

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Space Imaging, LLC)	
)	
Petition for Clarification of)	
Amendment of the Commission's Space)	IB Docket No. 02-34
Station Licensing Rules and Policies)	
)	
Application for authority to modify its)	File No. SES-MOD-20040607-00809
Norman, OK earth station license to add)	File No. SES-AMD-20040728-01073
the Indian remote-sensing satellite,)	File No. SES-AMD-20040728-01075
ResourceSat-1, as a point of communication)	Call Sign E960463
)	

**DECLARATORY ORDER AND
ORDER AND AUTHORIZATION**

Adopted: July 6, 2005

Released: July 6, 2005

By the Chief, International Bureau:

I. INTRODUCTION

1. In this Order, we authorize Space Imaging, LLC (Space Imaging) to modify its Norman, Oklahoma Earth station license to add ResourceSat-1, a nongeostationary satellite orbit (NGSO) satellite in the Earth Exploration Satellite Service (EESS),¹ licensed by the Republic of India, as a new point of communication. Specifically, we authorize Space Imaging's Norman, Oklahoma Earth station to receive remotely-sensed data and imagery² from ResourceSat-1 in the 8072.5-8177.5 MHz and 8247.5-8352.5 MHz frequency bands (X-band). Grant of this application will allow Space Imaging to provide enhanced imagery and data services, thereby promoting competition for remote-sensing services in the United States.

¹ Remote-sensing systems are intended to operate in the EESS allocation. EESS is defined as "[a] radiocommunication service between earth stations and one or more space stations, which may include links between space stations in which: (1) information relating to the characteristics of the Earth and its natural phenomena is obtained from active or passive sensors on earth satellites; (2) similar information is collected from air-borne or earth-based platforms; (3) such information may be distributed to earth stations within the system concerned; and (4) platform interrogation may be included." 47 C.F.R. § 2.106.

² "Land Remote Sensing" is "the collection of data which can be processed into imagery of surface features of the Earth from an unclassified satellite or satellites, other than an operational United States Government weather satellite." Land Remote Sensing Policy Act of 1992, Pub. L. No. 102-555, § 3(5). 106 Stat. 4164, 4165 (1992), 15 U.S.C. § 5602 (5). The term "remote sensing space system" is defined by the U.S. Department of Commerce as "any instrument or device or combination thereof and any related ground based facilities capable of sensing the Earth's surface from space by making use of the properties of the electromagnetic waves emitted, reflected, or diffracted by the sensed objects." 15 C.F.R. § 960.3.

2. In addition, we deny a petition for clarification of the *First Space Station Reform Order*³ filed by Space Imaging, in that we disagree with Space Imaging's argument that the Commission's definition of "NGSO-like" does not apply to EESS. Based on the reasoning in Space Imaging's petition for clarification, however, we waive the modified processing round procedure for considering NGSO-like applications, Sections 25.156 and 25.157 of the Commission's Rules,⁴ and consider Space Imaging's application pursuant to the first-come, first-served procedure adopted in the *First Space Station Licensing Reform Order*.⁵ By this action, we further the goals of the *First Space Station Reform Order* to develop faster satellite licensing procedures, thereby expediting service to the public.

II. BACKGROUND

A. Petition for Clarification

3. In its *First Space Station Licensing Reform Order*, the Commission adopted new licensing procedures for satellite systems. Specifically, the Commission determined that different procedures are best suited for different kinds of systems. In particular, the Commission observed that NGSO systems generally cannot operate on the same spectrum without causing unacceptable interference to each other. To facilitate the potential for competitive market entry,⁶ the Commission adopted a modified processing round procedure for NGSO-like applications.⁷ Under this procedure, when an NGSO-like application is filed, the Commission announces a cut-off date for competing applications and then splits the available spectrum among all the qualified applicants.⁸

4. Conversely, the Commission explained that GSO satellite systems, which operate pursuant to two-degree spacing requirements, can generally operate in the same frequency bands and are thus generally authorized to operate throughout a particular frequency band.⁹ Therefore, for GSO-like applications,¹⁰ the Commission adopted a first-come, first-served procedure in

³ Amendment of the Commission's Space Station Licensing Rules and Policies, *First Report and Order*, IB Docket No. 02-34, 18 FCC Rcd 10760 (2003) (*First Space Station Reform Order*).

⁴ 47 C.F.R. §§ 25.156, 25.157.

⁵ Amendment of the Commission's Space Station Licensing Rules and Policies, *First Report and Order*, IB Docket No. 02-34, 18 FCC Rcd 10760 (2003) (*First Space Station Licensing Reform Order*).

⁶ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10773 (para. 21).

⁷ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10773 (paras. 21-22). NGSO-like satellite systems are those in which the earth station has little or no directivity towards a satellite, so that the earth station must track the satellite in all directions, such as hand-held satellite telephones. NGSO systems generally cannot operate on the same spectrum without causing unacceptable interference to each other. *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10773 (para. 21). However, as discussed further below, Space Imaging's EESS system is an exception in that assigning spectrum to one EESS operator does not necessarily preclude other EESS operators for using that frequency band.

⁸ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10777 (para. 32).

⁹ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10773-74 (para. 22).

¹⁰ GSO-like satellite systems use earth stations with antennas with directivity towards the satellites, such as FSS, and MSS feeder links which use GSO satellites. GSO satellites can operate on the same spectrum at two-degree orbit spacings. *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10773 (para. 21).

which it considers applications in the order they are filed. The Commission grants each application if the applicant is qualified, and the proposed operations do not conflict with any previously licensed satellite or any previously filed application.¹¹ The Commission also concluded that the first-come, first-served procedure allows it to issue licenses more quickly than the modified processing round procedure, adopted for NGSO-like satellite systems.¹² The Commission further determined that it is in the public interest to adopt a first-come, first-served procedure for as many types of satellite applications as possible, except in circumstances where licensing the first applicant to operate in a certain frequency band would prevent other applicants from using that spectrum.¹³

5. On September 12, 2003, Space Imaging filed a petition for clarification of the *First Space Station Licensing Reform Order* to request further explanation of the new licensing procedures with respect to EESS applications.¹⁴ Specifically, Space Imaging argues that NGSO-like EESS satellite systems are different from most NGSO-like systems, and that NGSO-like EESS systems are best suited for the first-come, first-served procedure. For the reasons set forth below, we deny Space Imaging's petition, but grant Space Imaging a waiver of the Commission's rules.

B. License Modification

6. The Commission initially authorized Space Imaging to construct, launch, and operate a commercial remote sensing satellite system comprised of two NGSO satellites on August 23, 1995.¹⁵ In 1996, the International Bureau (Bureau) authorized Space Imaging to operate an 11-meter antenna in Norman, Oklahoma, to communicate with NGSO remote-sensing satellites IRS-1B and IRS-1C (both licensed by the Republic of India) and ERS-1 and 2 (both licensed by France).¹⁶ In 1998, the Bureau authorized Space Imaging to add another Indian-licensed NGSO satellite, IRS-1D, as a new point of communication.¹⁷

7. In June 2004, Space Imaging filed an application to modify its Norman, Oklahoma Earth station license to add ResourceSat-1 as a new point of communication.¹⁸ ResourceSat-1 is a remote-sensing satellite owned and operated by the Indian Space Research

¹¹ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10805 (paras. 108-10).

¹² *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10793 (para. 74).

¹³ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10793 (para. 74).

¹⁴ On October 9, 2003, the Commission invited comment on the Space Imaging Petition together with petitions for reconsideration of the *First Space Station Licensing Reform Order*. Later, on October 17, 2003, the Commission sought additional comment on the Space Imaging Petition. These comments were due on November 1 and November 6, 2003. No comments were filed in response to either public notice.

¹⁵ See Space Imaging, L.P., *Order and Authorization*, 10 FCC Rcd 10911 (1995). These two satellites were referred to as IKONOS-1 and IKONOS-2.

¹⁶ See *Space Imaging/EOSAT, LLC* application, File No. SES-LIC-19960703-00903.

¹⁷ See *Space Imaging L.P. Modification*, File No. SES-MOD-19980217-00201.

¹⁸ See *Space Imaging, LLC Application* File No. SES-MOD-20040607-00809. Space Imaging later amended its Application to provide additional casualty risk assessment information relating to atmospheric re-entry of the ResourceSat-1 satellite. See Amendment, File Nos. SES-AMD-20040728-01073 and SES-AMD-20040728-01075.

Organization (ISRO), a governmental entity of the Republic of India.¹⁹ In its application, Space Imaging states that ResourceSat-1 is a “follow-on” satellite to the IRS-1C systems and operates under the International Telecommunication Union (ITU) IRS-1C Notification.²⁰ Space Imaging seeks authorization to operate its Norman, Oklahoma earth station to receive remotely-sensed data and imagery with an emission of 105MG7D from ResourceSat-1 in the 8072.5-8177.5 MHz and 8247.5-8352.5 MHz frequency bands. Finally, Space Imaging repeats its request that we consider EESS applications on a first-come, first-served basis rather than in a modified processing round.²¹ We placed Space Imaging’s modification application and its associated amendments on public notice.²² No comments were received.²³

III. DISCUSSION

A. Processing Procedure

1. Waiver of Processing Rules

8. Although ResourceSat-1 is an NGSO satellite, Space Imaging requests that we process its application pursuant to the first-come, first served procedure adopted for GSO-like satellite systems.²⁴ In support of its request, Space Imaging argues that NGSO EESS licensees, unlike most other NGSO-like systems, use earth stations with large antennas generating narrow beams that can track the target satellite without causing co-frequency interference to any other NGSO EESS satellite.²⁵ Because multiple EESS systems can operate on the same frequencies, Space Imaging asserts they are better suited to the first-come, first-served procedure than a modified processing round.²⁶ Space Imaging also notes that the Commission has traditionally processed EESS licenses outside of processing rounds precisely because these systems are capable of sharing spectrum.²⁷

9. The Commission’s rules may be waived when good cause is demonstrated.²⁸ The Commission may exercise its discretion to waive a rule where the particular facts make strict

¹⁹ *Id.*

²⁰ See *ITU International Frequency Information Circular (IFIC) 2440 dated 20-03-2001, AR11/A.893 and IFIC 2446 dated 12-06-2001, AR11/A.893 MOD-1.*

²¹ Space Imaging Application at 8-9.

²² See Public Notice Report No. SES 00634 (August 25, 2004).

²³ On December 8, 2004, the Commission granted Space Imaging 60-days special temporary authority (STA) to receive remotely-sensed data on its Norman, Oklahoma earth station from the Indian-licensed ResourceSat-1 on a non-harmful interference basis. See File No. SES-STA-20041206-01789. The Bureau granted has Space Imaging extensions of this STA on several occasions. See, e.g., File No. SES-STA-20050207-00151.

²⁴ See Space Imaging Application at 8-9, *citing* Space Imaging Petition for Clarification.

²⁵ Space Imaging Petition for Clarification at 6-7.

²⁶ Space Imaging Petition for Clarification at 6-7.

²⁷ Space Imaging Petition for Clarification at 5-6.

²⁸ 47 C.F.R. § 1.3; see also *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972) (*WAIT Radio*).

compliance inconsistent with the public interest.²⁹ In doing so, the Commission may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.³⁰ Waiver of the Commission's rules is therefore appropriate only if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest.³¹

10. Space Imaging has demonstrated special circumstances warranting a waiver of the modified processing round rule. As noted above, the purpose of the modified processing round rule is to preserve opportunities for competitive market entry in frequency bands where licensing the first applicant to operate throughout the band would prevent subsequent applicants from using the spectrum. These circumstances do not apply here. Authorizing Space Imaging to operate in the 8072.5-8177.5 MHz and 8247.5-8352.5 MHz frequency bands will not preclude other NGSO operators from operating in those bands because NGSO EESS operators are generally capable of sharing spectrum in the same frequency band. This is due, in part, to the unique operating features of NGSO remote-sensing systems. Space Imaging asserts that spectrum sharing between NGSO remote sensing systems is possible for the following reasons.³² First, the downlink transmissions of NGSO remote-sensing satellite systems are received by relatively large earth stations, for example, Space Imaging's 11-meter Oklahoma earth station, which have narrow main beams and therefore provide angular discrimination for almost all of the time towards any other co-frequency NGSO satellite that might be visible in the sky. Second, the EESS satellite only transmits when the receive Earth station is in sight. This ensures an extremely low probability of an interference event occurring.

11. In addition, the fact that there are currently very few U.S. licensed EESS NGSO systems operating in the band further reduces the possibility of interference with other operators in the X-band.³³ Given these circumstances, we conclude that Space Imaging's application warrants GSO-like treatment, in that a grant of this application will neither preclude future systems from using the spectrum assigned to Space Imaging, nor cause harmful interference to other operators in the band.³⁴ Therefore, we waive on our own motion Sections 25.156 and 25.157 of the Commission's rules³⁵ and consider Space Imaging's application under the first-come, first-served licensing procedure.

²⁹ *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (*Northeast Cellular*).

³⁰ *WAIT Radio*, 418 F.2d at 1159; *Northeast Cellular*, 897 F.2d at 1166.

³¹ *Id.* at 1159.

³² Space Imaging Petition for Clarification at 7.

³³ In addition to Space Imaging, there are two other U.S. commercial NGSO remote-sensing systems currently operating in the EESS band.

³⁴ We note that Space Imaging has been communicating with ResourceSat-1 pursuant to STA granted on Dec. 9, 2004 and has not received any interference complaints that the Commission is aware of. File No. SES-STA-20041206-01789 (granted on Dec. 8, 2004) and File No. SES-STA-200502-07-00151 (granted on February 10, 2005).

³⁵ 47 C.F.R. §§ 25.156, 25.157.

2. Petition for Clarification

12. In its petition for clarification, Space Imaging argues that we should interpret the Commission's satellite processing rules as classifying EESS as a service subject to the first-come, first-served procedures, because licensing an EESS system to operate in a particular frequency band does not preclude other EESS operators from using that frequency band.³⁶ The language in Section 25.157(a) defining "NGSO-like" clearly applies to EESS.³⁷ Specifically, Section 25.157(a) states that "NGSO-like" satellite systems are comprised of all NGSO satellite systems, and all GSO MSS satellite systems.³⁸ Thus, while we agree with Space Imaging's reasoning, and find that it provides a good basis for a waiver as discussed above, the language of the Commission's rules does not permit the adoption of Space Imaging's recommended interpretation.

13. Nevertheless, we will consider requests for waivers of the modified processing round rules from other EESS applicants and other NGSO-like applicants. As with any waiver request, such applicants must show good cause for a waiver. In particular, we would expect NGSO-like applicants requesting waivers of Sections 25.156 and 25.157 to show, as did Space Imaging, that modified processing rounds are not necessary to preclude an applicant from unreasonably restricting further entry in that frequency band.

B. DISCO II Framework

14. In the *DISCO II Order*,⁴⁰ the Commission established a framework under which it would consider requests for non-U.S. licensed satellite to serve the United States. To implement this framework, the Commission, among other things, established a procedure by which a service provider in the United States could request immediate access to a foreign in-orbit satellite that would serve the United States market.⁴¹ This procedure requires a U.S. earth station operator seeking to communicate with a non-U.S. satellite to file an earth station application for an initial license or for a modification of its existing earth station license, listing the foreign satellite as a point of communication.⁴² It also requires the earth station applicant to provide the same information about the foreign satellite as applicants must file when seeking a license for a U.S. satellite.

15. In the *DISCO II Order*, the Commission set forth the public interest analysis

³⁶ Space Imaging Petition for Clarification at 5-11.

³⁷ 47 C.F.R. § 25.157(a).

³⁸ 47 C.F.R. §§ 25.157(a)(1) and (2).

⁴⁰ 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, *Report and Order*, IB Docket No. 96-111, 12 FCC Rcd 24094 (1997) ("*DISCO II*" or "*DISCO II Order*").

⁴¹ *DISCO II*, 12 FCC Rcd at 24174 (para. 186).

⁴² When an earth station has been granted authority to communicate with a specific satellite or group of satellites, those satellites are referred to in the earth station license as "points of communication."

applicable in evaluating applications to use non-U.S. licensed space stations to provide satellite service in the United States. This analysis considers the effect on competition in the United States,⁴³ eligibility and operating (*e.g.*, technical) requirements,⁴⁴ spectrum availability,⁴⁵ and national security, law enforcement, foreign policy, and trade concerns.⁴⁶ We evaluate Space Imaging's application under this framework.

1. Competition Concerns

16. In *DISCO II*, the Commission established a rebuttable presumption in favor of entry by non-U.S. satellites licensed by WTO Members to provide satellite services covered by the U.S. commitments under the WTO Basic Telecom Agreement.⁴⁷ This means that we will presume that WTO-member licensed satellites providing WTO-covered services satisfy the competition component of the public interest analysis. The Commission concluded that the market access commitments made under the WTO Basic Telecom Agreement will help ensure the presence and advancement of competition in the satellite services market and yield the benefits of a competitive marketplace to consumers in the United States and other countries.

17. In this case, we conclude that the rebuttable presumption in favor of entry applies to ResourceSat-1, which is licensed by the Republic of India, a WTO member, and which will be used to provide satellite services covered by the WTO Basic Agreement to customers in the United States. Because the presumption that entry is pro-competitive applies here and because no entity filed comments rebutting this presumption, we need not further consider the MOU.⁴⁸ Therefore, we conclude that authorizing Space Imaging to communicate with ResourceSat-1 for the purpose of offering remote-sensing satellite services will enhance competition for these services in the United States market.

2. Spectrum Availability

18. In *DISCO II*, the Commission determined that, given the scarcity of orbit and spectrum resources, it would consider spectrum availability as a factor in determining whether to allow a foreign satellite to serve the United States.⁴⁹ This is consistent with the Chairman's Note to the WTO Basic Telecom Agreement, which states that WTO Members may exercise their

⁴³ *DISCO II*, 12 FCC Rcd at 24107-56 (paras. 30-145).

⁴⁴ *DISCO II*, 12 FCC Rcd at 24159-69 (paras. 151-74).

⁴⁵ *DISCO II*, 12 FCC Rcd at 24157-59 (paras. 146-50).

⁴⁶ *DISCO II*, 12 FCC Rcd at 24169-72 (paras. 175-82).

⁴⁷ *DISCO II*, 12 FCC Rcd at 24112 (para. 39).

⁴⁸ In further support of its application, Space Imaging cites a Memorandum of Understanding (MOU) between the Department of Space and the Department of Science and Technology of the Government of the Republic of India and the National Aeronautics and Space Administration (NASA) and the United States Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) for scientific cooperation in the areas of earth and atmospheric sciences (the "MOU"). According to Space Imaging, the MOU demonstrates ongoing cooperation between the United States and India in the exchange of remote sensing data and imagery.

⁴⁹ *DISCO II*, 12 FCC Rcd at 24158-59 (paras. 149-50).

domestic spectrum/frequency management policies when considering foreign entry.⁵⁰ Thus, in *DISCO II*, we stated that when grant of access would create interference with U.S.-licensed systems, we may impose technical constraints on the foreign system's operations in the United States or, when conditions cannot remedy the interference, deny access.

19. In its application, Space Imaging states that ResourceSat-1 is an NGSO EESS satellite that will downlink remotely sensed data in the 8025-8400 frequency band to Space Imaging's Earth station located in Norman, Oklahoma. Space Imaging states that ResourceSat-1 is a follow-on to the IRS-1C satellite and operates under the ITU IRS-1C Notification for that satellite system.⁵¹ Space Imaging also states that there are several U.S.-licensed NGSO EESS space stations currently operating downlinks in the 8025-8400 band.

20. We conclude that authorizing Space Imaging to add ResourceSat-1 as a new point of communication to its Norman, Oklahoma earth station will not have an adverse effect on the operations of any U.S.-licensed satellites nor contravene the Commission's spectrum/frequency management policies. We agree with Space Imaging that, even though there is no formal ITU coordination for commercial EESS operators operating in the X-band, service providers can readily address any potential interference problems through private coordination efforts, as described below, due to the unique operating characteristics of these systems.⁵² In this regard, we note that the Commission has routinely licensed EESS systems to operate concurrently in the X-band with the expectation that licensees will coordinate in good faith with other operators.⁵³ Because the X-band is shared with the U.S. government, however, we have coordinated Space Imaging's application with National Telecommunications and Information Administration (NTIA). NTIA has concurred with Space Imaging's proposed frequencies and operations.

3. Legal and Financial Requirements

21. The Commission's rules require that non-U.S. licensed space station operators meet the same legal qualifications as U.S.-licensed space station operators.⁵⁴ In its application, Space Imaging states that ISRO, a governmental entity of the Republic of India, is the operator of the ResourceSat-1. Space Imaging also states that the Commission has previously authorized Space Imaging earth stations to receive data from satellites operated by ISRO.⁵⁵ Nothing in the record raises concerns regarding ISRO's legal qualifications to provide satellite services in the United States.

⁵⁰ See Chairman of the World Trade Organization Group on Basic Telecommunications, Chairman's Note, Market Access Limitations on Spectrum Availability, 36 I.L.M. at 372 (Chairman's Note to the WTO Basic Telecom Agreement).

⁵¹ See *ITU International Frequency Information Circular (IFIC) 2440 dated 20-03-2001, AR11/A.893 and IFIC 2446 dated 12-06-2001, AR11/A.893 MOD-1.*

⁵² See Section III.B.4.b. below (describing commercial EESS operations and sharing with other operators in the X-band).

⁵³ See *Astrovision International, Inc., Authorization and Order*, 15 FCC Rcd 22299, 22303-04 (paras. 8-10) (2000). *Orbital Imaging Corporation, Authorization and Order*, 14 FCC Rcd 2997, 3000-01 (paras. 7-10) (Int'l Bur., 1999).

⁵⁴ *DISCO II*, 12 FCC Rcd at 24161-63 (paras. 154-59). See also 47 C.F.R. § 25.137.

⁵⁵ See *Space Imaging/EOSAT, LLC Application*, File No. SES-LIC-19960703-00903 and *Space Imaging L.P. Modification*, File No. SES-MOD-19980217-00201.

22. In the *First Space Station Licensing Reform Order*, the Commission eliminated the financial requirements then in-place and replaced them with a requirement to execute a performance bond thirty days after license grant.⁵⁶ This requirement is intended to ensure that licensees are financially able and committed to implementing their systems in a timely manner. Non-U.S. licensed satellite operators are not required to post a bond if they are requesting U.S. market access with an in-orbit satellite because in those cases a bond requirement would be superfluous. ResourceSat-1, which was launched in October 2003, is currently in orbit and operational. Therefore, ISRO is not required to post a bond in this instance.

4. Technical Requirements

a. Default Service Rules

23. In the *First Space Station Licensing Reform Order*, the Commission determined that it would consider applications for satellite licenses after a domestic frequency allocation had been adopted, but prior to adopting frequency-band-specific service rules for that allocation. As part of this policy, the Commission established a set of “default service rules,” which apply to license applications to operate in frequency bands in which the Commission has yet to adopt service-specific rules. In adopting the default rules, the Commission stated that where the default rules are not appropriate in a particular case, they would be superceded by subsequently adopted service rules.⁵⁷

24. The Commission has not adopted band-specific service rules in Part 25 for EESS NGSO operations in the X-band. Nevertheless, according to Space Imaging, the Commission has licensed both GSO and NGSO EESS satellite systems without the need for adopting specific service rules or sharing criteria, and argues that it would be unnecessary to impose the default service rules on EESS.⁵⁸ Space Imaging further asserts that the majority of the default service rules referred to in Section 25.217 of the Commission’s rules, by their own terms, do not apply to an in-orbit EESS system.⁵⁹ Specifically, Space Imaging maintains that Sections 25.142(d), 25.143(b)(2)(ii), 25.143(b)(2)(iii), 25.204(g), and 25.210(c) of the default service rules are inapplicable.⁶⁰ Space Imaging also maintains that Sections 25.210(d), 25.210(f), 25.210(i) and 25.210(k) of the Commission’s rules are inapplicable, but requests that, to the extent the Commission believes otherwise, the Commission grant Space Imaging a waiver of these rules.⁶¹

25. We agree with Space Imaging that it is not necessary to apply the default service

⁵⁶ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10874-75 (paras. 308-309). *See also Fifth Space Station Reform Order*, 19 FCC Rcd at 12661 (para. 64) (clarifying that when U.S. earth station operators seek access to an in-orbit and operational non-U.S. licensed satellite, the non-U.S. satellite operator will not be required to post a bond.)

⁵⁷ *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10786 (para. 55).

⁵⁸ Space Imaging Petition for Clarification at 11-12.

⁵⁹ Space Imaging Application, Technical Appendix at 6. With its application, Space Imaging submitted a detailed analysis of the default service rules with its application, which explains the applicability of each default service rule to its proposed operations with ResourceSat-1. *See* Space Imaging Application, Technical Appendix, Table 6-1.

⁶⁰ *Id.*

⁶¹ *See* Space Imaging Application, Technical Appendix.

rules in Section 25.217 to the EESS. This is because, although there are no service rules in Part 25 specifically applicable to the X-band, EESS operators must comply with technical requirements in Part 2 of the Commission's rules⁶² and with the International Telecommunication Union (ITU) Radio Regulations. We note that EESS systems currently operate, and have been operating for years, under the general rubric of Part 2 of the Commission's rules and the ITU Radio Regulations without causing harmful interference. Because these requirements have been sufficient in the past to prevent harmful interference in this band there is no need to impose additional technical requirements to X-band operations at this time.⁶³ Accordingly, we grant Space Imaging a waiver of Section 25.217 of the Commission's rules.

b. 8025-8400 MHz Band Operations

26. Space Imaging proposes to use the 8072.5-8177.5 MHz and 8247.5-8352.5 MHz bands frequency bands to receive data from ResourceSat-1. In the U.S. Table of Allocations, these bands are allocated on a primary basis to non-government EESS in the United States, subject to a case-by-case electromagnetic analysis of compatibility with United States government and other authorized operations in the band.⁶⁴ These frequency bands also are allocated on a co-primary basis to government Fixed, Fixed-Satellite (FSS), and EESS, and on a secondary basis to government Mobile-Satellite Service (MSS). In addition, the 8175-8177.5 MHz band is allocated on a co-primary basis to government Fixed, FSS, EESS, and the Meteorological-Satellite (Earth-to-space) Service (MetSat). We address the sharing criteria as it relates to each of these services below.

27. *Sharing with Government Operations.* We have coordinated Space Imaging's proposed receive-only operations with NTIA through the frequency assignment and coordination practices established by NTIA and the Interdepartment Radio Advisory Committee (IRAC). As noted above, NTIA has concurred with Space Imaging's proposed operations with ResourceSat-1. NTIA bases its concurrence in part on the fact that Resource-Sat1 will limit its equivalent isotropically radiated power (EIRP) to 17 dBW. In addition, ResourceSat-1 has a post power amplifier band pass filter providing a minimum of 45 dB signal level reduction at 8400 MHz. We condition Space Imaging's license on ResourceSat-1 continuing to meet these parameters.

28. *Sharing with Fixed Service Systems.* Generally, sharing between satellite downlinks and the fixed service is accomplished through power flux density (PFD) limits. There are no power flux-density limits in Section 25.208 of the Commission's rules for non-geostationary EESS satellite systems in the 8025-8400 MHz band.⁶⁶ However, Table 21-4 of the ITU Radio Regulations states that the power flux-density (PFD) at the Earth's surface produced by emissions from an EESS space station in the band 8025-8400 MHz band, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed

⁶² 47 C.F.R. § 2.106, footnote 258.

⁶³ We need not reach the issue of whether or to what extent specific provisions in the default service rules may or may not apply by their own terms to future satellite services.

⁶⁴ See 47 C.F.R. § 2.106; Footnote US 258.

⁶⁶ 47 C.F.R. § 25.208.

the following values:

1) $-150 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

2) $-150 + 0.5(\delta-5) \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

3) $-140 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

29. These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions. The maximum power flux-density produced at the surface of the Earth by the ResourceSat-1 transmissions in the 8025-8400 MHz band is $-156.3 \text{ dBW/m}^2/4 \text{ kHz}$. This value is less than the PFD limits in the ITU Radio Regulations. Therefore, with respect to the fixed service operations in the band, the ResourceSat-1 satellite meets the applicable PFD limits.

30. *Sharing with FSS, MetSat and MSS Systems.* There is a potential for interference from the downlinks of the ResourceSat-1 satellite network into the uplinks of FSS, MetSat and MSS geostationary satellite systems in the 8025-8400 MHz band. In order to provide adequate protection to FSS and MetSat uplinks, the ITU Radio Regulations contain a PFD limit at the geostationary satellite orbit.⁶⁷ Space Imaging has provided an analysis in its application demonstrating a margin of 15.1 dB relative to the ITU PFD limit. Accordingly, we find that ResourceSat-1 complies with this ITU Radio Regulation. Finally, we note that these bands are allocated to MSS on a secondary basis. Therefore Space Imaging is not required to protect MSS uplinks from interference in these bands.

31. *Sharing with other EESS systems.* Space Imaging states that interference between EESS systems operating in this band occurs very infrequently, if at all, due to the characteristics of the systems and their earth stations. Space Imaging states that, due to their orbits, an EESS space station will at some point pass through another EESS earth station's antenna beamwidth, but the parties can coordinate to ensure that there is no harmful interference between the systems. For example, because the ResourceSat-1 is programmed to transmit only to the earth stations to which it is downloading data, it can be programmed to avoid transmissions when there is the potential for interference to another EESS earth station.

c. Orbital Debris Mitigation

32. In 2004, the Commission adopted standards for end-of-life satellite disposal, designed to mitigate orbital debris.⁶⁸ The Commission also made clear that these standards

⁶⁷ Article 22.5 § 4 of ITU Radio Regulations states that "in the frequency band 8025-8400 MHz, which the Earth Exploration-Satellite Service using non-geostationary satellites shares with the fixed-satellite service (Earth-to-space) or the meteorological-satellite service (Earth-to-space), the maximum power flux-density produced at the geostationary-satellite orbit by any Earth Exploration-Satellite Service space station shall not exceed $-174 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band."

⁶⁸ 47 C.F.R. § 25.283. See also *Mitigation of Orbital Debris, Second Report and Order*, IB Docket No. 02-54, 19 FCC Rcd 11567 (2004) (*Orbital Debris Mitigation Order*).

would be applied to non-U.S. licensed satellites entering the U.S. market.⁶⁹ Space Imaging submitted a narrative statement with its application describing ISRO's Orbital Debris Mitigation design strategies for ResourceSat-1. According to this statement, ResourceSat-1 was launched October 17, 2003 into an 817 kilometer circular polar with an inclination angle of 98.7°. At the end of its mission life, of ResourceSat-1 will be placed in a 25-year lifetime orbit as incorporated in the Inter-Agency Debris Coordination Committee (IADC) guidelines for post-mission disposal. No intentional atmospheric entry is planned, but rather uncontrolled re-entry will be used for disposal. On July 28, 2004, Space Imaging amended its application, supplementing its casualty risk assessment for atmospheric re-entry of ResourceSat-1 satellite.⁷⁰ We have reviewed these submissions and conclude that they satisfy the Commission's Orbital Debris requirements.⁷¹

5. Other Requirements

33. Finally, as described above, under *DISCO II*, national security, law enforcement, foreign policy, and trade concerns are included in the public interest analysis.⁷² Nothing in the record before us raises any such concerns.

IV. ORDERING CLAUSES

34. Accordingly, IT IS ORDERED, pursuant to Section 1.2 of the Commission's rules, 47 C.F.R. § 1.2, that the petition for clarification filed by Space Imaging LLC on September 12, 2003, IS DENIED.

35. IT IS FURTHER ORDERED, pursuant to Section 1.3 of the Commission's rules, 47 C.F.R. § 1.3, that Space Imaging LLC IS GRANTED a waiver of Sections 25.156 and 25.157 of the Commission's rules, 47 C.F.R. §§ 25.156, 25.157, to the extent necessary to enable the Bureau to consider its EESS application on a first-come, first-served basis as set forth in Section 25.158 of the Commission's rules, 47 C.F.R. § 25.158.

36. IT IS FURTHER ORDERED that Application File No. SES-MOD-20040607-00809, Call Sign E960463, as amended by SES-AMD-20040728-01073, and SES-AMD-20040728-01075, IS GRANTED, and Space Imaging, LLC is AUTHORIZED to use its Norman, Oklahoma earth station to receive remotely-sensed data and imagery from the ResourceSat-1 satellite in the 8072.5-8177.5 MHz and 8247.5-8352.5 MHz bands in accordance with the terms, conditions, and technical specifications set forth in its application, as amended, this Order, and the Commission's Rules. Space Imaging, LLC's authorization is subject to the following conditions: Space Imaging, LLC may communicate with the ResourceSat-1 satellite from its Norman, Oklahoma earth station, provided that:

(a) the ResourceSat-1 satellite is operated at an EIRP of 17 dBW or less, and

⁶⁹ *Orbital Debris Mitigation Order*, 19 FCC Rcd at 11605-07 (paras. 92-97).

⁷⁰ See supplement to Orbital Debris Mitigation Report. Space Imaging's supplement contains an analysis utilizing the NASA Orbital Debris Assessment Software, DAS 1.5.3, to perform orbital debris assessment as required by NASA Policy Directive 1740.14.

⁷¹ See *Orbital Debris Mitigation Order*, 19 FCC Rcd 11567 (2004).

⁷² *DISCO II*, 12 FCC Rcd at 24170-72 (paras. 178-82).

(b) the ResourceSat-1 satellite uses a post-power amplifier band pass filter providing a minimum of 45 dB reduction of power at the Deep Space Network (DSN) band edge (8400 MHz).

37. IT IS FURTHER ORDERED that access to ResourceSat-1 must comply with current coordination agreements with other satellite systems and any future modification to such agreements, including all applicable agreements between the United States and India.

38. IT IS FURTHER ORDERED that Space Imaging, LLC, is afforded 30 days from the release of the Order to decline authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.

39. This Order is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. § 0.261, and is effective upon release. 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 release date of this Order.

FEDERAL COMMUNICATIONS COMMISSION

Donald Abelson
Chief, International Bureau