

FCC MAIL SECTION

DA 96-650

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

DISPATCHED

In the Matter of)	
)	
Mobile Satellite-Based)	RM-7912
Communications Services by)	
Crescomm Transmission)	
Services, Inc. and Qualcomm Incorporated)	

ORDER

Adopted: April 25 , 1996

Released: April 29, 1996

By the Chief, International Bureau and the Chief, Office of Engineering and Technology:

Introduction

1. Crescomm Transmission Services, Inc. filed a petition for rule making which requests amendment of **Part 80** of our Rules to allow it to provide satellite-based communications between ships and fixed or temporary-fixed satellite earth stations in the Fixed Satellite Service (FSS), 4/6 GHz and 12/14 GHz bands.¹ Qualcomm, Inc. has filed a request for waiver of the Table of Frequency Allocations, 47 C.F.R. § 2.106, to allow it to provide satellite-based communications to ships in the 12/14 GHz band.² Six parties filed responses to the public notice of Crescomm's petition.³ No comments were filed in response

¹ The 4/6 GHz band, also referred to as C-band, covers 3.7-4.2 GHz (downlink) and 5.925-6.425 GHz (uplink); the 12/14 GHz band, also known as Ku-band, covers 11.7-12.2 GHz (downlink) and 14.0-14.5 GHz (uplink). See 47 C.F.R. § 25.202.

² See 47 C.F.R. § 2.106. Crescomm has also filed a Supplement to Petition for Rulemaking and Request for Expedited Action (Supplement). This Supplement is moot by the action we take herein. Also, Maritime Telecommunications Network, Inc. (MTN) has filed a petition requesting that it be permitted to replace Crescomm as petitioner of record in Crescomm's original Petition for Rule Making. For historical consistency in this proceeding, we will continue to use "Crescomm" rather than "MTN."

³ Responses were filed by the Bell Atlantic Companies, COMSAT, Inc., CruiseCom, GTE Spacenet Corporation, the National Spectrum Managers Association (NSMA) and the Pan American Satellite Corporation (PanAmSat). In addition, fifteen parties filed letters of support for Crescomm. They include: Alascom, Atlantic Satellite Communications, Inc., Broadcast Satellite International, Inc., Compression Labs, Inc., Computel Communications Systems, Inc., Interface Conversions D.I.P., Inc., MCL, Inc.,

to Qualcomm's waiver request. We grant waivers of the Table of Frequency Allocations to both Crescomm and Qualcomm to provide the communications services they seek to offer, subject to certain conditions.

Background

2. In the United States, the 4/6 GHz band is allocated on a co-primary basis to the terrestrial Fixed Service, terrestrial Mobile Service (except aeronautical mobile), and the FSS. For the Fixed Service, the band is used for both commercial and private operational microwave communications. For the FSS, the 4 GHz portion of the band is used for space-to-Earth (downlink) applications, and the 6 GHz portion is used for Earth-to-space (uplink) communications. The FSS also operates in the 12/14 GHz band. The 12 GHz part of the band is used for space-to-Earth (downlink), and the 14 GHz portion is used for Earth-to-space (uplink) communications, primarily to geostationary satellites. The 12/14 GHz band is allocated on a primary basis to FSS, but the lower band (12 GHz) is also allocated on a secondary basis to the Mobile (except aeronautical mobile) Service. The 14.0-14.2 GHz portion is allocated to the Radionavigation Service on a coprimary basis with FSS. The 14.3-14.4 GHz portion is allocated to FSS and, in different areas of the world, Fixed Service, Mobile Service (except aeronautical mobile) and Radionavigation Service (on a secondary basis).⁴

3. *Crescomm Petition*. Crescomm asks us to reallocate the FSS 4/6 GHz and 12/14 GHz bands to permit the maritime mobile satellite service (MMSS)⁵ to operate on a co-primary basis; to amend Part 80 of our Rules, which governs Maritime Services, to accommodate this service; and to provide Crescomm with a blanket ship earth station license for the very small aperture terminal (VSAT) earth stations on the ships.

4. Crescomm states that its ship-board VSAT earth stations will operate from gyrostabilized platforms that assure constant contact with the satellite. The earth stations are capable of operating in both the 4/6 GHz and 12/14 GHz bands, and can communicate through in-orbit fixed satellite systems, such as PanAmSat. Crescomm contends that its system can provide continuous, two-way video, audio, and high-speed digital communications to

WXTV, Channel 41, NorthCom, Inc., Private Satellite Network, Inc., RF Scientific Transportables, Inc., Republic Telecom Systems, Sea Tel, Inc., Strategic Television, Inc., and Waterfront Communications Corporation.

⁴ The 14.0-14.5 GHz band is also allocated on a secondary basis to the Land Mobile-Satellite Service in the United States. See 47 C.F.R. § 2.106, n. US287. In general, the U.S. allocations track the international allocations. There are differences between the international and the U.S. allocations, which are explained in notes to the Allocation Table, e.g. US287.

⁵ Crescomm refers to its ship stations as Digital Shipboard Earth Stations, which would operate in the Maritime Mobile-Satellite Service (MMSS). See *Crescomm Petition* at 1, 6.

ships. It further states that shipboard satellite earth stations operating within the Inmarsat system⁶ cannot meet the full-time, high-capacity needs of shipboard consumers. Crescomm adds that its system will provide higher capacity and allow more service flexibility, at lower cost to ship-based customers.

5. In response, COMSAT, the U.S. signatory to Inmarsat, supports the expansion of maritime communications capabilities because such expansion will enable more providers to offer services that meet customer needs. It also states that the new services should be required to operate without causing harmful interference to existing terrestrial Fixed and Fixed-Satellite services, and that the Commission should address international issues for band sharing and interference protection in this proceeding. CruiseCom agrees with Crescomm that it is technically possible for shipboard earth stations to communicate with satellites without causing harmful interference to either fixed earth stations or fixed terrestrial stations, or other satellites. It further agrees that new satellite services would provide higher-quality, lower-cost shipboard communications. PanAmSat states that it has been providing service to Crescomm via its PAS-1 satellite in connection with Crescomm's shipboard communications system tests for more than three years, and that it has not received any complaints from its other customers or from other service providers. PanAmSat urges the Commission to grant Crescomm's petition.

6. Bell Atlantic, on the other hand, maintains that Crescomm has not provided any details for frequency coordination with existing 4/6 GHz and 12/14 GHz band users to demonstrate that there will be no harmful interference. Bell Atlantic requests that the Commission either deny Crescomm's petition or delay action until the demonstration is provided. Similarly, NSMA argues that Crescomm has not shown that it will coordinate with terrestrial common carrier users in the 4/6 GHz band. GTE, in order to maintain the protected status of FSS operations in these bands, opposes a reallocation of the 4/6 GHz and 12/14 GHz bands to mobile satellite communications but states that it would support waiver of the Table of Frequency Allocations to permit Crescomm's proposed operation. It argues that this approach would protect existing users while allowing Crescomm to offer service on a non-interference basis. In its reply, Crescomm pledges to cooperate in establishing interference assessment and prevention procedures, and states that procedures can be developed that will address the interference and coordination concerns raised by Bell Atlantic, NSMA, and GTE.

7. *Qualcomm Request.* Qualcomm requests a waiver of Section 2.106 of the Rules to allow it to provide maritime satellite communications in the 12/14 GHz band via its satellite-

⁶ Inmarsat is an intergovernmental satellite system established to provide worldwide maritime and aeronautical mobile satellite services, including Global Maritime Distress and Safety Services (GMDSS). Inmarsat has also adopted amendments to its charter to include land mobile satellite services, although these have not yet entered into force.

based land mobile data system known as OmniTRACS.⁷ This system, authorized by the Commission in 1989, provides low power, two-way data communications and, according to Qualcomm, has operated since that time without interference to other services.⁸ In 1989 and again in 1990, the Commission granted Qualcomm an STA to operate OmniTRACS in the maritime and aeronautical environments.⁹ Qualcomm now states that the success of its maritime operations has proven there is a demand for its satellite-based communications in the maritime environment and that such operation can be conducted without interference to other services in the 12/14 GHz band.

8. Qualcomm further states that the only potential source of harmful interference from OmniTRACS to other services is the uplink signal from the mobile station to the satellite.¹⁰ Qualcomm says that its OmniTRACS system applies the following techniques to ensure that the mobile uplink does not cause harmful interference: 1) maintaining low power for mobile transmit/receive units;¹¹ 2) controlling transmissions of mobile units so that they will not transmit unless commanded to do so; 3) using direct-sequence, spread spectrum modulation¹² to distribute the power density of the transmitted signal over a broad bandwidth; and 4) using frequency hopping and frequency division multiple access schemes¹³ to ensure that power from mobile units is spread across the assigned band. Further, Qualcomm states,

⁷ The Bureau returned Qualcomm's license modification application, file no. 2285-DSE-ML-92, on November 9, 1995. See Letter to Qualcomm Counsel from Chief, Satellite Engineering Branch, Satellite and Radiocommunication Division, November 9, 1995. By that letter, we denied Qualcomm's requests for special temporary authority (STA) and waiver, indicating that the use of the 12/14 GHz band would be better handled in a rulemaking proceeding. Based on re-evaluation of the policies and circumstances associated with the provision of satellite-based communications to and from ships, we are reversing that decision, on our own motion. However, because the record associated with Qualcomm's application is stale, and the original application never appeared on public notice, we will ask Qualcomm to file its application anew. That will also give Crescomm a comparable opportunity to commence its service under the waivers we are conditionally granting.

⁸ See *OmniTRACS Licensing Order*, *infra*.

⁹ STAs were originally granted on December 28, 1989 and July 13, 1990 for maritime and aeronautical service, respectively, and subsequently have been renewed.

¹⁰ All of OmniTRACS's other communications links conform to the primary 12/14 GHz FSS allocation. These links include the uplink to the satellite from the hub earth station, the downlink to the hub earth station from the satellite, and the downlink to the mobile station from the satellite.

¹¹ Mobile units have a maximum transmit power of +20 dBw equivalent isotropic radiated power.

¹² Direct-sequence, spread spectrum systems use digital code sequences to encode the signal being transmitted.

¹³ Frequency hopping is a spread spectrum transmission protocol that "hops" to different frequencies as a function of code patterns. Frequency-division multiple access is a communications scheme that divides the bandwidth of a frequency assignment into separate channels and allocates the channels among users.

OmniTRACS avoids interference to the Radionavigation Service by using frequencies outside the 14.0-14.2 GHz band. Moreover, to guard against interference to the Radio Astronomy Service in the 14.47-14.50 GHz band, Qualcomm does not operate between 14.45 and 14.5 GHz. See *Qualcomm, Inc.*, 4 F.C.C. Rcd. 1543, 1548 n. 33 (1989) (*OmniTRACS Licensing Order*).

Discussion

9. *Waiver.* Mobile-Satellite Service (MSS) is defined in the International Telecommunications Union (ITU) Regulations as "[A] radiocommunication service between mobile earth stations and one or more space stations, or between space stations used by this service; or between mobile earth stations by means of one or more space stations."¹⁴ It is precisely this service that both Crescomm and Qualcomm wish to provide and which they have shown is feasible from shipboard mobile platforms, with minimal likelihood of harmful interference to FSS or other services. However, MSS does not appear in the Table of Frequency Allocations for the 4/6 GHz and 12/14 GHz bands. As noted above, those bands are allocated for the FSS and non-satellite mobile (excluding aeronautical) services. We believe that there is ample support for waiver of our Rules to permit Crescomm and Qualcomm to provide MSS in the 4/6 GHz and 12/14 GHz bands.¹⁵ The service tests they have conducted over several years provide compelling evidence that MSS is technically feasible. We find, therefore, that the public interest will be served by granting waivers to Crescomm and Qualcomm to provide MSS in the 4/6 GHz and 12/14 GHz bands, as they have in their experiments and under earlier special temporary authorizations. However, such operation must protect existing users in those bands.

10. *Interference protection.* In order to protect existing services in the 4/6 GHz and 12/14 GHz bands, Crescomm and Qualcomm must operate on a non-interference basis. This means that their MSS earth stations must protect all other authorized services in these bands from harmful interference, and must accept interference from any other authorized service in these bands. For example, private operational fixed and commercial microwave services operate in the 4/6 GHz band. These services carry myriad public and private business communications, and cannot tolerate harmful interference from MSS earth stations. It is for this reason that Section 25.203 of our Rules requires earth stations in the 4/6 GHz band to coordinate with terrestrial microwave licensees and to select sites and frequencies for earth stations that will avoid interference to microwave licensees.

¹⁴ See International Radio Regulations, Chapter 1, Article 1, Section 3.8.

¹⁵ We are issuing a *sua sponte* waiver to Crescomm, useable by Crescomm if it files and is granted licensing authority or an STA, or both. We believe that waiver of our Rules, with the attached conditions, represents the appropriate regulatory response under current Commission policies that encourage competition in the provision of telecommunications services. See *WAIT Radio v. F.C.C.*, 418 F2d 1153 (D.C. Cir. 1969).

11. The mobile nature of MSS stations makes it extremely difficult to prevent harmful interference and to identify the interference source. As a ship rocks on the open seas,¹⁶ its directional uplink antennas could direct harmful signal levels toward an unintended satellite.¹⁷ Of potentially greater concern is the potential for harmful interference from the shipboard uplink transmissions to fixed stations on land. To prevent any risk of harmful interference by MSS earth stations, we will impose a blanket restriction forbidding them from transmitting in the 6 GHz band when they are within 100 kilometers of land.¹⁸ If, however, the MSS licensee can successfully coordinate its operations with all existing fixed service stations along a particular route, we will not apply the 100 km restriction.¹⁹ Furthermore, we will require that the MSS applicants cooperate in establishing interference assessment and prevention procedures as proposed by Crescomm in its reply comments.²⁰ We will condition grant of our waivers on these requirements.²¹ The 100 km condition will also serve to avoid interference with terrestrial Fixed Service stations in other countries. In addition, any Crescomm or Qualcomm MSS-equipped ship that sails into the national waters of another country is expected to abide by any restrictions and regulations on the use of the ship earth station imposed by that country, including any necessary coordination.²²

Conclusion

12. We therefore find that the public interest will be served by waiving Section 2.106 of our Rules to permit Crescomm and Qualcomm to provide MSS between ships and fixed or temporary-fixed satellite earth stations in the FSS, in the 4/6 GHz and 12/14 GHz bands. Because we have no Title III applications for permanent authority on file from either party, however, we cannot grant construction or operating authorization by this Order. We therefore

¹⁶ "Seas" in this Order includes oceans, lakes and rivers.

¹⁷ Absent receipt of complaints regarding such earth station-to-space station interference, we will refrain from requiring licensees to use gyrostabilized antenna platforms. However, we expect licensees to incorporate such technologies into their shipboard installations to prevent errant uplink directionality.

¹⁸ See ITU-R Recommendations, 1994 IS Series Volume, Inter-Service Sharing and Compatibility, para. 5 (Minimum value of coordination distance). This restriction will apply with regard to all U.S. and foreign territories.

¹⁹ A cruise ship, for example, might always travel the same shipping lane and thus would be able to coordinate its transmissions with all potentially affected Fixed Service (terrestrial) stations. The burden rests with the licensee to assure compliance with this requirement.

²⁰ See para. 6, *supra*.

²¹ We believe that these requirements, in conjunction with Crescomm's pledge to cooperate in establishing interference assessment and prevention procedures, constitute sufficient assurance that the concerns expressed by Bell Atlantic, NSMA, and GTE will be satisfied.

²² See International Radio Regulations, Appendix 28.

condition our waivers on Crescomm and Qualcomm expeditiously filing appropriate radio license applications.²³

Ordering Clauses

13. Accordingly, Crescomm Transmission Services, Inc. IS GRANTED waiver of Section 2.106 of the Commission's Rules, 47 C.F.R. § 2.106, to provide mobile-satellite service between ships and fixed or temporary-fixed satellite earth stations in the fixed-satellite service, in the 4/6 GHz and 12/14 GHz bands, subject to:

- (a) Cresscom must submit an acceptable application for the permanent provision of mobile-satellite service under Part 25 of the Rules;
- (b) Cresscom may not transmit from any mobile-satellite station operating at sea within 100 kilometers of land unless it has successfully coordinated the transmissions with all affected terrestrial fixed service stations;
- (c) Cresscom must comply with all applicable international coordination and operation requirements;
- (d) Cresscom may not cause harmful interference to any other service or operation in the 4/6 GHz and 12/14 GHz bands.

14. IT IS FURTHER ORDERED that Qualcomm, Incorporated IS GRANTED a waiver of Section 2.106 of the Commission's Rules, 47 C.F.R. § 2.106, to provide mobile-satellite service between ships and fixed or temporary-fixed satellite earth stations in the fixed-satellite service, in the 4/6 GHz and 12/14 GHz bands subject to the following conditions:

- (a) Qualcomm must submit an acceptable application for the permanent provision of mobile-satellite service under Part 25 of the Rules;
- (b) Qualcomm may not transmit from any mobile-satellite station operating at sea within 100 kilometers of land unless it has successfully coordinated the transmissions with all affected terrestrial fixed service stations;

²³ To the extent permitted under Section 309(c) of the Act, we will entertain immediate STA requests from both Qualcomm and Crescomm, effective for up to 60 days, during which time we expect to receive full Title III applications filed pursuant to Part 25 of the Rules. The showings in the applications must include downlink interference parameters which demonstrate a low probability of harmful interference to existing licensees, power flux density data, radiation hazard showings, the identity of the satellite being used to provide service, technical parameters of the earth station equipment, and all other relevant information.

(c) Qualcomm must comply with all applicable international coordination and operation requirements;

(d) Qualcomm may not cause harmful interference to any other service or operation in the 4/6 GHz and 12/14 GHz bands.

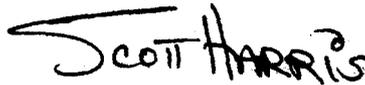
15. IT IS FURTHER ORDERED that Crescomm Transmission Services, Inc. and Qualcomm, Incorporated, respectively, are afforded thirty days from the date of release of this Order to decline this waiver as conditioned. Failure to respond within that period will constitute formal acceptance of the waiver as conditioned. Further, failure to file an acceptable application under Part 25 of the Rules within 60 days of release of this Order will be considered rejection of the waiver and the waiver as to that party will be terminated.

16. IT IS FURTHER ORDERED that, prior to commencement of service, Crescomm and Qualcomm will prepare the necessary submissions for consultations by the U.S. Party in accordance with Article 8 of the Inmarsat Convention.

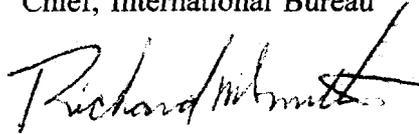
17. IT IS FURTHER ORDERED that, based on the foregoing, the petition for Rulemaking filed by Crescomm is dismissed as moot.

18. IT IS FURTHER ORDERED that this Order is effective upon release.

FEDERAL COMMUNICATIONS COMMISSION



Scott Blake Harris
Chief, International Bureau



Richard M. Smith
Chief, Office of Engineering and Technology