

January 28, 1999

Ms. Regina M. Keeney
Chief of the International Bureau
Federal Communications Commission
Washington, D.C. 20554

Dear Ms. Keeney:

The National Telecommunications and Information Administration on behalf of the Executive Branch Agencies, has approved the release of two draft proposals and one revision of a preliminary view for WRC-2000.

The first proposal concerns agenda item 1.9 and addresses the issue of the Mobile Satellite Service (MSS) in the band 1559-1567 MHz.

The second proposal addresses agenda item 1.15.2. This agenda item considers the addition of the space-to-space direction to the radionavigation-satellite service (RNSS) allocations in the bands 1 215 -1 260 and 1 559 - 1610 MHz. The goal of this proposal is to provide an allocation for space-to-space use for (RNSS), which will ensure the protection of space-based RNSS receivers.

We have also revised our preliminary view for agenda item 1.9 concerned with the proposal of an allocation for mobile satellite in 1559-1567 MHz band. Our preliminary view opposes any mobile satellite allocation in the 1559-1610 MHz band, and recommends suppression of Resolution 220. The revised document better states our reasons for this position. We have included two versions of this preliminary view, one version with edit markings and one version without the edit markings.

Sincerely,

Original Signed
William T. Hatch
Acting Associate Administrator
Office of Spectrum Management

Enclosures

United States of America

(DRAFT) PROPOSALS FOR THE WORK OF THE CONFERENCE

Proposals for Agenda Item 1.9

to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97)

Background: The frequency range under consideration, 1 559 to 1 567 MHz, is allocated on a co-primary basis to Radionavigation Satellite Service (RNSS) (space to Earth) and Aeronautical Radionavigation Service (ARNS.) Additionally, the band is allocated to the Fixed Service (FS) in some countries.

There are millions of RNSS receivers in use today for a wide range of applications, including safety-of-life-critical navigation on land, at sea, and in the air. Today, most of these receivers operate with the Global Positioning System (GPS), an important element of the Global Navigation Satellite System (GNSS) that operates in the 1 559 - 1 610 MHz band.

GPS provides position and time information to users by means of one-way transmissions using RNSS (space-to-Earth) allocations. GPS is information technology that uses systems of hardware and software, as well as information (time and ephemeris) transmitted from satellites to provide derived information to the user.

GLONASS and GPS are established elements of the International Civil Aviation Organization (ICAO) GNSS, operating in the band 1 559 - 1 610 MHz. These systems are accepted by the ICAO Council for use in international civil aviation. ICAO is currently developing Standards and Recommended Practices for international application in civil aviation. The GNSS will be used during all phases of flight, including precision approaches and landing, and under all weather conditions. The latter places extensive requirements on the performance characteristics of the system. The aeronautical use of RNSS is recognized in the Radio Regulations as a safety-of-life application. GPS is the sole basis for the formation of International Atomic Time and Coordinated Universal Time (UTC) by the International Bureau of Weights and Measures. GPS is also the primary means by which clocks are synchronized within telecommunications networks for Time Division Multiple Access transmissions. Time and frequency functions are or will be available on other RNSS systems.

As Resolution **220 (WRC-97)** recognizes RNSS and ARNS systems are evolutionary and other types of GNSS are under development for operation in the band 1 559 - 1 610 MHz. There are both aeronautical and non-aeronautical safety-of-life services in the 1 559 - 1 610 MHz band, and it is well established that there is an essential need to protect systems operating in the ARNS and RNSS.

The core signal structures of the MSS and the RNSS and ARNS are fundamentally different: MSS uses a two-way signal while ARNS and RNSS transmits a weak, receive-only signal. Having systems from a

radiocommunication service operate on a co-primary, co-frequency basis in the 1 559 - 1 610 MHz band would limit ARNS and RNSS operators' flexibility to adjust their spectrum usage, and would hamper efforts to develop a GNSS that is capable of meeting evolving international needs and of providing adequate protection for international civil use worldwide.

Studies conducted in the ITU-R indicate the incompatibility of the MSS (space-to-Earth) and ARNS and RNSS in any portion of the 1 559 - 1 567 MHz band. Not only do MSS signals have the potential to cause significant interference to ARNS and RNSS, but GNSS pseudolites and proposed new RNSS systems also have the potential to cause significant interference to the MSS (space-to-Earth).

Proposal:

USA/ / 1
NOC

The United States proposes that no allocation be made to the Mobile Satellite Service in the 1559-1567 MHz band.

Reasons : The mobile satellite service is not compatible with RNSS and ARNS use of the 1559-1567 MHz band.

USA/ / 2
SUP

~~**RESOLUTION 220 (WRC-97)**~~
~~**Studies to consider the feasibility of use of a portion**~~
~~**of the band 1 559-1 610 MHz by the mobile satellite**~~
~~**service (space-to-Earth) Suppress WRC-97 Resolution 220**~~

Reasons: Studies performed by the ITU-R show that MSS systems are incompatible with GNSS; therefore, sharing of the band 1559-1567 MHz is not feasible. These studies satisfy the requirement of Resolution 220; therefore Res. 220 should be deleted.

United States of America

(DRAFT) PROPOSALS FOR THE WORK OF THE CONFERENCE

Proposals for Agenda Item 1.15.2

to consider the addition of the space-to-space direction to the radionavigation-satellite service allocations in the bands 1 215 -1 260 and 1 559 - 1610 MHz

Background: Radionavigation-Satellite Service (RNSS) systems such as the Global Positioning System and Global Navigation Satellite System are primarily being used in the space-to-Earth direction to provide service to terrestrial users. These systems are, however, also increasingly being used in the space-to-space direction by spaceborne users for such applications as spacecraft three-dimensional positioning and velocity determination; three-axis attitude control; precise time synchronization; precision orbit determination, and atmospheric science. The use of RNSS signals is presently protected only through a space-to-Earth allocation in the 1 215 - 1 260 and 1 559 - 1 610 MHz bands. Recognizing current and future operational usage of spaceborne RNSS receivers for scientific and commercial applications, it is important to add the space-to-space direction to the existing RNSS allocations so that these uses can be taken into consideration when changes to the use of these bands are contemplated.

Interference studies have been conducted to assess the sensitivity of spaceborne RNSS receivers to interference from radiolocation, Earth exploration-satellite (active), space research (active), fixed, mobile and aeronautical radionavigation services in the 1 215 - 1 260 MHz band; from the aeronautical radionavigation and fixed services in the 1 559 - 1 610 MHz band; and also their sensitivity to intra-service interference between radionavigation satellite service systems in these two bands.

The ITU-R has concluded that the addition of a space-to-space direction to the 1 215 - 1 260 MHz and 1 559 - 1 610 MHz RNSS bands will not cause any additional interference to other services since it involves no change to the space-to-Earth transmissions.

Studies demonstrate that RNSS spaceborne receivers can operate satisfactorily in the presence of interference caused by systems in other services as well as other RNSS systems. Potential interference from services in adjacent bands was also examined.

Existing coordination procedures are adequate for space-to-space operations.

Proposal

MHz
1 215 – 1 260

		Allocation to Services			
		Region 1	Region 2	Region 3	
USA/ / 3 MOD	1 215-1 240		EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) <u>(space-to-space)</u> SPACE RESEARCH (active) S5.329 S5.330 S5.331 S5.332		
USA/ / 4 MOD	1 240-1 260		EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) <u>(space-to-space)</u> SPACE RESEARCH (active) Amateur S5.329 S5.330 S5.331 S5.332 S5.334 S5.335		

Reasons: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

MHz
1 559 – 1 610

		Allocation to Services			
		Region 1	Region 2	Region 3	
USA/ / 5 MOD	1 559 – 1 610		AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) <u>(space-to-space)</u> S5.341 S5.355 S5.359 S5.363		

Reasons: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

UNITED STATES

PRELIMINARY VIEW

WRC-2000 Agenda Item AGENDA ITEM 1.9: to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service (MSS) in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions **213 (WRC-97)** and **220 (WRC-97)** ~~(COM5-31)~~;

ISSUE: Mobile-Satellite Service (MSS) downlink at 1559-1567 MHz

BACKGROUND: The band 1559-1610 MHz is allocated to Radionavigation Satellite Service (RNSS) and the Aeronautical Radionavigation ~~Service. A U.S., as well as an ICAO objective,~~ Service (ARNS). An objective of the United States, as well as the International Civil Aviation Organization (ICAO), is the implementation of a global navigation satellite system (GNSS) that can support aeronautical safety in all phases of flight. GNSS The implementation of GNSS will require use of the 1559-1610 MHz band, which is the sole band currently identified to meet present and future requirements of GNSS and its augmentations.

A principal ~~system~~ component of GNSS operating in this band today is ~~GPS,~~ Global Position System (GPS), a navigation satellite constellation providing a worldwide free-of-charge utility that is being used increasingly for ~~critical, high-payoff~~ critical radionavigation, geolocation and timing functions. GPS will be an element of GNSS. There are many types of GPS receivers and applications, including aeronautical radionavigation for all phases of flight, maritime, and uses on land such as surveying, automobiles and scientific investigations. Systems that augment GPS in critical applications are developing. Some of these systems are planned to operate using frequencies in the lower end of the ~~1559-~~ 1559-1610 MHz band. These systems would be blocked by a MSS Mobile-Satellite Service (MSS) allocation. In addition, there are new RNSS systems being proposed that would operate in the 1559-1567 MHz band, such as the European Space ~~Agency ENSS satellite system. These systems also are anticipated to be part of the~~ GNSS-Agency's, European Navigation Satellite System.

WRC-97 adopted RES 220 in response to a proposal to add an allocation to the 1559-1567 MHz band for the Mobile-Satellite Service. ITU-R WP8D has been tasked with performing studies to determine if sharing between MSS and ~~ARNS/RNSS~~ ARNS and RNSS is feasible. The ITU Radio Regulation S4.10 states "Members recognize that U.S. the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies." The United States is working in WP8D and ICAO to document GPS requirements and the requirements for new systems in this band. Studies are underway largely completed to determine interference requirements of a broad range of GPS receivers covering safety and non-safety applications. ~~The required studies will be complete prior to WRC-2000.~~

Further work ~~including a measurement program~~ is planned for the next WP8D meeting.

PRELIMINARY VIEW: Based on ~~the information currently available, considering~~ present and future requirements of the radionavigation satellite services and in particular civil aviation, there is a need to retain the 1559-1610 MHz band for exclusive use by ~~Aeronautical Radionavigation Service (ARNS) and the ARNS and the RNSS. Accordingly, the United States opposes any proposed MSS allocation in the 1559-1610 MHz Radionavigation Satellite Service (RNSS). It is essential that ARNS/RNSS be protected from harmful interference from MSS operations in this band in accordance with RR S4.10. The U.S. is continuing its investigation of this situation in accordance with RES 220. (3June98) band, and recommends suppression of Res. 220. (19Jan99)~~

The following is the same preliminary view with the ~~strikeout and underline~~ markings removed.

WRC-2000 AGENDA ITEM 1.9: *to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service (MSS) in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 (WRC-97) and 220 (WRC-97)*

ISSUE: Mobile-Satellite Service (MSS) downlink at 1559-1567 MHz

BACKGROUND: The band 1559-1610 MHz is allocated to Radionavigation Satellite Service (RNSS) and the Aeronautical Radionavigation Service (ARNS). An objective of the United States, as well as the International Civil Aviation Organization (ICAO), is the implementation of a global navigation satellite system (GNSS) that can support aeronautical safety in all phases of flight. The implementation of GNSS will require use of the 1559-1610 MHz band, which is the sole band currently identified to meet present and future requirements of GNSS and its augmentations. A principal component of GNSS operating in this band today is Global Position System (GPS), a navigation satellite constellation providing a worldwide free-of-charge utility that is being used increasingly for critical radionavigation, geolocation and timing functions. GPS will be an element of GNSS. There are many types of GPS receivers and applications, including aeronautical radionavigation for all phases of flight, maritime, and uses on land such as surveying, automobiles and scientific investigations. Systems that augment GPS in critical applications are developing. Some of these systems are planned to operate using frequencies in the lower end of the 1559-1610 MHz band. These systems would be blocked by a Mobile-Satellite Service (MSS) allocation. In addition, there are new RNSS systems being proposed that would operate in the 1559-1567 MHz band, such as the European Space Agency's, European Navigation Satellite System.

WRC-97 adopted RES 220 in response to a proposal to add an allocation to the 1559-1567 MHz band for the Mobile-Satellite Service. ITU-R WP8D has been tasked with performing studies to determine if sharing between MSS and ARNS and RNSS is feasible. The ITU Radio Regulation S4.10 states "Members recognize that the safety aspects of radionavigation and other safety services require special

measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.” The United States is working in WP8D and ICAO to document GPS requirements and the requirements for new systems in this band. Studies are largely completed to determine interference requirements of a broad range of GPS receivers covering safety and non-safety applications.

Further work is planned for the next WP8D meeting.

PRELIMINARY VIEW: Based on present and future requirements of the radionavigation satellite services and in particular civil aviation, there is a need to retain the 1559-1610 MHz band for exclusive use by ARNS and the RNSS. Accordingly, the United States opposes any proposed MSS allocation in the 1559-1610 MHz band, and recommends suppression of Res. 220. **(19Jan99)**

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