

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

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In the Matter of )  
)  
Amendment of Parts 2 and 87 of the )  
Commission's Rules Regarding the ) ET Docket No. 98-197  
Radionavigation Service at 31.8-32.3 GHz )

**NOTICE OF PROPOSED RULE MAKING**

**Adopted: October 28, 1998**

**Released: November 6, 1998**

**Comment Date: [30 days from publication in the Federal Register]**

**Reply Comment Date: [45 days from publication in the Federal Register]**

By the Commission:

**I. INTRODUCTION**

1. By this action, we propose to amend Parts 2 and 87 of the Commission's Rules in order to delete the unused non-Government radionavigation service allocation at 31.8-32.3 GHz and to also remove this frequency segment from the list of available frequencies set forth in the rules for the Aviation Services.<sup>1</sup> We make this proposal in response to a request from the National Telecommunications and Information Administration ("NTIA").<sup>2</sup> The adoption of this proposal would protect the Federal Government's deep space operations in the 31.8-32.3 GHz band from uncoordinated commercial radionavigation usage that may otherwise occur in the future, while maintaining adequate spectrum for future non-Government radionavigation services in the adjacent 32.3-33.4 GHz band.

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<sup>1</sup> Radionavigation is defined as radiodetermination used for the purpose of navigation, including obstruction warning. Radiodetermination, in turn, is the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. See 47 C.F.R. § 2.1.

<sup>2</sup> See Letter to Chief, Office of Engineering and Technology, from the Associate Administrator, Office of Spectrum Management, NTIA, dated November 3, 1997.

## II. BACKGROUND

2. Internationally, the 31.8-33.4 GHz band is allocated to the radionavigation service on a primary, worldwide basis.<sup>3</sup> In addition, the 31.8-32.3 GHz band is allocated to the space research service (deep space) (space-to-Earth)<sup>4</sup> on a primary, worldwide basis and the 32-33 GHz band is allocated to the inter-satellite service on a primary, worldwide basis.<sup>5</sup> Furthermore, in designing systems for the inter-satellite and radionavigation services in the 32-33 GHz band, and for the space research service (deep space) in the 31.8-32.3 GHz band, administrations are urged to take all necessary measures to prevent harmful interference between these services, while bearing in mind the safety aspects of the radionavigation service.<sup>6</sup>

3. In the United States, the 31.8-33.4 GHz band is Government/non-Government shared spectrum, and the following radio services are allocated on a primary basis and are available to both Government and non-Government users. The 31.8-33.4 GHz band is allocated to the radionavigation service,<sup>7</sup> has previously been added to the list of frequencies available under the rules for Aviation Services,<sup>8</sup> but is currently unused by non-Government licensees. The 31.8-32.3 GHz band is also allocated to the space research service for space-to-Earth ("downlink")

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<sup>3</sup> At the 1997 World Radiocommunication Conference ("WRC-97"), the 31.8-33.4 GHz band was allocated to the fixed service on a primary basis throughout the world -- except in the United States -- and is available for high-density applications. See Appendix, entries for the International Table and footnotes S5.547, S5.547A, S5.547B, S5.547C, S5.547D, and S5.547E. See also International Telecommunication Union's *Final Acts of the World Radiocommunication Conference 1997 (WRC-97)*, Geneva, 1997, at pp. 56-57.

<sup>4</sup> The space research service is a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. See 47 C.F.R. § 2.1. The directional indicators to the space research allocation, *i.e.*, deep space and space-to-Earth, means that the space research service allocation at 31.8-32.0 GHz is restricted to space-to-Earth transmissions from deep space. See 47 C.F.R. § 2.105(d)(3). Deep space is defined as space at distances from the Earth equal to, or greater than, two million kilometers (1,242,742 miles). See 47 C.F.R. § 2.1. As a reference, we note that the mean distance of the moon from the Earth is 384,403 kilometers (238,857 miles).

<sup>5</sup> The inter-satellite service is a radiocommunication service providing links between artificial satellites. At the 1992 World Administrative Radio Communications Conference, the definition for the inter-satellite service was amended by changing the phrase "artificial earth satellites" to "artificial satellites." See *International Telecommunication Union Radio Regulations*, Edition of 1990, Revised in 1994, page RR1-4. We are updating our definition in 47 C.F.R. § 2.1 to conform to this WARC-92 amendment.

<sup>6</sup> See Appendix A, footnote S5.548. At WARC-95, former international footnote 893 was re-numbered as S5.548. Previously, at WARC-92, the footnote was amended to include reference to the space research service (deep space) at 31.8-32.3 GHz.

<sup>7</sup> Ground-based radionavigation aids are not permitted in the 31.8-33.4 GHz band, except where they operate in cooperation with airborne or shipborne radionavigation devices. See 47 C.F.R. § 2.106, footnote US69.

<sup>8</sup> See 47 C.F.R. § 87.173(b).

transmissions on a primary basis by footnote US262<sup>9</sup> and the use of this allocation is limited to deep space communications at Goldstone, California.<sup>10</sup> The 32-33 GHz band is also allocated to the inter-satellite service ("ISS") on a primary basis.<sup>11</sup> We note that there are pending applications from our Ka-band licensees<sup>12</sup> and V-band applicants to use the 32-33 GHz band for inter-satellite links, and we expect that sharing of the 32.0-32.3 GHz band may require detailed coordination between the space research and inter-satellite services.

### III. DISCUSSION

4. NTIA, at the request of the National Aeronautics and Space Administration ("NASA"), asks that we delete the non-Government radionavigation service from the 31.8-32.3 GHz band. NASA bases its request on the potential for interference to its deep space receive site at Goldstone, California, from uncoordinated commercial radionavigation usage of the 31.8-32.3 GHz band.<sup>13</sup> In support of its request, NASA cites International Telecommunication Union Recommendation ITU-R SA.1061 as documenting that space research (deep space) sharing with airborne operations in the radionavigation service is not feasible. NASA explains that signals received on Earth from spacecraft in deep space are extremely weak, and thus are highly susceptible to interference of all kinds. Further, NASA stresses that airborne interference sources, if present, would easily overwhelm the desired but weak signals from space. In its normal deep space operations, to bolster signal reception, NASA points out that it has fitted its large earth

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<sup>9</sup> We observe that the references to footnotes US69, US262, US278, S5.548 (893) in the Table of Frequency Allocations, 47 C.F.R. § 2.106, for the 32.0-33.0 GHz band are missing. A review of our docket history files shows that these footnotes were adopted in 1984. See *Amendment of Part 2 of the Commission's Rules Regarding Implementation of the Final Acts of the World Administrative Radio Conference, Geneva, 1979*, General Docket No. 80-739, *Second Report and Order*, 49 FR 2357 (January 19, 1984) at page C-149. We take this opportunity to correct these typographical omissions.

<sup>10</sup> Our rules also urge applicants for airborne or space station assignments in the 31.8-32.0 GHz band to take all practicable steps to protect radio astronomy observations in the 31.3-31.8 GHz band from harmful interference. However, the radio astronomy service is protected from extraband radiation only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates. See 47 C.F.R. § 2.106, footnotes US211, US74.

<sup>11</sup> In the 32-33 GHz band, non-geostationary inter-satellite links may operate on a secondary basis to geostationary inter-satellite links. See 47 C.F.R. § 2.106, footnote US278.

<sup>12</sup> PanAmSat Licensee Corp. and Hughes Communications Galaxy Inc.

<sup>13</sup> NASA operates a complex at Goldstone, California (on the Ft. Irwin Military Reservation) for its Deep Space Network in order to provide continuous communications with planetary spacecraft. The Deep Space Network uses very large high gain antennas and state-of-the-art receiver systems in order to receive very low-level signals in the 31.8-32.3 GHz band. The coordinates of the Deep Space receive site are 35° 20' North Latitude and 116° 53' West Longitude.

station antennas with cryogenically-cooled preamplifiers and has employed specialized receivers. NASA states that it has sited the earth stations in such a way as to provide radio shielding from *terrestrial* radio sources sharing the same frequency band, which are potential interferers. But, NASA states, its earth stations cannot be shielded from *airborne* radio sources operating in the 31.8-32.3 GHz band, because the potential interfering signals may emanate from the same general direction as the desired deep space signals.

5. NASA indicates that currently, the only radionavigation operations in the 31.8-32.3 GHz band are from Federal Government (military) operations. The coordination of these military operations with NASA/Goldstone has been successful, NASA says, largely because they occur infrequently. By contrast, NASA does not believe that deep space operations can be coordinated successfully with private or commercial aircraft using terrain-following or landing-aid radars operating on an unrestricted basis within line-of-sight of the Deep Space Network site at Goldstone. To avoid causing interference, NASA states, such aircraft would have to choose between the impractical solutions of either avoiding the airspace in the Goldstone vicinity or turning off their transmitters in the 31.8-32.3 GHz band while within line-of-sight of Goldstone.

6. NASA brought this issue before NTIA's Interdepartment Radio Advisory Committee ("IRAC"). During these discussions, the Federal Aviation Administration indicated that there are no known plans for commercial aeronautical radionavigation operations in the 31.8-32.3 GHz band. After considering several options, IRAC recommended to NTIA that the 31.8-32.3 GHz band be limited to Federal Government operations. NTIA endorsed this recommendation, concluding that future demand for commercial or private radionavigation services could be adequately accommodated in the 1.1 gigahertz of radionavigation spectrum that would remain at 32.3-33.4 GHz.

7. We propose to implement NTIA's proposal to delete the non-Government radionavigation service allocation at 31.8-32.3 GHz. We agree with NTIA that the 32.3-33.4 GHz band appears adequate to accommodate commercial and private radionavigation services that may develop in the future. By limiting future non-Government radionavigation services to the 32.3-33.4 GHz band, we believe that adequate spectrum would be preserved for these potential services and that NASA's deep space operations in the 31.8-32.3 GHz band would be adequately protected from those services. We further propose to remove the 31.8-32.3 GHz segment from the list of frequencies that are available for use by the aeronautical radionavigation service under Section 87.173 of the rules for the Aviation Services<sup>14</sup> and to add a rule part cross reference to Part 87 in the Table of Frequency Allocations entry for the 32.3-33.4 GHz band in Section 2.106. In addition, as suggested in NTIA's letter, we propose to parallel the international table by changing the space research service (deep space) (space-to-Earth) allocation from a footnote allocation to a table entry allocation and, as a consequence of that proposal, to modify the text

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<sup>14</sup> 47 C.F.R. § 87.173(b). Currently, this aeronautical radionavigation band extends from 31.8 GHz to 33.4 GHz.

of footnote US262 to remove unneeded information. See the Appendix. We request comment on these proposals.

#### IV. PROCEDURAL INFORMATION

8. Initial Regulatory Flexibility Certification. The Regulatory Flexibility Act ("RFA")<sup>15</sup> requires that an initial regulatory flexibility analysis be prepared for notice-and-comment rulemaking proceedings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A small business concern is one which: (1) independently owned and operated; 2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration ("SBA").

9. In this *Notice of Proposed Rule Making*, we propose to delete an unused non-Government allocation for the radionavigation service at 31.8-32.3 GHz in order to protect existing Government operations in this band from harmful interference. In addition, we tentatively conclude that the remaining portion of the existing non-Government radionavigation allocation at 32.3-33.4 GHz will provide sufficient spectrum for future non-Government radionavigation services, if and when such services develop. Accordingly, we hereby certify that the proposed deletion of the non-Government radionavigation allocation at 31.8-32.3 GHz will not have a significant economic impact on a substantial number of small entities. The Commission's Office of Public Affairs, Reference Operations Division, will send a copy of this *Notice of Proposed Rule Making*, including this certification, to the Chief Counsel for Advocacy of the Small Business Administration. A copy will also be published in the Federal Register.

10. Ex Parte Rules -- Permit-But-Disclose Proceedings. This is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during any Sunshine Agenda period, provided they are disclosed as provided in the Commission's rules. See generally 47 C.F.R. Sections 1.1202(a), 1.1203, and 1.1206.

11. Authority. This action is taken pursuant to Sections 4(i), 7(a), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 157(a), 303(c), 303(f), 303(g), and 303(r).

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<sup>15</sup> The RFA, see 5 U.S.C. § 601 *et. seq.*, has been amended by the Contract with American Advancement Act of 1996, Public Law 104-121, 110 Stat. 847 (1996) ("CWAAA"). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA").

12. Comment. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415, 1.419, interested parties may file comments by **[30 days from publication in the Federal Register]**, and reply comments by **[45 days from publication in the Federal Register]**. Comments may be filed using the Commission's Electronic Comment Filing System ("ECFS") or by filing paper copies. See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24,121 (1998).

13. Comments filed through the ECFS can be sent as an electronic file via the Internet to <http://www.fcc.gov/e-file/ecfs.html>. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to [ecfs@fcc.gov](mailto:ecfs@fcc.gov), and should include the following words in the body of the message, "get form <your e-mail address>." A sample form and directions will be sent in reply.

14. Parties who choose to file by paper must file an original and four copies of all comments, reply comments and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original plus nine comments must be filed. If more than one docket or rulemaking number appear in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, The Portals, 445 Twelfth Street, S.W., Room TW-A325, Washington, D.C. 20554.

15. All relevant and timely comments will be considered by the Commission before final action is taken in this proceeding. Comments and reply comments will be available for public inspection during regular business hours in the Office of the Secretary.

16. Additional Information. For further information concerning this rule making proceeding contact Tom Mooring at (202) 418-2450, internet: [tmooring@fcc.gov](mailto:tmooring@fcc.gov), Office of Engineering and Technology, Federal Communications Commission, Washington, DC 20554.

FEDERAL COMMUNICATIONS COMMISSION



Magalie Roman Salas  
Secretary

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**Appendix: Proposed Rules**

Parts 2 and 87 of title 47 of the Code of Federal Regulations are proposed to be amended as follows:

**PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;  
GENERAL RULES AND REGULATIONS**

1. The authority citation for Part 2 continues to read as follows:

**AUTHORITY:** Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 302, 303 and 307, unless otherwise noted.

2. Section 2.1(c) is amended by revising the definition for the inter-satellite service.

**§ 2.1 Terms and definitions.**

\* \* \* \* \*

(c) \* \* \*

*Inter-Satellite Service.* A radiocommunication service providing links between artificial satellites.  
(RR)

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3. Section 2.106, the Table of Frequency Allocations, is amended as follows:
- a. Remove the existing entries for the 31.3-33.4 GHz band.
  - b. Add entries in numerical order for the 31.3-33.4 GHz band.
  - c. In the International Footnotes under heading I., add footnotes S5.340, S5.546, S5.547, S5.547A, S5.547B, S5.547C, S5.547D, S5.547E, and S5.548.
  - d. In the International Footnotes under heading II., remove footnote 887, 888, 889, and 893.
  - e. Revise footnote US262.

**§ 2.106 Table of Frequency Allocations**

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International table			United States table		FCC use designators	
Region 1 -- allocation MHz	Region 2 -- allocation MHz	Region 3 -- allocation MHz	Government	Non-Government	Rule part(s)	Special-use frequencies
(1)	(2)	(3)	Allocation MHz (4)	Allocation MHz (5)	(6)	(7)
*	*	*	*	*	*	*
31.3 - 31.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)  S5.340			31.3 - 31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			
31.5 - 31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile  S5.149 S5.546	31.5 - 31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)  S5.340	31.5 - 31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile  S5.149	US74 US246	US74 US246		
31.8 - 32 RADIONAVIGATION FIXED S5.547A SPACE RESEARCH (deep space)(space-to-Earth)  S5.547 S5.547B S5.548			31.8 - 32 RADIONAVIGATION US69 SPACE RESEARCH (deep space)(space-to-Earth) US262  S5.548 US211			

International table			United States table		FCC use designators	
Region 1 -- allocation MHz	Region 2 -- allocation MHz	Region 3 -- allocation MHz	Government	Non-Government	Rule part(s)	Special-use frequencies
(1)	(2)	(3)	Allocation MHz (4)	Allocation MHz (5)	(6)	(7)
32 - 32.3	INTER-SATELLITE FIXED S5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth)  S5.547 S5.547C S5.548		32 - 32.3 INTER-SATELLITE US278 RADIONAVIGATION US69 SPACE RESEARCH (deep space)(space- to-Earth) US262  S5.548	32 - 32.3 INTER-SATELLITE US278   S5.548		
32.3 - 33	INTER-SATELLITE FIXED S5.547A RADIONAVIGATION  S5.547 S5.547D S5.548		32.3 - 33 INTER-SATELLITE US278 RADIONAVIGATION US69  S5.548	32.3 - 33 INTER-SATELLITE US278 RADIONAVIGATION US69  S5.548	32.3 - 33.4 AVIATION (87)	
33 - 33.4	RADIONAVIGATION FIXED S5.547A  S5.547 S5.547E		33 - 33.4 RADIONAVIGATION  US69	33 - 33.4 RADIONAVIGATION  US69		
*	*	*	*	*	*	*

## INTERNATIONAL FOOTNOTES

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## I. New "S" Numbering Scheme.

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S5.340 All emissions are prohibited in the following bands:  
1400-1427 MHz,  
2690-2700 MHz except those provided for by Nos. S5.421 and S5.422,  
10.68-10.7 GHz except those provided for by No. S5.483,  
15.35-15.4 GHz except those provided for by No. S5.511,  
23.6-24 GHz,  
31.3-31.5 GHz,  
31.5-31.8 GHz in Region 2,  
48.94-49.04 GHz from airborne stations,  
50.2-50.4 GHz<sup>1</sup> except those provided for by No. S5.555A,  
52.6-54.25 GHz,  
86-92 GHz,  
105-116 GHz,  
140.69-140.98 GHz from airborne stations and from space stations in the space-to-Earth direction,  
182-185 GHz except those provided for by No. S5.563,  
217-231 GHz.

S5.546 Different category of service: in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, United Arab Emirates, Spain, Estonia, Finland, Georgia, Hungary, Iran (Islamic Rep. of), Israel, Jordan, Kazakstan, Latvia, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Syria, Kyrgyzstan, Romania, the United Kingdom, Russia, Tajikistan, Turkmenistan, Turkey and Ukraine, the allocation of the band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. S5.33).

S5.547 The bands 31.8-33.4 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolution COM5-12 (WRC-97)).

S5.547A Use of the band 31.8-33.4 GHz by the fixed service shall be in accordance with Resolution COM5-11 (WRC-97).

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<sup>1</sup> The allocation to the earth exploration-satellite service (passive) and the space research service (passive) in the band 50.2-50.4 GHz should not impose undue restraints on the use of the adjacent bands by the primary allocated services in those bands.

S5.547B Alternative allocation: in the United States, the band 31.8-32 GHz is allocated to the radionavigation and space research (deep space)(space-to-Earth) services on a primary basis.

S5.547C Alternative allocation: in the United States, the band 32-32.3 GHz is allocated to the inter-satellite, radionavigation and space research (deep space)(space-to-Earth) services on a primary basis.

S5.547D Alternative allocation: in the United States, the band 32.3-33 GHz is allocated to the inter-satellite and radionavigation services on a primary basis.

S5.547E Alternative allocation: in the United States, the band 33-33.4 GHz is allocated to the radionavigation service on a primary basis.

S5.548 In designing systems for the inter-satellite and radionavigation services in the band 32-33 GHz, and for the space research service (deep space) in the band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation 707).

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#### UNITED STATES (US) FOOTNOTES

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US262 The Space Research (space-to-Earth) allocation is limited to deep space communications at Goldstone, California.

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## PART 87 -- AVIATION SERVICES

1. The authority citation for Part 87 continues to read as follows:

**AUTHORITY:** 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-156, 301-609.

2. Section 87.173(b) is amended by revising the last entry in the frequency table to read as follows:

**§ 87.173 Frequencies.**

\* \* \*

(b) Frequency table.

Frequency or frequency band	Subpart	Class of station	Remarks
*	*	*	*
32300-33400 MHz.....	F, Q	MA, RL	Aeronautical radionavigation.