d. Earth Exploration Satellite <input type="checkbox"/> e. Direct to Home Fixed Satellite <input type="checkbox"/> f. Digital Audio Radio Service <input type="checkbox"/> g. Other (please specify)	
21. STATUS: Choose the button next to the applicable status. Choose only one. <input type="radio"/> Common Carrier <input checked="" type="radio"/> Non-Common Carrier	22. If earth station applicant, check all that apply. Not Applicable
23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Choose one. Are these facilities: <input type="radio"/> Connected to a Public Switched Network <input type="radio"/> Not connected to a Public Switched Network <input checked="" type="radio"/> N/A	
24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s). <input checked="" type="checkbox"/> a. C-Band (4/6 GHz) <input checked="" type="checkbox"/> b. Ku-Band (12/14 GHz) <input type="checkbox"/> c. Other (Please specify upper and lower frequencies in MHz.) Frequency Lower: Frequency Upper: (Please specify additional frequencies in an attachment)	

TYPE OF STATION

25. CLASS OF STATION: Choose the button next to the class of station that applies. Choose only one.

(N/A) a. Fixed Earth Station
(N/A) b. Temporary-Fixed Earth Station
(N/A) c. 12/14 GHz VSAT Network
(N/A) d. Mobile Earth Station
 e. Geostationary Space Station.
 f. Non-Geostationary Space Station
 g. Other (please specify)

26. TYPE OF EARTH STATION FACILITY: Not Applicable

PURPOSE OF MODIFICATION

27. The purpose of this proposed modification is to: (Place an "X" in the box(es) next to all that apply.) Not Applicable

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as an exhibit to this application. A Radiation Hazard Study must accompany all applications for new transmitting facilities, major modifications, or major amendments. Yes No

ALIEN OWNERSHIP

Earth station applicants not proposing to provide broadcast, common carrier, aeronautical en route or aeronautical fixed radio station services are not required to respond to Items 30-34.

29. Is the applicant a foreign government or the representative of any foreign government?	<input type="radio"/> Yes <input checked="" type="radio"/> No
30. Is the applicant an alien or the representative of an alien?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
31. Is the applicant a corporation organized under the laws of any foreign government?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.	

BASIC QUALIFICATIONS

<p>35. Does the Applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents.</p>	<input checked="" type="radio"/> Yes <input type="radio"/> No
<p>36. Has the applicant or any party to this application or amendment had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explanation of circumstances.</p>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<p>37. Has the applicant, or any party to this application or amendment, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explanation of circumstances.</p>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<p>38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition? If Yes, attach as an exhibit, an explanation of circumstances</p>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<p>39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceding two items? If yes, attach as an exhibit, an explanation of the circumstances.</p>	<input type="radio"/> Yes <input checked="" type="radio"/> No

40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, address, and citizenship of those stockholders owning a record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer.

41. By checking Yes, the undersigned certifies, that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes. Yes No

42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If Yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. 25.137, as appropriate. If No, proceed to question 43. Yes No

42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station? Brazil

43. Description. (Summarize the nature of the application and the services to be provided). (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

See narrative and attachments thereto for responses to Questions 34, 35, 40, 42a and 43.

Narrative

43a. Geographic Service Rule Certification

By selecting A, the undersigned certifies that the applicant is not subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25.

A

By selecting B, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will comply with such requirements.

B

By selecting C, the undersigned certifies that the applicant is subject to the geographic service or geographic coverage requirements specified in 47 C.F.R. Part 25 and will not comply with such requirements because it is not feasible as a technical matter to do so, or that, while technically feasible, such services would require so many compromises in satellite design and operation as to make it economically unreasonable. A narrative description and technical analysis demonstrating this claim are attached.

C

CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or 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, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to jboley@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

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

_____))
In the Matter of))
))
Star One S.A.) File No. _____)
))
Petition for Declaratory Ruling To Add))
the Star One C5 Satellite at 68° W.L. to))
the Permitted Space Station List))
_____))

To: The Commission

PETITION FOR DECLARATORY RULING

Star One S.A. (“Star One”), by its attorneys, respectfully petitions the Commission, pursuant to Section 25.137 of the Commission’s rules,¹ to add the Star One C5 satellite at 68° W.L. to the Permitted Space Station List (“Permitted List”). The Star One C5 satellite will supplement the services to be provided by Star One using the soon-to-be-launched Star One C1 satellite at 65° W.L.² and the planned Star One C2 satellite at the 70° W.L.³

¹ See 47 C.F.R. §25.137; see also *Amendment of the Commission’s Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, First Order on Reconsideration, 15 FCC Rcd 7207 (1999) (“*DISCO II First Reconsideration Order*”); *Amendment of the Commission’s Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 02-34, FCC 03-102 (rel. May 19, 2003) (“*Space Station Licensing Reform Order*”).

² Stamp Grant, File No. SAT-PPL-20050706-00143 (granted March 29, 2006) (“*Star One C1 Stamp Grant*”). An earlier Petition for Declaratory Ruling for the Star One C1 satellite had been granted, but was subsequently surrendered by Star One due to complications relating to the performance bond requirement. See *Star One S.A. Petition for Declaratory Ruling to Add the Star One C1 Satellite at 65° W.L. to the Permitted Space Station List*, DA 04-2614, Order, 19 FCC Rcd 16334 (2004) (“*Star One C1 Order*”).

³ Stamp Grant, SAT-PPL-20050708-00144 (granted Sept. 9, 2005) (“*Star One C2 Stamp Grant*”).

Star One has been licensed by Brazil to operate the Star One C5 satellite at the 68° W.L. orbit location. The Star One C5 satellite will provide a wide array of Fixed-Satellite Service (“FSS”) services using the C-band and Ku-band frequencies throughout North, Central and South America, including the continental United States. Star One proposes to offer satellite communications services on routes to, from and within the United States in conventional C-band and Ku-band spectrum,⁴ and grant of this petition will permit U.S.-licensed earth stations with an “ALSAT” designation to access the Star One C5 satellite to provide these important communications services in the United States.⁵ As demonstrated herein, adding the Star One C5 satellite to the Permitted Space Station List would strongly serve the public interest.

I. PLACEMENT OF THE STAR ONE C5 SATELLITE ON THE PERMITTED SPACE STATION LIST WOULD SERVE THE PUBLIC INTEREST

In the *DISCO II Order*, the Commission set forth the public interest analysis applicable in evaluating requests to use non-U.S. licensed space stations to provide satellite service in the United States.⁶ This analysis considers the effect on competition in the United States, spectrum availability, eligibility and operating (*e.g.*, technical) requirements, and national security, law

⁴ The conventional C-band includes the 3700-4200 MHz (downlink) and 5925-6425 MHz (uplink) bands, and the conventional Ku-band includes the 11.7-12.2 GHz (downlink) and 14.0-14.5 GHz (uplink) bands. Although the communications payload of the Star One C5 satellite includes certain extended C-band and Ku-band frequencies, Star One is requesting Permitted List authority to provide service in the United States using the conventional C- and Ku-bands only.

⁵ In the *DISCO II First Reconsideration Order*, the Commission determined that U.S.-licensed earth stations with an “ALSAT” (all U.S.-licensed space stations) designation may communicate with U.S.-licensed satellites and non-U.S. licensed satellites on the Permitted Space Station List in conventional C-band and Ku-band frequencies.

⁶ See *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, 12 FCC Rcd. 24094 (1997) (“*DISCO II Order*”).

enforcement, foreign policy and trade concerns.⁷ Star One fully satisfies the Commission's criteria for inclusion of the Star One C5 satellite on the Permitted Space Station List.

A. Competition Considerations

Star One will operate the Star One C5 satellite at the 68° W.L. orbital location pursuant to an authorization granted by the Brazilian National Telecommunications Agency ("Anatel").⁸ Brazil is a member of the WTO and Star One seeks access to the U.S. market to provide satellite services covered by the WTO Basic Telecommunications Agreement. Accordingly, the Commission applies a presumption in favor of entry to Star One's request to place the Star One C5 satellite on the Permitted Space Station List, and Star One is not required to make the effective competitive opportunities demonstration set forth in Section 25.137(a)(2) of the Commission's rules.⁹

Significantly, the Commission has already authorized Star One to access the U.S. market through placement of three other Star One satellites on the Permitted Space Station List -- Brasilsat A2 at 63° W.L.,¹⁰ Star One C1 at 65° W.L.¹¹ and Star One C2 at 70° W.L.¹² Nothing

⁷ See generally *id.*, ¶¶ 30-182.

⁸ See Anatel Term of Right (attached as Attachment B).

⁹ See 47 C.F.R. § 25.137(a)(2); see also *DISCO II Order*, ¶ 39 ("We adopt our proposal to apply a presumption in favor of entry in considering applications to access non-U.S. satellites licensed by WTO Members to provide services covered by the U.S. commitments under the WTO Basic Telecom Agreement."), ¶ 64 ("[W]e will not evaluate the effective competitive opportunities in the route market for non-U.S. satellites licensed by a WTO Member providing WTO-covered services. Thus, we will not perform an ECO-Sat test on any route, whether a WTO route market or a non-WTO route market.").

¹⁰ At that time, the Brasilsat A2 satellite was operated by Empresa Brasileira de Telecomunicações S.A. ("Embratel") but was subsequently transferred to Star One. See Permitted Space Station List at < <http://www.fcc.gov/ib/sd/se/permitted.html>>; see also *Empresa Brasileira de Telecomunicações S.A., Petition for Declaratory Ruling on Access to Brasilsat A2 Satellite via U.S. Earth Stations*, Order, DA 00-2878 (rel. Jan. 16, 2001) ("*Brasilsat A2 Order*"). On March 1, 2001, Embratel filed a letter with the Commission indicating that 19.9 percent of its

has changed that would alter the Commission's prior conclusions with respect to the pro-competitive benefits of Star One's access to the U.S. market via the Permitted Space Station List. Indeed, when the Commission first added the Star One C1 satellite to the Permitted List, it found that "[t]here is no evidence to rebut the proposition that Star One C1's entry into the U.S. market is pro-competitive."¹³ Star One has proven itself as a reliable satellite operator over the years, as evidenced by its successful operation of Brasilsat A2 for 18 years (three of which as a Permitted List satellite) and the recent successful launch of the Star One C1 satellite, which further supports inclusion of the Star One C5 satellite at 68° W.L on the Permitted Space Station List.

Moreover, the Commission has added other Brazilian-licensed satellites to the Permitted Space Station List, including Amazonas-1 at 61° W.L. and Estrela Do Sul at 63° W.L., , concluding that such action should stimulate competition in the United States by providing consumers more alternatives in choosing communications providers and services.¹⁴ The addition of the Star One C5 satellite to the Permitted List would further stimulate such competition

satellite services subsidiary had been purchased by Societe Europeenne des Satellites S.A. ("SES"), and that the operator of the Brasilsat A2 satellite would be Star One. *See* Satellite Policy Branch Information, Public Notice, Report No. SAT-00076 (rel. July 20, 2001). *See also* *Star One C1 Order* (placing the Star One C1 satellite on the Permitted Space Station List). The Brasilsat A2 satellite was de-orbited in 2004 and is no longer operating at the 63° W.L. orbit location. *See* Letter from Alfred M. Mamlet to Marlene H. Dortch, File No. SAT-PDR-20000111-00047 (dated April 27, 2004).

¹¹ *See Star One C1 Stamp Grant*.

¹² *See Star One C2 Stamp Grant*.

¹³ *Star One C1 Order* at ¶ 5.

¹⁴ *See Loral Skynet do Brasil Petition for Declaratory Ruling to Add Estrela do Sul 1, a Ku-band Satellite, to the Permitted Space Station List*, Order, File Nos. SAT-PDR-20021010-00196, SAT-WAV-20031202-00352, DA 03-4095 (rel. Dec. 23, 2003) ("*Estrela do Sul Order*"); Stamp Grant, *in* File No. SAT-PPL-20040402-00073 and SAT-MOD-20040628-00124 (granted Aug. 26, 2004) ("*Amazonas-1 Stamp Grant*"). *See also* <http://www.fcc.gov/ib/sd/se/permitted.html>.

Access to the U.S. market for the Star One C5 satellite will also help continue to fulfill the promise of the WTO Basic Telecommunications Agreement with respect to satellite communications services. The ability of all U.S. earth stations with an ALSAT designation to communicate with the Star One C5 satellite would enhance competition in the FSS market, thereby stimulating lower rates, improving service quality, increasing service options and fostering technological innovation. The Commission has consistently relied on these same public interest benefits in granting similar requests for foreign satellites to access the U.S. market via the Permitted Space Station List.¹⁵

B. Spectrum Availability

In the *DISCO II Order*, the Commission determined that, given the scarcity of geostationary orbit locations and spectrum resources, it would consider spectrum availability as a factor in determining whether to allow a foreign satellite to serve the United States.¹⁶ The Commission further stated that when grant of access would create interference with U.S.-licensed systems, it may impose technical constraints on the foreign system's operations in the United States or, when conditions cannot remedy the interference, deny access.

The Star One C5 satellite will provide service from the 68° W.L. orbit location pursuant to satellite authorizations issued by Anatel and satellite network coordination information filed by Brazil with the International Telecommunication Union. There are no space stations currently authorized or under consideration by the Commission within two degrees of the 68° W.L. orbital location. The closest satellites operating in the C- and Ku-bands are Brasilsat B2 and Star One C1 collocated at 65° W.L., and Brasilsat B4 at 70° W.L., all three of which are under the control

¹⁵ See, e.g., *Brasilsat A2 Order*; *Estrela do Sul Order*.

¹⁶ See *DISCO II Order*, ¶ 150.

of Star One. Star One will operate the Star One C5 in conformity with the Commission's two-degree spacing policy (subject to the technical waivers requested herein).¹⁷ To the best of Star One's knowledge, there are no satellites currently operating at the 68° W.L. orbital location. Star One notes that the United Arab Emirates and the U.S. have submitted ITU filings for several satellite networks at that location. Star One will physically coordinate the operation of its Star One C5 satellite with those satellite networks, as necessary and appropriate. Star One is an experienced satellite operator that has successfully coordinated its operations with other collocated satellites in the past (including, *e.g.*, the collocation of the Brasilsat B1 satellite with NOAA's GOES-12 satellite at 75° W.L.).

C. Eligibility Requirements

The Commission has concluded that it will require non-U.S. space station operators to meet the same qualifications that U.S.-licensed space station operators must meet to obtain a satellite license.¹⁸ The information provided in this Petition, associated Attachments, Schedule S, and the accompanying FCC Form 312 demonstrate that Star One satisfies the Commission's requirements.

a. Legal Requirements

The Commission will grant a petition for declaratory ruling filed by a foreign satellite operator to be added to the Permitted Space Station List where the request is accompanied by the information demonstrating compliance with Sections 25.114 (applications for space station

¹⁷ See Annex 1 to Attachment A ("Interference and PFD Analyses").

¹⁸ See *DISCO II Order*, ¶¶ 154-59.

authorizations) and 25.137 (application requirements for earth stations operating with non-U.S. licensed space stations) of the Commission's rules.¹⁹

The general legal information required by Section 25.114 (e.g., submission of a comprehensive proposal on FCC Form 312 and applicant information)²⁰ is set forth in the accompanying FCC Form 312 and its attachments, and the public interest considerations supporting grant are discussed throughout this Petition.²¹ Star One provides the following additional information required by Section 25.114:

- Star One seeks to add the Star One C5 satellite to the Permitted Space Station List and provide satellite service in the United States using conventional C- and Ku-band frequencies;²²
- Star One seeks to provide service in the United States using any available conventional C and Ku band transponder with U.S. coverage on a non-common carrier basis only through satellite transponder leases and other individual contractual arrangements,²³ and
- Star One plans to implement the Star One C5 satellite well within the Commission's space station milestone requirements.²⁴

<u>Event</u>	<u>FCC Requirement</u>
Contract execution	Grant plus 1 year
Critical Design Review	Grant plus 2 years
Commence construction	Grant plus 3 years
Launch and operation	Grant plus 5 years

¹⁹ See *DISCO II First Reconsideration Order*, ¶¶ 10, 16, 28-30. Section 25.114 sets forth certain technical application requirements which are addressed, *infra*, in Section I.C.b of this Petition and the associated Schedule S and Attachment A.

²⁰ See 47 C.F.R. § 25.114(a), (c)(1)-(2).

²¹ See *id.* at § 25.114(c)(16).

²² See *id.* at § 25.114(c)(3).

²³ See *id.* at § 25.114(c)(11).

²⁴ See *id.* at § 25.164.

With respect to the legal qualification information required by Section 25.137, the Star One C5 satellite is licensed by Brazil, a WTO member nation, and will provide services covered by the WTO Basic Telecommunications Agreement. Accordingly, Star One is not required to make an effective competitive opportunities demonstration and the Commission instead applies a presumption in favor of entry.²⁵ The additional legal information required by Section 25.137 of the Commission's rules is provided in this Petition, the attached ownership attachment²⁶ and in the associated FCC Form 312. In view of the foregoing, Star One plainly meets the Commission's legal requirements for placement of the Star One C5 satellite on the Permitted Space Station List.

b. Technical Requirements

As noted above, the Commission concluded that it will grant a petition for declaratory ruling filed by a foreign satellite operator to be added to the Permitted Space Station List where the request complies with Sections 25.114 and 25.137 of the Commission's rules.²⁷ The Commission also confirmed that:

U.S. earth stations with ALSAT licenses should be permitted to communicate with any non-U.S. satellite just as easily as they communicate with any U.S.-licensed satellite, provided that those communications do not cause harmful interference to or require protection from adjacent satellite operations, and otherwise comply with *DISCO II*.²⁸

²⁵ See 47 C.F.R. § 25.137(a)(1)-(2).

²⁶ See Star One Ownership and Officers and Directors (Attachment C).

²⁷ See *DISCO II First Reconsideration Order*, ¶¶ 10, 16, 28-30.

²⁸ *Id.*, ¶ 16.

Star One provides the information required by Section 25.114(c) on the Schedule S accompanying this Petition, as supplemented by the information in Attachment A. In addition, Star One provides the following information required by Section 25.114(d):

- **General Description of the Star One C5 Satellite.**²⁹ *See* Attachment A (Technical Information to Supplement Schedule S).
- **Orbital Location and Predicted Space Station Antenna Gain Contours.**³⁰ Star One C5 will operate at 68° W.L. pursuant to satellite authorizations issued by Anatel. *See also* Schedule S and Attachment A.
- **Description of Services to be Provided and Areas to be Served.**³¹ The Star One C5 satellite will offer C- and Ku-band FSS satellite services covered by the WTO Basic Telecommunications Agreement throughout the Americas, including substantial portions of the United States, from the 68° W.L. orbit location. At this time, Star One does not seek authority to provide DBS, DTH or DARS service, nor is it proposing to offer analog video transmission services in the United States. The link budgets included in the attached Schedule S provide additional information regarding the transmission characteristics for various proposed carriers, including typical earth station parameters, modulation parameters, overall link performance, etc.
- **Power Flux Density Levels.**³² *See* Attachment A and Schedule S.
- **Interference Analysis.**³³ *See* Annex 1 of Attachment A.
- **Orbital Debris Mitigation.**³⁴ *See* Attachment A.

²⁹ *See* 47 C.F.R. § 25.114(d)(1).

³⁰ *See id.* at § 25.114(d)(3).

³¹ *See id.* at § 25.114(d)(4).

³² *See id.* at § 25.114(d)(5).

³³ *See id.* at § 25.114(d)(7); *see also id.* at § 25.140.

³⁴ *See id.* at § 25.115(d)(14).

c. Waiver Requests

Star One hereby requests a few limited waivers of the rules with respect to certain technical characteristics of the Star One C5 satellite that are not consistent with requirements imposed by the Commission on U.S.-licensed satellites to facilitate two-degree spacing. The Commission has previously granted waivers of such provisions in authorizing foreign satellite access to the U.S. market where a waiver will not cause harmful interference to or require protection from adjacent satellite operations, and would not otherwise undermine the purposes of the rules. Star One requests waivers of two such provisions below and, consistent with the *DISCO II First Reconsideration Order* and past precedent, the Commission should grant these waivers and add Star One C5 to the Permitted Space Station List.

First, Star One is requesting a waiver of Section 25.210(a)(3), which requires that C-band transponders have the capability of switching polarization sense upon ground command to permit flexibility in assignment of U.S. orbital positions and to mitigate potential interference between adjacent satellites transmitting analog video signals.³⁵ At this time, Star One is not proposing to offer analog video transmission services in the United States, so a waiver of the polarity-switchability requirement would not undermine the purpose of the rule. Star One is prepared to undertake not to transmit analog video transmissions to, from or within the United States without further Commission authorization.

Second, Star One is requesting a waiver of Section 25.210(i), which requires satellite antennas to provide cross-polarization isolation of at least 30 dB throughout a satellite's primary coverage area.³⁶ The minimum cross-polarization isolation of the Star One C5 satellite's C- and

³⁵ See *id.* at § 25.210(a)(3); see *Brasilsat A2 Order* at ¶ 10.

³⁶ 47 C.F.R. § 25.210(i).

Ku-band antennas within the primary coverage area will not be lower than 27 dB. This minor discrepancy will not cause harmful interference to any adjacent satellites including U.S.-licensed satellites for a number of reasons: (i) the shortfall is relatively small (3 dB) so any potential impact on neighboring satellites will be negligible; (ii) the cross-polarization isolation performance will have a negligible impact on adjacent U.S. domestic satellites (adjacent satellite cross-polarization interference is dominated by the off-axis cross-polarization gain of the earth stations); and (iii) Star One will coordinate with potentially affected U.S. satellite operators will ensure that this minor cross-polarization isolation discrepancy will not adversely affect U.S.-licensed satellites. The cross-polarization requirement of Section 25.210(i) also serves to limit the level of intra-system interference. The Star One C5 satellite's cross-polarization isolation performance has been fully taken into account in the design of the link budgets for the services that the satellite will provide. The link budgets are sufficiently robust to compensate for the negligible degradation caused by the slightly reduced cross-polarization isolation performance. For all of these reasons, the Commission should waive the cross-polarization isolation requirement for the Star One C5 satellite.³⁷

Finally, the transmission of certain Star One C5 Ku-band carriers may have power levels in excess of the Commission's routine licensing rules. Star One affirms that it will permit the use of these higher power Ku-band carriers with U.S.-licensed earth stations only to the extent such transmissions have been coordinated with potentially affected satellite operators. Such

³⁷ The Commission has waived this requirement before in similar circumstances, and should do so again here. *See New Skies Satellites N.V. Petition for Declaratory Ruling*, Order, File Nos. SAT-PDR-20010309-00020, SAT-PDR-20011016-00137, DA -2-1256 (rel. May 28, 2002) at ¶ 19 (waiving cross-polarization isolation requirement for where exceedance was limited to a portion of the coverage area and isolation was 25-30 dB, with typical isolation better than 27 dB); *see also Star One C1 Order*; *Star One C1 Stamp Grant*; and *Star One C2 Stamp Grant*.

higher power transmissions with U.S. earth stations are authorized through the Commission's earth station licensing process and must be first accepted by adjacent satellite operators before they may be brought into use. Thus, use of any higher power Ku-band carriers on the Star One C5 satellite by a U.S. earth station will be subject to further Commission review, and adjacent operator acceptance, in the context of the relevant earth station licensing proceeding.

In sum, the Star One C5 satellite substantially complies with the Commission's technical requirements and, to the extent the satellite does not comply with certain operational provisions, the Commission should waive such requirements as it has in the past for similar requests to be placed on the Permitted Space Station List (including in the *Star One C1 Order*, the *Star One C1 Stamp Grant* and the *Star One C2 Stamp Grant*).

II. CONCLUSION

Granting Star One access to the U.S. market via placement of the Star One C5 satellite at 68° W.L. on the Permitted Space Station List would strongly serve the public interest. It would enhance competition by providing consumers more alternatives in choosing communications providers and services, thereby stimulating lower rates, improving service quality, increasing service options and fostering technological innovation. In addition, there are no national security, law enforcement, foreign policy or international trade concerns that arise in the context of the instant Petition for Declaratory Ruling; and the operations of the Star One C5 satellite will not adversely affect the operations of any U.S.-licensed satellite nor contravene the Commission's spectrum and frequency management policies.

In view of the positive public interest benefits and the absence of any harm, Star One respectfully requests that the Commission issue a declaratory ruling to add the Star One C5 satellite to the Permitted Space Stations List.

Respectfully submitted,

s/ Alfred M. Mamlet

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ATTACHMENT A
TECHNICAL APPENDIX

Star One C5

ATTACHMENT A

Technical Information to Supplement Schedule S

A.1 Scope

This Attachment contains additional information required by §25.114(c) and other sections of the FCC §25 rules that cannot be entered into the Schedule S submission.

A.2 General Description (§25.114(d)(1))

The Star One C5 satellite will operate at the 68° W.L. orbital location. The Star One C5 is a hybrid satellite which will provide a range of FSS services to various countries within Region 2 using the C- and Ku-band frequencies. The satellite will employ 28 C-band transponders and 48 Ku-band transponders using both linear polarizations thereby providing dual frequency re-use.

The C-band payload consists of 28 transponders. 27 transponders have a bandwidth of 36 MHz and one transponder has a bandwidth of 33 MHz. The satellite uses the conventional C-band (5925-6425 MHz / 3700-4200 MHz) and part of the extended C-band (5850-5925 MHz / 3325-3700 MHz). There is one C-band beam, using both linear polarizations, which provides hemispheric coverage.

The Ku-band payload consists of 48 transponders; each with a bandwidth of 36 MHz. 24 transponders use the conventional Ku-band (14.0-14.5 / 11.7-12.2 GHz) and 24 transponders use the extended Ku-band (13.75-14.0 GHz / 10.95-11.2 GHz and 11.45-11.7 GHz). The satellite has three Ku-band beams, all using both linear polarizations: a South American beam, a North

American beam and a Hemispheric beam. The beam connectivity of the conventional Ku-band is fixed, with the Hemispheric beam being used in both the uplink and downlink directions. Each extended Ku-band transponder can be switched between one of two downlink beams.

Although Star One is currently seeking Commission approval to be placed on the Permitted Space Station List for use of the conventional C- and Ku-band frequencies, the Schedule S form describes the technical characteristics of the entire satellite.

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

The Star One C5 antenna gain contours for all receive and transmit beams, as required by §25.114(d)(3), are given in GXT format and embedded in the associated Schedule S submission.

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

The Star One C5 satellite will provide a variety of FSS services ranging between narrowband to wideband digital services.

Typical emission designators and their allocated bandwidths are:

- 614KG7W (614 kHz)
- 1M64G7W (1.64 MHz)
- 5M50G7W (5.50 MHz)
- 17M9G7W (17.9 MHz)
- 36M0G7W (36 MHz)

Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission.

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 command system will control spacecraft operation through all phases of the mission by receiving and decoding commands to the spacecraft. Additionally, it will serve as the uplink receiver for ranging signals. The command subsystem features two command receivers each one set to receive one of the two Star One C5 command frequencies. Uplink commands are received at the C-band command receivers either via the dedicated on-station C-band antenna or through the omni-directional antenna. The receiving antennas are permanently connected to the command receivers. The receivers demodulate the uplink signal and recover the command data. All receivers are powered and accessible throughout mission life.

The telemetry system will comprise two telemetry beacons. Telemetry data from the spacecraft is collected by the bus and payload remote units or directly from the spacecraft units themselves. The Data Handling subsystem, collects the data, which is forwarded to the telemetry transmitters in a continuous stream. The telemetry transmitters will also serve as the downlink transmitter for ranging. The normal telemetry stream is phase-shifted-keyed onto a sub-carrier. For normal on-station operation, two telemetry transmitters will operate via the C-band communications antenna. During transfer orbit and emergency situations, the omni-directional antenna will be used to transmit the telemetry signals.

Two Ku-band downlink communications beacons will be continuously transmitted by the satellite and used by earth stations operators as a calibrated reference to compensate for rain attenuation and to adjust antenna pointing. These communication beacons will be transmitted via the Hemispheric beam, one for each polarization.

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

The predicted worst case receive and transmit channel filter response performance is given in Tables A.6-1 and A.6-1 for C-band and Ku-band, respectively. 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 A.6-1 - C-Band Typical Receiver and Transmitter Filter Responses

Frequency offset from channel center	Gain relative to channel center frequency (dB)		Comments
	Receive	Transmit	
CF±12 MHz	-0.6	-1.07	<u>In-Band</u> Value does not exceed these p-p values
CF±16 MHz	-0.8	-1.45	
CF±18 MHz	-1.2	-2.5	
CF±22 MHz	-13	-15	<u>Out-of-Band</u> Attenuation is not less than these values
CF±25 MHz	-30	-25	

Table A.6-2 - Ku-Band Typical Receiver and Transmitter Filter Responses

Frequency offset from channel center	Gain relative to channel center frequency (dB)		Comments
	Receive	Transmit	
CF±8 MHz	-0.5	-0.5	<u>In-Band</u> Value does not exceed these p-p values
CF±12 MHz	-0.7	-0.7	
CF±15 MHz	-1.0	-1.0	
CF±18 MHz	-1.8	-2.5	
CF±22 MHz	-19	-8	<u>Out-of-Band</u> Attenuation is not less than these values
CF±27 MHz	-30	-20	

**A.7 Cessation of Emissions
(§25.207)**

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

**A.8 Interference and PFD Analyses
(§25.140(b)(2) and (§25.114(c)(8))**

The interference and PFD analyses are contained in Annex 1 of this Attachment.

A.9 Orbital Debris Mitigation Plan
(§25.114(d)(14))

The spacecraft manufacturer for the Star One C5 satellite has not yet been selected and therefore Star One's Orbital Debris Mitigation Plan is necessarily forward looking. Star One will incorporate the material objectives of §25.114(d)(14) of the Commission's Rules into the design of the satellite through the satellite's Technical Specifications, Statement of Work and Test Plans. The Statement of Work will include provisions to review orbital debris mitigation as part of the preliminary design review ("PDR") and the critical design review ("CDR") and to incorporate its requirements, as appropriate, into its Test Plan, including a formal Failure Mode Verification Analysis ("FMVA") for orbital debris mitigation involving particularly the TT&C, propulsion and energy systems. During this process, some changes to the Orbital Debris Mitigation Plan may occur and Star One will provide the Commission with updated information, as appropriate.

A.9.1 Spacecraft Hardware Design

Although the Star One C5 satellite has not been fully designed, based on its experience, Star One does not expect that the satellite will undergo any release of debris during its operation. Furthermore, all separation and deployment mechanisms, and any other potential source of debris are expected to be retained by the spacecraft and launch vehicle.

In conjunction with the spacecraft manufacturer, Star One will assess and limit 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. Star One will take steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems. Star One will incorporate a rugged TT&C system with regard to meteoroids smaller than 1 cm through redundancy, shielding, and appropriate physical separation of components. The TT&C subsystem will have no single points of failure. The TT&C system will be equipped with two omni-directional antennas mounted on

opposite sides of the spacecraft. Each antenna will provide greater than hemispherical coverage for both command and telemetry and each is capable of accomplishing orbit raising independent of the other. The command receivers and decoders and telemetry encoders and transmitters will be totally redundant. While Star One's access to TT&C capability will be reduced in the event one of the omni-directional antennas is damaged by debris, the redundancy that will be built into the antenna system will ensure that Star One will be able to complete disposal of the satellite. Any failure of one TT&C component due to collision with debris or small meteoroids will not impact Star One's ability to control the Star One C5 satellite.

The propulsion subsystem will be designed such that it will not be separated from the spacecraft after de-orbit maneuvers. It will be protected from the effects of collisions with small debris through shielding. Moreover, propulsion subsystem components critical to disposal (e.g. propellant tanks) will be located deep inside the satellite, while other components, such as the thrusters, externally placed, are redundant to allow for de-orbit despite a collision with debris.

A.9.2 Minimizing Accidental Explosions

Star One and its spacecraft manufacturer will assess and limit the probability of accidental explosions during and after completion of mission operations. The satellite will be designed to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite. The propulsion subsystem pressure vessels will be designed with high safety margins. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant lines and pressurization lines. All pressures, including those of the batteries, will be monitored by telemetry. At end-of-life and once the satellite has been placed into its final disposal orbit, Star One will remove all stored energy from the spacecraft by depleting any residual fuel, leaving all fuel line valves open, venting the pressure vessels and the batteries will be left in a permanent state of discharge.

A.9.3 Safe Flight Profiles

In considering current and planned satellites that may have a station-keeping volume that overlaps the Star One C5 satellite, Star One 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 ± 0.2 degrees of 68° W.L. have also been reviewed. Only those networks that either operate, or are planned to operate, and have an overlapping station-keeping volume with the Star One C5 satellite, have been taken into account in the analysis.

Based on the review, there are no networks currently authorized or under consideration by the Commission to operate in the immediate vicinity of 68° W.L. slot.

With regard to ITU filings within ± 0.2 degrees of 68° W.L., the ITU has published requests for coordination for the following FSS networks:

- the UAE's EMARSAT-4I/M network;
- the USA's MILSTAR-8 network;
- the USA's USGAE-7 network;
- the USA's USGAE-7R network.

To the best of Star One's knowledge, there are no satellites currently operating at the 68° W.L. orbital location. With respect to the UAE network, Star One can find no evidence that it is being progressed. In addition, there are no public databases available to confirm whether or not U.S. Government satellites operate in the vicinity of 68° W.L. Star One will physically coordinate the operation of its Star One C5 satellite with other satellite networks at the 68° W.L. orbital location, as necessary and appropriate.

A.9.4 Post Mission Disposal Plan

At the end of the operational life of the Star One C5 satellite, Star One will maneuver the satellite to a disposal orbit with a minimum perigee of 320 km above the normal GSO operational orbit. This proposed disposal orbit altitude is based on the following calculation, as required in §25.283:

$$\begin{aligned}\text{Total Solar Pressure Area "A"} &= 126 \text{ m}^2 \\ \text{"M"} = \text{Dry Mass of Satellite} &= 2250 \text{ kg} \\ \text{"C}_R\text{"} = \text{Solar Pressure Radiation Coefficient} &= 1.5\end{aligned}$$

Therefore the Minimum Disposal Orbit Perigee Altitude:

$$\begin{aligned}&= 36,021 \text{ km} + 1000 \times C_R \times A/m \\ &= 36,021 \text{ km} + 1000 \times 1.5 \times 126/2250 \\ &= 36,105.0 \text{ km} \\ &= 318.8 \text{ km above GSO (35,786.2 km)}\end{aligned}$$

To provide margin, the nominal disposal orbit will be increased to 320 km. This will require 11 kg of propellant that will be reserved, taking account of all fuel measurement uncertainties, to perform the final orbit raising maneuvers.

A.10 Spacecraft Characteristics and Estimated Operational Lifetime and Reliability

The spacecraft manufacturer for the Star One C5 satellite has not yet been selected. Star One will provide the Commission with the precise spacecraft physical and electrical characteristics when the final supplier has been selected and the satellite fully designed. Estimates of these characteristics are included in the Schedule S form.

The spacecraft reliability will be consistent with current manufacturing standards in place for the major suppliers of space hardware. Bus reliability will be greater than 0.8 with overall spacecraft reliability to EOL of greater than 0.7. TWTA and receiver sparing will be consistent

with documented failure rates which allow attaining the overall spacecraft reliability numbers stated above.

**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
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ANNEX 1

INTERFERENCE AND PFD ANALYSES

1.0 Interference Analyses

1.1 C-Band

Currently there are no operational C-band satellites two degrees away from the 68° W.L. location. The Star One C2 satellite is scheduled to be launched to the 70° W.L. location in the second quarter of 2008. The satellite does not have the capability of providing C-band service to the U.S. and accordingly the Star One C2 satellite has not been placed on the Commission's Permitted Space Station List ("PSSL") for the transmission of C-band services to, from or within the U.S.

In order to demonstrate two-degree compatibility, the transmission parameters of the Star One C5 satellite have been assumed as both the wanted and victim transmissions. It should be noted that these parameters are very similar to those that will be used with the Star One C2 satellite (for service to South America) and therefore the conclusions reached herein can also be extended with respect to the compatibility between the Star One C5 and Star One C2 satellites.

Table 1 provides a summary of the C-band transmission parameters derived from the Star One C5 link budgets that are embedded in the Schedule S form and which were used in the interference analysis. The interference calculations assumed a 1 dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of $29-25 \log(\theta)$. The C/I calculations were performed on a per Hz basis.

Table 2 shows the results of the C-band interference calculations in terms of the overall C/I margins. The table is provided in a format similar to that of the output of the Sharp Adjacent Satellite Interference Analysis program. It can be seen that all C/I margins are positive.

Table 1. Star One C5 Typical C-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	47.5	51.7	18.4	42.0	17.9
2	1M64G7W	1.64	51.3	56.8	23.2	43.7	20.7
3	5M50G7W	5.5	47.5	62.0	28.6	47.5	21.6
4	17M9G7W	17.9	53.5	67.5	33.5	49.7	24.6
5	36M0G7W	36.0	53.5	75.1	38.0	43.7	20.0

Table 2. Summary of the overall link C/I margins (dB).

		Interfering Carriers					
		Carrier ID	1	2	3	4	5
Wanted Carriers	1	1	2.5	2.6	1.8	2.8	1.1
	2	2	1.6	1.8	0.9	2.1	0.3
	3	3	3.2	4.0	2.4	4.6	2.3
	4	4	1.3	2.5	0.5	3.1	0.5
	5	5	4.4	4.2	3.7	4.4	2.8

1.2 Ku-Band

Currently there are no operational Ku-band satellites two degrees away from the 68° W.L. location. The Star One C2 satellite is scheduled to be launched to the 70° W.L. location in the second quarter of 2008. The satellite is authorized by the Commission to provide Ku-band services to the U.S. and it has been placed on the Commission's PSSL.

Tables 3 and 4 provide summaries of the Ku-band transmission parameters for the Star One C2 and Star One C5 satellites, respectively. The Star One C2 parameters are those previously provided to the Commission¹ and the Star One C5 parameters were derived from the link budgets that are embedded in the associated Schedule S form. The interference calculations assumed a 1

¹ See SAT-MOD-20051014-00200.

dB advantage for topocentric-to-geocentric conversion, all wanted and interfering carriers are co-polarized and all earth station antennas conform to a sidelobe pattern of $29-25 \log(\theta)$. The C/I calculations were performed on a per Hz basis.

Tables 5 and 6 show the results of the Ku-band interference calculations: Table 5 shows the overall C/I margins with the Star One C5 satellite interfering into the Star One C2 and Table 6 shows the C/I margins with the Star One C2 satellite interfering into the Star One C5 satellite. All C/I margins are positive in both tables.

Table 3. Star One C2 Typical Ku-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	46.6	60.0	26.5	53.2	17.9
2	614KG7W	0.614	54.5	63.5	30.0	45.2	17.9
3	1M64G7W	1.64	49.1	66.0	32.5	55.7	20.7
4	1M64G7W	1.64	57.0	68.0	35.0	47.7	20.7
5	5M50G7W	5.5	57.0	70.0	37.0	55.7	21.6
6	17M9G7W	17.9	59.0	74.5	41.0	57.6	24.6
7	36M0G7W	36.0	59.0	81.0	50.0	45.2	20.0

Table 4. Star One C5 Typical Ku-band Transmission Parameters

Carrier ID	Emission Designator	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	C/I Criterion (dB)
1	614KG7W	0.614	54.7	55.7	29.0	45.2	17.9
2	1M64G7W	1.64	53.0	60.1	33.2	49.6	20.7
3	5M50G7W	5.5	59.1	65.7	39.0	57.6	21.6
4	17M9G7W	17.9	57.2	74.6	43.5	57.6	24.6
5	36M0G7W	36.0	60.7	79.0	48.0	47.7	20.0

Table 5. Summary of the overall link C/I margins (dB). Star One C5 interfering into Star One C2.

		Interfering Carriers					
		Carrier ID	1	2	3	4	5
Wanted Carriers	1	11.7	11.5	11.6	11.6	10.6	
	2	7.7	7.8	7.3	7.8	6.5	
	3	12.8	12.4	12.9	12.4	11.8	
	4	8.1	8.0	7.7	8.1	6.8	
	5	11.0	10.5	11.2	10.6	10.0	
	6	8.4	7.8	8.8	7.9	7.5	
	7	7.9	7.9	7.5	7.9	6.6	

Table 6. Summary of the overall link C/I margins (dB). Star One C2 interfering into Star One C5.

		Interfering Carriers							
		Carrier ID	1	2	3	4	5	6	7
Wanted Carriers	1	2.9	4.0	2.9	4.1	7.3	8.7	3.1	
	2	0.9	3.5	1.3	4.3	7.6	9.3	4.0	
	3	0.7	4.8	1.4	6.6	9.9	12.2	8.0	
	4	1.3	4.9	1.9	6.3	9.5	11.5	6.8	
	5	5.9	6.2	5.7	6.1	9.4	10.7	5.0	

2.0 C-Band PFD Analyses

Star One will operate the Star One C5 satellite such that all C-band downlink transmissions will comply with the PFD limits of §25.208. In order to demonstrate compliance with the PFD limits, the carrier with the highest EIRP density is used. Based on the C-band link budgets, the highest downlink EIRP density is 1.4 dBW/4 kHz, which occurs when the transponder is operated at saturation with the 36 MHz carrier.

Table 7 shows the worst-case PFD levels that will occur at various angles of arrival and demonstrates compliance with §25.208.

Table 7. Maximum PFD Levels of the C-Band Beam.

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-152.0	-163.4	-3.0	-165.0	13.0
5°	-152.0	-163.3	-2.9	-164.8	12.8
10°	-149.5	-163.2	-2.7	-164.4	14.9
15°	-147.0	-163.0	-2.4	-164.0	17.0
20°	-144.5	-162.9	-2.1	-163.6	19.1
25°	-142.0	-162.8	-1.9	-163.3	21.3
66° (Peak)	-142.0	-162.2	0	-160.8	18.8

3.0 Extended Ku-Band PFD Analyses

Star One will operate the Star One C5 satellite such that all extended Ku-band downlink transmissions will comply with the PFD limits of §25.208. In order to demonstrate compliance with the PFD limits, the carriers with the highest EIRP density is used for each of the three Ku-band beams. For all beams, these correspond to saturated operation across the entire transponder bandwidth. The worst-case downlink EIRP densities are 13.5 dBW/4 kHz for the North American and South American beams and 11.5 dBW/4 kHz for the Hemispheric beam.

Tables 8, 9 and 10 show the worst-case PFD levels that will occur at various angles of arrival for each of the Ku-band beams and demonstrate compliance with §25.208 in all cases.

Table 8. Maximum PFD Levels of the North American Beams (NADH and NADV).

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-150.0	-163.4	-1.1	-151.0	1.0
5°	-150.0	-163.3	-1.1	-150.9	0.9
10°	-147.5	-163.2	-1.1	-150.8	3.3
15°	-145.0	-163.0	-1.1	-150.7	5.7
20°	-142.5	-162.9	-1.1	-150.6	8.1
25°	-140.0	-162.8	-1.0	-150.4	10.4
44° (Peak)	-140.0	-162.5	0.0	-149.0	9.0

Table 9. Maximum PFD Levels of the South American Beams (SADH and SADV).

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-150.0	-163.4	-20.0	-169.9	19.9
5°	-150.0	-163.3	-20.0	-169.8	19.8
10°	-147.5	-163.2	-20.0	-169.7	22.2
15°	-145.0	-163.0	-20.0	-169.6	24.6
20°	-142.5	-162.9	-19.0	-168.5	26.0
25°	-140.0	-162.8	-14.2	-163.6	23.6
79° (Peak)	-140.0	-162.1	0.0	-148.6	8.6

Table 10. Maximum PFD Levels of the Hemispheric Beams (R2KDH and R2KDV).

Angle of Arrival	Applicable PFD Limit for Angle of Arrival (dBW/m ² /4 kHz)	Spreading Loss (dBW/m ²)	Gain Contour (dB)	Worst Case PFD Level at Angle of Arrival (dBW/m ² /4 kHz)	PFD Margin (dB)
0°	-150.0	-163.4	9.0	-160.9	10.9
5°	-150.0	-163.3	8.5	-160.3	10.3
10°	-147.5	-163.2	8.0	-159.7	12.2
15°	-145.0	-163.0	5.0	-156.6	11.6
20°	-142.5	-162.9	3.7	-155.2	12.7
25°	-140.0	-162.8	3.2	-154.6	14.6
40° (Peak)	-140.0	-162.5	0.0	-151.1	11.1

ATTACHMENT B
ANATEL TERM OF RIGHT

ERROR: ioerror
OFFENDING COMMAND: image

STACK:

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