- 4 - 8 GHz (C band) -168 dB(W/m^2/4 kHz)
- 10 - 16 GHz (Ku band) - 168 dB(W/m^2/4kHz)

If we finalize proposals for RBW bands we would also propose to adopt these limits and consequently to make the appropriate modifications to Section V. of Article 28 (RR). These limits would apply only to those bands identified for RBW use. We request comment on these limits. Parties who disagree with these PFD limits for NGSO MSS feeder links should provide a technical basis for alternative limits.

Table 2.

Candidate Bands for NGSO MSS Feeder Link Spectrum[1]

Frequency Band (GHz)	Bandwidth (MHZ) & Direction	Current Primary Allocations	Sharing Potential	
			Co-Directional	Bi-Directional
4.5-4.8[2]	300 ↑	FSS, FS, MS[3]	Sharing not feasible	Sharing feasible
5-5.25[4,5]	250 ↑	ARNS[6], FSS	Sharing feasible	Sharing feasible
5.85-5.925	75 ↓	FSS, FS, MS		
6.425-6.525	100 ↓	FSS, FS, MS		
6.525-6.775	250 ↓	FSS, FS, MS, BA	Sharing not feasible	Sharing feasible
6.525-7.075	550 ↓	FSS, FS, MS, BA	Sharing not feasible	Sharing feasible
10.7-10.95[7]	250 ↑	FSS, MS, FS	Sharing not feasible	Sharing feasible
11.2-11.45[7]	250 ↑	FSS, MS, FS	Sharing not feasible	Sharing feasible
12.75-13.25	500 ↓	FSS, MS, FS	Sharing not feasible	Sharing feasible
15.4-15.7[8]	300 ↑	FSS, ARNS[9]	Sharing feasible	Sharing feasible
17.7-17.8[10]	100 ↓	FSS, FS, BSS	Needs study	Needs study
17.8-18.1	300 ↓	FSS, FS, MS	Needs study	Needs study
18.1-18.4	300 ↓	FSS, FS, MS	Needs study	Needs study
18.4-18.9	500 ↑↓	FSS, EES, FS, MS, SR[11]	Sharing feasible	Sharing possible, if paired with a lower band
18.9-19.2	300 ↓			

Frequency Band (GHz)	Bandwidth (MHZ) & Direction	Current Primary Allocations	Sharing Potential	
			Co-Directional	Bi-Directional
19.2-19.7[12]	500 ↓	FSS, FS, MS	Sharing feasible	Sharing possible, if paired with a lower band
19.7-20.1	400 ↓	FSS,MSS(R2)		
24.75-25.25	500 ↑↓	FSS (R2&3)		
27.5-28.5	1000 ↑	FSS, FS, MS	Sharing feasible	Operationally impracticable
28.5-29.0	500 ↑	FSS, FS, MS	Sharing feasible	Operationally impracticable
29.0-29.5	500 ↑			
29.5-29.9	400 ↑	FSS, MSS		
29.9-30	100 ↑	FSS, MSS		

Notes to Table 2.

* Indicates candidate band is attached as a preliminary proposal. New footnotes proposed in the preceding feeder link regulatory section would apply.

↑ = uplink (Earth-to-space) direction
↓ = downlink (space-to-Earth) direction

ARNS: Aeronautical Radionavigation Service
BA: Broadcast Auxiliary Service
FS: Fixed Service
FSS: Fixed-Satellite Service
MS: Mobile Service
MSS: Mobile-Satellite Service
SR: Space Research

Notes to Table 2., continued

Note 1 - Task Group 4/5 analyzed sharing constraints extensively. See ITU-R Document 4-5/TEMP/SUM, Geneva 1994.
Note 2 - Task Group 4/5 noted that sharing was feasible if the frequency band was not being used by fixed troposcatter systems. However, the 4660-4685 MHz band portion of the 4.5-4.8 GHz band is under consideration in ET Docket No. 94-32, where it has been identified for potential fixed and mobile service use. See Notice of Proposed Rulemaking, (Spectrum Transfer Notice) ET Docket No. 94-32, 9 FCC Rcd 6779 (1994). Therefore, it is unlikely that we would propose the 4.5-4.8 GHz band for feeder link use.
Note 3 - See ITU-R Document 8-3/TEMP/54-E, Geneva, 1994, for an analysis of frequency sharing with mobile services in this band.
Note 4 - The 5-5.25 GHz band is proposed to be paired with the 6.825-7.075 GHz band.
Note 5 - The 5-5.25 GHz band is allocated to the aeronautical radionavigation service and in accordance with RR 796, the Microwave Landing System (MLS) has precedence over all other uses of the band. Currently, MLS occupies the 5030-5091 MHz portion of the band and is planned to extend its use up to 5150 MHz. Task Groups 8/3 and 4/5 have analyzed the sharing situation between MLS and NGSO MSS feeder links and have indicated that sharing may be feasible given certain constraints. However, Task Group 4/5 recommends that, given the safety aspects of MLS, the two services use non-overlapping spectrum. Additionally, Task Group 4/5 notes that MLS could be 'reorganized' in the future into the 5000-5120 MHz portion of the band. This would yield 130 MHz of non-overlapping, contiguous spectrum that could be used for NGSO MSS feeder links. See ITU-R Document 4-5/Temp/38 (Rev.1) at 2.1.3.8.1.1. U.S. delegation members, including those from the FCC, NTIA, the Department o State, and the FAA did not oppose these conclusions.
Note 6 - See ITU-R Document 8-3/TEMP/55-E, Geneva, 1994, for an analysis of frequency sharing in this band.
Note 7 - The 10.7-10.95 and 11.2-11.45 GHz bands are proposed to be paired with the 12.75-13.25 GHz band.
Note 8 - Proposed to be paired with spectrum in the 18.9-19.2 GHz band.
Note 9 - See ITU-R Document 8-3/TEMP/54-E, Geneva, 1994, for an analysis of frequency sharing in this band.
Note 10 - Footnotes RR 869 and 870A limit the use of the band by the fixed-satellite service to feeder links for the broadcasting-satellite service. If NGSO MSS feeder links are permitted in these bands those footnotes would need to be suppressed or modified.
Note 11 - The 18.6 - 18.8 GHz band is allocated to the Earth exploration-satellite service in Region 2.
Note 12 - We proposed to pair the 19.2-19.7 GHz band with 500 MHz of spectrum within the 27.5 - 29.5 GHz band. The most logical pairing would be with the 29.0-29.5 MHz band. However, the Commission is engaged in other rulemaking proceedings

that could affect the availibility of the 29.0-29.5 MHz band for feeder links. Therefore, we request comment on both the 29.0-29.5 GHz and alternate 500 MHz segments within the 27.5-29.5 GHz range for pairing with the 19.2-19.7 GHz band. We include the 29.0-29.5 MHz band as an example '500 MHz' proposal.

Further details on the constraints associated with these bands are identified in the IAC Interim Report.[87] Additionally, parties should take account of the proposed regulatory provisions described previously that apply to candidate bands as indicated in footnotes to Table 5.

5. MSS Spectrum Requirements/Allocations

56. Spectrum Requirements/Proposed Allocations - MSS Below 1 GHz. Non-voice, non-geostationary MSS proponents who intend to operate below 1 GHz have indicated a need for at least an additional 10 MHz of spectrum, available for network use by the year 2000, and for an additional 13-20 MHz by the year 2010. The IAC identified candidate bands that may be suitable for these operations and recommends seeking an allocation of 10 MHz of spectrum at WRC-95. The bands it identified are listed in the table in Appendix 2.

57. While the proposed bands total more than 10 MHz, the identification of a number of candidate bands will likely be necessary to ensure the worldwide allocation of 10 MHz at WRC-95. Note that the IAC has prioritized candidate bands into three categories. They are:

Priority One	bands the IAC considers as most desirable for allocation in the near term and on a worldwide basis;
Priority Two	bands where NVNG MSS can share with existing services, however, achieving worldwide allocations might be difficult; and
Lowest Priority	bands used heavily in the U.S. However, the nature of existing operations might permit sharing.

The priorities above are the IAC's assessment of the potential for using the bands it identifies. We note that all of the 'Priority One' bands for which the IAC has submitted draft conference proposals are either allocated exclusively for government use or for shared government - non-government use. NVNG MSS use of these bands has not been coordinated or agreed upon among the FCC, NTIA or government agency users. Therefore, it is premature to indicate that these bands will be U.S. proposals to WRC-95. We invite parties to comment on potential NVNG MSS allocations in the bands in the table particularly the 'Priority One' bands,[88]

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[87] IAC Interim Report at 167-69.

[88] The IAC's 'Priority One' bands are: 138-141 MHz (space-to-Earth) and 141-144 MHz (Earth-to-space); 225-235 MHz (space-to-Earth) and 390.0-399.9 MHz (Earth-to-space); 312-315 (Earth-to-space) and 387-390 MHz (space-to-Earth); and 399.9-400.05 MHz (both

noting that, with the exception of the 399.9-400.05 MHz band, such use has not been coordinated or agreed upon between the FCC and NTIA. We also invite parties to identify and give consideration to potential below 1 GHz NVNG MSS allocations in non-Government spectrum.[89] Additionally, recognizing that it may be difficult to agree on U.S. proposals for allocations in spectrum with primary Government allocations, parties should attempt to identify potential allocations that might use both Government and non-Government spectrum.[90]

58. Two of the IAC's candidate bands are being included as preliminary FCC proposals for WRC-95. One, the 399.9-400.05 MHz band has an operation that will cease by 1 January 1997. The IRAC's RCS also includes this band as a preliminary WRC-95 proposals for NVNG MSS. The other, the 137-138 MHz band is used in the U.S. by NOAA and DoD for MetSats operations. However, Congress has mandated that those entities consolidate their MetSat programs. This convergence of programs is still under discussion. Consequently, the time frame during which MetSats might migrate from this band is as yet uncertain. Discussions with NTIA on the eventual availability of this band continue. We invite further comment on including this band as a FCC proposal for a NVNG MSS allocation at WRC-95.

59. Spectrum Requirements/Allocations - MSS Between 1 and 3 GHz. There are numerous existing or proposed MSS networks worldwide. These networks will compete for approximately 200 MHz of MSS spectrum currently available on a worldwide, co-primary basis. In the IAC, a methodology for converting traffic projections for MSS to needed spectrum was developed.[91] Using that methodology,

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directions). With regard to the 380-399.9 MHz spectrum range, we note that in Europe and the United States, some entities have indicated a desire to reserve any non-military use for land mobile public safety services (see para. 104, infra.). We invite comment on the ability of NVNG MSS to share with existing and future fixed and mobile services in this spectrum.

[89] For example, we note that the IAC includes the 470-512 MHz and 512-806 MHz bands under its 'Priority Two' categorization as possible candidates for NVNG MSS allocations in the long term. In the United States, these bands are allocated for television broadcasting. For these bands, we invite parties to comment on the technically feasibility of spectrum sharing between NVNG MSS and both existing analog and future digital television broadcasting.

[90] For example, it is usually necessary to have a certain percentage of frequency separation for send and receive transmissions. Given that a NVNG MSS allocation around 400 MHz is desirable and a frequency separation on the order of 5-7% is needed, would it be possible to obtain allocation in the 380-400 MHz range for one transmission direction with a companion allocation in the 420-450 MHz range? Parties should identify such possibilities.

[91] See IAC Interim Report at 90-101.

the IAC arrived at the following spectrum requirements, given in Table 4, for handheld terminal, NGSO MSS.

Table 4.

MSS Spectrum Requirements by the Year 2005.
(Handheld Terminal, NGSO MSS)

Market Estimate[92]	Subscribers (Millions)	Equivalent Spectrum Requirement (each direction)
LOW	4.11	19.3 MHz
LOW	6.0	28.1 MHz
MEDIUM	15.0	70.2 MHz
HIGH	22.0	103 MHz

60. The estimates in Table 4 are for NGSO networks only. Prior to WARC-92, the Joint International Working Party for WARC-92 projected that between 88.8 MHz and 164.1 MHz of spectrum in each direction would be needed for GSO MSS by 2010. Recently, ITU-R Task Group 8/3, based on inputs from Inmarsat and others, has produced forecasts for MSS spectrum requirements to the year 2005.[93] The Inmarsat material input to Task Group 8/3 forecasts a minimum of 61.3 MHz in each direction and a realistic requirement of 105.7 MHz in each direction needed by the year 2005. Compared to other estimates, the Inmarsat-based forecasts are revised downward. This is because Inmarsat factored in a potential overlap in providing land mobile-satellite services (LMSS) between GSO and NGSO MSS networks. Nevertheless, a considerable amount of spectrum for GSO MSS will be required. The IAC estimates that when all forecasts are taken into account, a total of 150-300 MHz of MSS spectrum will be required by the year 2005.[94]

61. The table below lists candidate bands for future MSS spectrum allocations. This table includes both potential "new" MSS allocations and bands listed

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[92] These estimates are based on various MSS market studies. See IAC Interim Report at 91.

[93] See ITU-R Document 8-3/TEMP/39(Rev 1).

[94] IAC Interim Report at 96.

earlier in the Allocation Constraints section. Bands that we intend to propose for allocation at WRC-95 at this juncture are noted and appear in Proposal No. 1/B-LEO Appendix 1.[95] The 1675-1710 MHz band is listed in the table, however, discussion is continuing between the FCC, NTIA and the National Oceanographic and Atmospheric Administration on conditions for access to this band continue.[96] We request comment on these and any other bands between 1 and 3 GHz that may be suitable for MSS .[97]

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[95] The IAC also identified the 2300-2310 MHz, 2390-2400 MHz and 2402-2417 MHz bands as potential locations for MSS allocations. See IAC Interim Report at 117. However, these bands are part of the transfer of spectrum from Federal use to private sector use and are under consideration in our Spectrum Transfer Notice as candidate bands for mobile and fixed services. They are not likely candidates for U.S. proposals for MSS allocations. In particular, the 2300-2310 MHz band is being given to non-government use on an accelerated basis, but only for non-space, non-airborne services. With regard to the 2390-2400 MHz band, in its preliminary report on identification of spectrum for private sector use the Department of Commerce expressed concern over the possible effect of private sector use on the National Astronomy and Ionospheric Center that conducts planetary research at 2380 MHz. To protect those operations the Department of Commerce stipulates that this band should not be used for airborne or space-to-Earth links. See Spectrum Transfer Notice at paras. 5-6.

[96] NTIA has indicated that ITU-R Working Party 7C will address draft new Recommendations that address the feasibility of sharing between MetSats and MSS. If these recommendations are approved prior to WRC-95, NTIA suggests that the meteorological satellite service could be suppressed from footnote RR 735A (see para. 35, supra.). However, until studies that address sharing between MSS and the meteorological aids service are completed, that service should be retained in RR 735A.

[97] Additional analysis and information on these bands can be found in the IAC Interim Report at 101-118.

Table 5.

Candidate Bands for Worldwide MSS Spectrum Allocations

Band (MHz)	Bandwidth & Direction	Notes	Use Summary	Draft FCC Proposal?
1675-1710	35 MHz ↑	Make primary worldwide.	MetAids, Metsat, fixed and mobile[98]	Yes
1525-1559/ 1626.5-1660.5	34 MHz ↓	Make Generic, Primary MSS in all 3 Regions	Sharing with fixed in certain countries under RR 730; some sub-bands subject to sharing.	Yes
	34 MHz ↑			
1985-2025/ 2165-2200	35 MHz ↑	Potential Domestic Allocation Adjustment[99]	Fixed Mobile	Yes
	35 MHz ↓			

Key to Table:

↑ = proposed Earth-to-space transmission direction
↓ = proposed space-to-Earth transmission direction

[98] Note para. 36, infra. that discusses current use of this band. Parties should also identify potential sharing possibilities for this proposed uplink band. For example, there will likely be high demand worldwide for 2 GHz MSS spectrum. It may be possible to pair this band with downlink spectrum in the 2 GHz range. Comment is invited.

[99] After restructuring its 2 GHz PCS allocations to expand into part of the Region 2 GHz MSS allocations made at WARC-92, the Commission indicated that it would seek additional MSS spectrum in the 2 GHz range. Concurrent with the adoption of this Notice, the Commission is adopting a Notice of Proposed Rulemaking that address 2 GHz MSS issues.

62. Parties should note that the attached 1-3 GHz MSS proposals (No. 1/B-LEO) incorporate proposed adjustments to current 2 GHz MSS allocations made at WARC-92. These adjustments reflect the Commission's allocation of the 1850-1990 MHz band for Personal Communication Services (PCS),[100] and its effect on our ability to use that spectrum for MSS in the United States. Specifically, WARC-92 made a secondary allocation for MSS in the 1930-1970 MHz band for Region 2 only. We are proposing to eliminate this allocation in the 1930-1945 MHz portion of this band. WARC-92 also made a primary allocation for MSS in the 1970-1980 MHz band for Region 2 only. We are proposing to drop the status of MSS in this band to secondary. This would reflect the current PCS use in the U.S. but could allow some MSS operation. Finally, we propose to eliminate the primary MSS allocation in the 1980-1985 MHz band in all three Regions. This last proposal leaves a 5 MHz primary MSS overlap with the our domestic PCS allocation. Although this spectrum may not be useable for primary MSS in the U.S., it may be useable in other parts of Region 2 and it provides additional spectrum for coordinating spectrum use between administrations international MSS networks.[101] We invite comment on this proposed MSS allocation structure.

6. Date of Entry Into Force of MSS Spectrum Allocations Around 2 GHz.

63. At WARC 92 different dates of entry into force (dates of entry) of 2 GHz MSS allocations were agreed upon. Footnote RR 746C specifies a date of entry of 1 January 1996 onwards for the United States, whereas RR 746B specifies a date of entry of 1 January 2005. In Task Group 8/3, it was noted that, with new interest in implementing 2 GHz MSS systems on the part of administrations other than the United States, this difference in dates of entry could have an adverse impact on implementing non-U.S. MSS networks.[102]

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[100] See id. This decision likely precludes use of the 1970-1990 MHz band for co-primary MSS.

[101] Our proposals in this proceeding reflect our desire to obtain common, useable worldwide MSS allocations at 2 GHz. We note however, that at least one U.S. petitioner (CELSAT, Inc., RM-7927) has indicated that it desires to implement a hybrid PCS/MSS network that would use PCS spectrum on a co-primary basis. As there are differing, evolving requirements for access to 2 GHz spectrum for both terrestrial and MSS networks, parties should take these into account.

[102] See ITU-R Document 8-3/TEMP/36 (Rev.3), Geneva, 1994. This relates to the fact that MSS systems can only be notified 6 years in advance of the date of entry of an allocation. Many administrations have advance published 2 GHz MSS systems in advance of that timeframe and these have been given favorable findings by the BR.

64. Parties take positions on both sides of the date of entry issue. Motorola opposes advancing the date of entry. Motorola argues that the U.S. should not support advancing the date of entry, because that action would be inconsistent with the use of 2 GHz spectrum for Future Public Land Mobile Telecommunication Systems (FPLMTS)-compatible satellite systems.[103] Motorola states that it would support moving the U.S. date in RR 746C to 1 January 2005 so that all potential MSS operators would face identical constraints.[104]

65. COMSAT Mobile Communications (COMSAT) argues that the U.S. should propose moving the RR 746B date of entry forward to be compatible with the U.S. date (1996-2000). COMSAT contends that there will likely be early saturation of MSS bands, therefore, it is urgent that WRC-95 provide access to 2 GHz bands around the year 2000.[105] COMSAT also maintains that early access to 2 GHz spectrum would facilitate provision of a FLMPTS-compatible satellite component worldwide.

66. The Commission's IAC recommends that the United States propose no change to its RR 746C date. It takes no position on advancing the RR 746B date. However, it does recommend that the U.S. adopt a position supporting a transition plan to gradually introduce MSS into 2 GHz bands sometime prior to the year 2005.

67. We note that although the current 1996 U.S. date of entry of RR 746C affords the United States maximum flexibility in implementing U.S.-based MSS networks, advancing the 2005 date of RR 746B could facilitate early introduction of global MSS networks -- including future networks in which U.S. entities may have interests. Therefore, we believe that consideration of the differing dates of entry into force of 2 GHz MSS allocations should be in the context of an overall approach to making available 2 GHz MSS spectrum, including potential expansion of existing allocations as proposed elsewhere in this document. Therefore, we will not make a specific proposal at this time.

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[103] RR 746A (WARC-92) states in part: "The frequency bands 1885-2025 MHz and 2110-2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement the future public land mobile telecommunications systems (FPLMTS). Such use does not preclude the use of these bands by other services to which the bands are allocated."

[104] Motorola comments at 6-7.

[105] COMSAT comments at 7-12.

B. Other WRC-95 Issues

1. Space Services

68. Earth Stations in the 2025-2110 MHz Band. WARC-92 upgraded to primary the status of the space research, space operation, and Earth exploration-satellite services in the 2025-2110 MHz band. This band is also allocated internationally for primary fixed and mobile use. In the United States, the 2025-2110 MHz band is allocated to the mobile service on a primary basis and is generally used for electronic news gathering purposes. To facilitate shared use of this band, item 2.2 of the WRC-95 agenda provides for consideration of power limits for Earth stations in the Earth exploration-satellite, space research, and space operation services.

69. Currently, RR 2541 specifies power limits for space services and Earth stations operating in a number of frequency bands shared by space and terrestrial services. The 2025-2110 MHz band, however, is not included in this provision. Accordingly, ITU-R Joint Ad Hoc Working Party (JWP) 7B/9D was tasked with developing appropriate power limits for Earth stations operating in this band. Recently, JWP 7B/9D reached a consensus that the power limits given in No. 2541 are appropriate to apply to the 2025-2110 MHz band.[106] The IAC and NTIA's RCS have developed draft language to implement these power limits by adding No. 2544 *bis* to Article 28 of the Radio Regulations to read as follows:

> ADD 2544 *bis* (6) As an exception to the limits given in No. 2541, the equivalent isotropically radiated power (e.i.r.p.) towards the horizon for an earth station in the Earth exploration-satellite service, space research service and space operation service in the 2025-2110 MHz band shall not exceed +XXdBW in any 4 kHz band.

70. The IAC continues to address this subject. CTA, Incorporated, the only commenter to address this issue, supports consideration of guidelines for sharing

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[106] The power limits in No. 2541 are:

+40 dBW in any 4 kHz band for $\Theta \leq 0°$
+40+3Θ dBW in any 4 kHz band for $0° < \Theta \leq 5°$

where Θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

within this band.[107] We renew our request for comments on this issue -- specifically whether the RR 2541 limits are appropriate.

71. Fixed Satellite Service Use of the Band 13.75-14.0 GHz. WARC-92 made a primary allocation for FSS in the 13.75-14.0 GHz band. This band is shared with the radiolocation and radionavigation services and is available on a secondary basis for the space research, Earth exploration-satellite, and standard frequency and time- signal satellite services. To facilitate shared use of this band, WARC-92 adopted footnote RR 855A to the international Radio Regulations that specifies technical criteria for primary services in this band.[108] Resolution 112 (WARC-92) resolves that the criteria specified in RR 855A be studied and that studies be conducted on the technical compatibility between FSS and secondary allocations in the 13.75-14.0 GHz band.

72. ITU-R Task Group 4/4 has completed its technical studies relative to RR 855A and has confirmed that the RR 855A values are appropriate. In Recommendation ITU-R S.1068, it provides further details on FSS sharing with the radiolocation and radionavigation services. In addition, WARC-92 adopted footnote RR 855B granting equal status with FSS operations to geostationary space stations in the space research service that were advance published prior to January 31, 1992. Radio Regulation 855B also stipulates that FSS stations shall not cause harmful interference to non-geostationary stations in the space research service prior to January 1, 2000.

73. ITU-R Task Group 7/3 studied the compatibility between FSS and other services in the 13.75-14.0 GHz band taking into consideration RR 855B. The group developed criteria necessary to provide protection to non-FSS services. Task Group 4/4 developed constraints on FSS operations to provide the necessary protection. As a result of their efforts, the two groups developed recommendations ITU-R S.1069 and ITU-R SA.1071 setting forth the sharing criteria for the band. In considering Item 2.3 on the WRC-95 Agenda, the CPM determined that all studies necessary to satisfy Resolution 112 have been performed and that the above Recommendations contain the appropriate sharing criteria.

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[107] CTA reply comments at 3.

[108] These criteria include minimum and maximum e.i.r.p. values of 68 dBW and 85 dBW, respectively, and a minimum antenna diameter of 4.5 meters for earth stations in the fixed-satellite service. Footnote 855A also provides a maximum e.i.r.p. value for stations in the radiolocation and radionavigation services.

74. COMSAT World and Hughes support the work of Task Groups 4/4 and 7/3 and urge approval of their conclusions.[109] The IAC and NTIA, on behalf of participating federal government agencies, concur and they have developed draft proposals consistent with these conclusions.[110] These draft proposals modify RR 855A and 855B to eliminate references to Resolution 112 and future studies on technical criteria. They add to RR 855A a reference to Recommendation ITU-R S.1068 and add references to Recommendations ITU-R S.1069 and ITU-R SA.1071 to RR 855B. Finally, their draft proposals suppress Resolution 112 as no longer necessary.

75. We note that there appears to be general agreement on the values affirmed by the relevant ITU-R groups and on the suppressions of Resolution 112. As an initial matter, we accept the IAC's recommendation on this issue and incorporate it as Proposal No. 4/SS, Appendix 1. However, we invite comment, noting that RR 855A stipulates that after 1 January 2000, non-geostationary space stations in the space research and Earth exploration-satellite service will operate on a secondary basis relative to the fixed-satellite service.

76. Space Services Allocations. Agenda item 3 for WRC-95 provides for consideration of Resolution 712 (WARC-92), with a view towards taking action at WRC-97. The following issues relating to space science services are considered under Resolution 712: (1) providing worldwide primary allocations for the Earth-exploration and space research services in appropriate bands within the 8-20 GHz range; (2) satisfying inter-satellite service requirements for up to 50 MHz of spectrum near 23 GHz; (3) providing up to 1 GHz of spectrum for space-based active Earth sensors around 35 GHz; and 4) including certain CCIR-approved space science service coordination parameters in Appendix 28 of the Radio Regulations. Technical studies are currently underway regarding each of these issues, including spectrum requirements, the allocation status of these services in various bands, and the feasibility of sharing between services. No parties commented on this issue in response to the Notice. A detailed discussion of these issues and the status of

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[109] COMSAT World comments at 6; Hughes comments at 3-4. Hughes has pending before the FCC an application (File Nos. 47-DSS-P/LA-94; CSS-94-018) for authority for a separate international fixed communications satellite to provide digital video distribution to Latin America. Hughes proposes to make use of the 13.75-14.0 GHz band for uplink transmissions from the U.S. and Latin America.

[110] See IAC Interim Report at 184; Initial Federal Government Draft Recommended Proposals (NTIA Draft Proposals), Dept. of Commerce, National Telecommunications and Information Administration, Nov. 8, 1994, at Document No. 4.

considerations is contained in the IAC's Interim Report.[111] Parties are invited to address these issues, bearing in mind that substantive action is planned for WRC-97.

2. Appendices 30 and 30A

77. WRC-95 agenda item 3a provides for consideration of Appendices 30 and 30A (Plans and procedures for the broadcasting-satellite service and associated feeder links, respectively) for Regions 1 and 3 in response to Resolution 524 (WARC-92). WRC-95 is directed to review related work being carried out in ITU Study Groups, with WRC-97 taking appropriate substantive action. At WRC-93, the U.S.'s primary concern was that the Region 2 Plan not be affected by modifications to the Plans of other Regions. This concern is reflected in WRC-93's direction that particular attention be given to 'resolves 2' of Resolution 524.[112] Item 3a also provides for consideration of Appendix 30B. This would allow an administration to implement its FSS allotment with the same satellite used for its BSS allotment under Appendices 30 and 30A.[113] In addition, the VGE proposes changes that affect the content and format of Appendices 30 and 30A.

78. The IAC has addressed both the VGE's Final Report as it relates to this subject and WRC-95 agenda item 3a. In its Interim Report, the IAC notes that VGE Recommendation Nos. 2/3, 2/5, and 2/6 would eliminate the Plans for BSS and associated feeder links and disperse their provisions and procedures throughout the Radio Regulations. It questions whether this is a useful 'simplification' and maintains that it would be premature to apply the VGE's recommendations since WRC-95 will consider major revisions to Appendices 30 and 30A. Furthermore, the IAC suggests that the recommendations might be used as a model for revisions of the Appendices at WRC-97.[114]

79. The IAC also states that in determining the impact on the Region 2 Plans of revising the Region 1 and 3 Plans (and associated inter-Regional sharing criteria), it is critical to note that BSS systems actually implemented in Region 2 differ from those described in the Region 2 Plan. These differences, it contends, could make operating BSS systems in Region 2 more vulnerable to interference from BSS

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[111] Id. at 187-91.

[112] Resolves 2 of Resolution 524 directs future conferences to ensure the integrity of the Region 2 Plan by providing the same level of protection to Region 2 assignments and not requiring additional protection from Region 2 assignments if other Plan are modified.

[113] See Notice, 9 FCC Rcd at 2436.

[114] IAC Interim Report at 35-36.

and FSS systems in the other Regions. The IAC maintains that unless modifications are made to the Region 2 Plan to reflect systems being implemented, Regions 1 and 3 would not be required to provide inter-Regional protection. In this regard, it observes that it might also be desirable to modify inter-Regional sharing criteria on a reciprocal basis.[115]

80. To preserve the United States's interests, the IAC recommends the following actions:

- oppose adoption of VGE Recommendation Nos. 2/3, 2/5 and 2/6;
- participate actively in options for revising the Plans in Regions 1 and 3, with two objectives:
  1) to ensure equitable assignments for U.S. territories in Region 3;
  2) to protect Region 2 assignments as implemented from revised assignments for Regions 1 and 3; and
- not oppose the adoption of new inter-Regional sharing criteria or new orbital assignments that permit co-location of BSS and FSS assignments (Appendix 30B aspect).[116]

81. In comments responding to the Notice, Hughes notes that U.S. BSS systems would be vulnerable to interference from systems in Regions 1 and 3.[117] Both Hughes and USSB comment that the U.S. should participate in studies being undertaken pursuant to Resolution 524 by ITU-R Working Party 10-11S and CPM-95.[118] Hughes also remarks that the impact of taking account of Appendix 30B in revising the Plans of Regions 1 and 3 should be negligible.[119]

82. We request further comment on the above including the IAC's recommendations. Parties should note the work being conducted by ITU-R Working Party 10-11/S in preparation for substantive actions at WRC-97. Specifically, suggestions have been made to change Appendix 30/30A and Resolution 42 to

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[115] Id. at 33-34.

[116] Id. at 37.

[117] Hughes comments at 8.

[118] Id. at 9; USSB comments at 3-4.

[119] Hughes comments at 9-10.

modify inter-regional sharing criteria as well as service implementation procedures and methods to provide additional flexibility to accommodate new direct broadcast satellite (DBS) technologies and services. Comment is also requested on whether the U.S. should propose to WRC-95 that WRC-97 be given appropriate limited competence to revise the Radio Regulations to ensure that these recommendations apply to Region 2.

3. High Frequency Broadcasting

83. WRC-95 Agenda Item 3c addresses the availability of High Frequency Broadcasting (HFBC) bands allocated at WARC-79 and WARC-92. The use of these bands was conditioned on the development of an acceptable worldwide planning system which has proven to be a difficult task due to excessive demand and limited HFBC spectrum. Since the Notice, the ITU has established Task Group 10/5 for the purpose of addressing planning procedures.

84. Task Group 10/5 has made significant progress. In its draft report, the group examines planning procedures associated with broadcasting and other radio services.[120] It enumerates guiding principles for a new planning procedure and describes the procedure for a new, simple, and flexible process for planning the HFBC bands. This approach is premised on the concept of seasonal coordination carried out at the regional level. Coordination is based on an agreed upon technical evaluation of the incompatibilities in the proposed broadcasting schedules. This technical evaluation is based on existing ITU-R Recommendations. This approach will be refined at subsequent meetings of Task Group 10/5 scheduled after WRC-95. The direction Task Group 10/5 takes appears to be consistent with U.S. interests.[121] Although the WRC-95 agenda does not provide for substantive action on this issue, Task Group-10/5's final report will likely be the basis for substantive action at WRC-97.[122] We invite further comment on the work of Task Group 10/5 and alternate approaches to facilitating the availability of HFBC bands.

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[120] ITU-R Document 10-5/TEMP/5, 1994 (Report to CPM-95).

[121] We note, however, that during recent Task Group 10/5 meetings, representatives of the Asian Broadcasting Union (ABU) and Japan expressed strong interest in global coordination meetings hosted by the ITU. At present, these entities do not participate in the coordination meetings where European and North American entities coordinate their frequency use and thus they find that their interests do not at present have an adequate forum for consideration.

[122] Task Group 10/5 also concluded that a suitable planning procedure for HF broadcasting will be produced and provided to WRC-97. Further, it recommends to WRC-95 that it hold in abeyance its review of the VGE Final Report's proposed revision of Article 17 (Article S12) until WRC-97 We request comments on these subjects.

85. Comments were received on an additional item regarding the HFBC issue.[123] Under the current WARC-92 constraints, only Single Side Band (SSB) transmissions can be used in this additional spectrum. This matter may be linked to the approval of a planning procedure at WRC-97. At present, SSB receivers are not widely available and represent a very small fraction of the HF receiver market. Also, the SSB receivers that are available are prohibitively expensive in many areas of the world. Commenters indicate that with the advent of new technologies, such as digital audio broadcasting (DAB), it may be unwise to impose a SSB standard without first giving further consideration to better long term alternatives. We request comments on the requirement of SSB transmissions in the new HFBC bands.

4. Review of the Final Report of the Voluntary Group of Experts

86. The Voluntary Group of Experts (VGE) was tasked by the ITU in 1989 to simplify the international Radio Regulations (RR) without making substantive alterations thereto.[124] The VGE divided its work into three areas: (1) Task 1 - Allocation Matters; (2) Task 2 - Procedural Matters Related to the Use of Frequencies; and (3) Task 3 - Operational and Administrative Matters. The VGE's Final Report will be reviewed by WRC-95, pursuant to item 1 of the WRC-95 agenda. WRC-95 will further undertake to make appropriate revisions to the Radio Regulations and to provide a timetable for implementation of any outstanding recommended actions.[125] The VGE recommends in the Final Report specific revisions to sections of the Radio Regulations and general guidelines for future development and administration of the Radio Regulations.[126] The U.S. generally supports the VGE and its efforts to simplify the international Radio Regulations and associated provisions.

87. In the Notice, we described the general approaches of the VGE for simplifying the Radio Regulations and invited parties to comment on those approaches and on specific VGE recommendations.[127] We further invited parties to identify foreseeable difficulties with any aspect of the VGE's work and, where possible, to propose alternative approaches and solutions.[128] The IAC has also been

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[123] See, e.g., comments of George Jacobs and Associates, Inc. at 6-7.

[124] See Final Acts of the Plenipotentiary Conference (Nice, 1989), Resolution 8.

[125] See Appendix 2, WRC-95 Agenda, Item 1.

[126] See Notice, 9 FCC Rcd at 2431-33.

[127] Id. Major portions of the VGE Final Report have been entered into the docket file of this proceeding and are available for public inspection.

[128] Id. at 2432-33.

asked to review the VGE's Final Report. NTIA's IRAC and its subordinate group, the Radio Conference Subcommittee (RCS), are also reviewing the VGE's work and developing preliminary draft U.S. proposals for WRC-95.[129] Their preliminary views were shared with the IAC.

88. Several parties express concern that full consideration of the VGE Report could consume too much of the time and resources of WRC-95 at the expense of affording full treatment of the other issues on agenda, most notably MSS. AMSC comments that "substantial danger exists that VGE deliberations will dominate WRC-95."[130] Further, some recommend that consideration of the VGE Final Report be deferred altogether until a future conference.[131] AMSC suggests that WRC-95 categorize the VGE issues according to service and then place specific issues for consideration on appropriate future WRC agendas.[132] Other commenters, such as Comsat Mobile Communications, propose that the VGE Final Report be addressed in a separate committee at WRC-95 so work can continue simultaneously on the other WRC-95 agenda items.[133] The Commission shares the commenters' concerns that adequate attention can be devoted at WRC-95 for considering issues besides the simplification of the Radio Regulations. Parties should note that it has not yet been determined to what extent and how WRC-95 or subsequent conferences might consider the VGE Final Report. That decision will likely develop at ITU meetings preparing for WRC-95 and will be finalized at the conference itself.

89. Other parties offer comment on specific VGE proposals. Aeronautical Radio, Inc. (ARINC) opposes VGE Recommendation No. 1/7 to allocate frequencies to more broadly defined service categories.[134] COMSAT World expresses concern that the VGE's "simplification" of notification, coordination, and registration procedures might serve to hinder implementation of satellite-based

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[129] See NTIA Draft Proposals.

[130] AMSC comments at 17; see also, e.g., COMSAT World comments at 7-9 (consideration of VGE item might consume "disproportionate share of WRC-95."); see also IAC Interim Report at 10.

[131] See AirTouch comments at 3-4; Loral comments at 20.

[132] See AMSC comments at 19.

[133] COMSAT Mobile comments at 32; COMSAT World reply comments at 10. Motorola disagrees that consideration of the VGE Report should be deferred but supports COMSAT World's and AMSC's ideas for controlling the conference's consideration of the item to preserve sufficient resources for full treatment of MSS issues. Motorola reply comments at 3-4.

[134] ARINC comments at 5-6.

telecommunications service.[135] The comments reflect differing views on whether the VGE's proposed Simplified Radio Regulations would improve the current interim procedures for coordination and notification of NGSO satellite networks contained in Res. 46.[136] We invite parties to submit any further comments on these identified issues or other concerns regarding the VGE's Final Report.

90. The IAC concludes in its Interim Report that the VGE has successfully carried the majority of the provisions of the international Radio Regulations forward to the Simplified Radio Regulations without change to the present registration process for frequency assignments.[137] The IAC also expresses general agreement with the preliminary views on this topic expressed by the federal government in the NTIA Draft Proposals.[138] Specific variances from the views of the VGE and the federal government are described in the Interim Report.[139]

91. Commission staff is continuing its own review of the VGE Final Report and is evolving preliminary draft U.S. proposals on this topic. In conjunction with these efforts, it will take into account the further views expressed by the IAC, the commenters, and NTIA. Parties are invited to comment on the IAC's recommendations and other VGE issues.

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[135] COMSAT World comments at 10-13.

[136] Motorola comments at 2-3; Orbcomm comments at 7; Starsys reply comments at 3-4. See also Notice, 9 FCC Rcd at 2432 n.9.

[137] IAC Interim Report at 10-11.

[138] Id.

[139] Id. at 11-37.

C. Planning for Future World Radiocommunication Conferences

1. 1997 World Radiocommunication Conference

92. In keeping with the ITU's new four-year planning cycle for WRCs, the 1993 conference developed a preliminary agenda for WRC-97.[140] In addition to urgent issues to be identified by WRC-95, the preliminary agenda provides for the consideration of the following items at WRC-97: (1) frequency allocations and regulatory aspects related to MSS including allocations for feeder links; (2) allocation issues for the space services -- specifically allocation of bands above 50 GHz to the Earth exploration-satellite (passive) service and allocations and associated provisions for the 399.9-400.05 MHz band; (3) HF bands allocated to the broadcasting service; (4) allocation issues concerning the aeronautical mobile (R) service in the band 136-137 MHz per Resolution 408 (Mob-87); (5) revisions to Chapters IX and N IX in accordance with Resolutions 200, 210, 330, 331 (Mob-87) taking into account the pending implementation of the global maritime distress and safety system (GMDSS); (6) use of Appendix 18 VHF frequency band for maritime mobile communications; (7) Article 61 relating to the priority of communications in the maritime mobile and the maritime mobile-satellite services; and (8) Appendices 30 and 30A for Regions 1 and 3 in response to Resolution 524 (WARC-92).[141]

93. The preliminary agenda also provides for consideration, at WRC-97, of the following outstanding resolutions and recommendations from past conferences: Resolution 60 (WARC-79) on revision of propagation information used in Appendix 28; Resolution 211 (WARC-92) on use by mobile service of frequency bands 2025-2110 MHz and 2200-2290 MHz; Resolution 710 (WARC-92) on primary service requirements for Met-Sat and Earth exploration-satellite services in band 401-403 MHz; and Resolution 712 (WARC-92) on issues dealing with allocations to space services which were not placed on the WARC-92 agenda;[142] Recommendation 66 (WARC-92) on studies of maximum permitted levels of spurious emissions;

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[140] Res. 2, WRC-93. Geneva, 1993. A copy of the Preliminary Agenda is attached to the Notice.

[141] See Appendix 3. WRC-97 Preliminary Agenda, Items 3.1-3.7.

[142] Consideration of Resolutions 211 and 712 (WARC-92) at a future WRC is preliminarily supported by the IAC. See IAC Interim Report at 233-34. Additionally, the IAC notes that Orbital Sciences Corporation has indicated its support of Resolution 712 and recommends establishment of a common primary allocation for Earth exploration-satellite service in the 8025-8400 MHz band on a worldwide basis with appropriate coordination parameters. Id. at 190, 204-05.

Recommendation 621 (WARC-92) on implementation of wind profiler radars;[143] Recommendation 711 (WARC-79) on coordination of Earth stations; and Recommendation 715 (Orb-88) on multi-band and/or multiservice satellite networks using the geostationary-satellite orbit.[144] Finally, WRC-97 is directed to recommend to the Council items for inclusion on the WRC-99 agenda and to provide its views on a preliminary agenda for the 2001 conference.

94. WRC-95 will review the WRC-97 preliminary agenda and recommend a final agenda to Council for its approval. WRC-95 will also recommend a preliminary agenda for WRC-99 and give its views on potential agenda items for future conferences.[145]

2. Suggested Topics for Future Conferences

95. In our first Notice in this proceeding, we remarked on the large number of issues identified on the preliminary agenda for consideration at WRC-97 and asked commenters to identify items that could be postponed for consideration at a future conference. Parties were also asked to address any additional items not appearing on the preliminary agenda that would be mature for consideration in 1997.[146] In response, some issues for possible consideration at future conferences were submitted. It should be initially noted that, with respect to WRC-97, there is broad agreement among the commenters that WRC-95 will be unable to fully accomplish all of the tasks on its broad agenda and that several of the issues will carry over to the 1997, and perhaps even to the 1999 conference.[147] Many parties therefore advocate limiting the placement of new items on the WRC-97 agenda to permit resolution of issues pending from WRC-95 -- particularly those relating to MSS allocations.[148] The

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[143] The Commission has pending a rule making proceeding related to this issue. See Notice of Proposed Rule Making and Notice of Inquiry, ET Docket No. 93-59, Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum for Wind Profiler Radar Systems, 8 FCC Rcd 2546 (1993).

[144] Commenters support consideration of Rec. 715 (Orb-88) at WRC-97. See COMSAT World comments at 19-20; COMSAT Mobile comments at 33-34; see also Teledesic comments at 13-16.

[145] See WRC-95 Agenda, Item 6.2.

[146] Notice, 9 FCC Rcd at 2437.

[147] See, e.g., Jacobs comments at 3; COMSAT World comments at 19-20; COMSAT Mobile comments at 33.

[148] See COMSAT World comments at 19-21; Starsys comments at 7; TRW comments at 12-13.

Intelligent Vehicle-Highway Society of America (IVHS America) seeks to add consideration of international IVHS (now known as Intelligent Transportation Systems or ITS) spectrum allocation issues to the agenda.[149] Teledesic recommends that WRC-97 address Recommendation 719 (WARC-92) concerning multiservice satellite networks using GSO in conjunction with its consideration of related Recommendation 715 (Orb-88).[150] AT&T seeks an allocation in 5.2 GHz band for mobile service on a worldwide basis to accommodate its proposed high-speed wireless data networks.[151]

96. The IAC is also considering the subject of future conference agendas. The section of its Interim Report that is devoted to this topic has not yet been fully developed, however, and its discussion is therefore quite preliminary. Further comment is welcome on the IAC's preliminary discussion. The IAC preliminarily recommends that WRC-97 consider the following additional items to facilitate MSS above 1 GHz: (1) continuing revision of Res. 46 based on experience gained from operating and coordinating NGSO MSS systems; (2) reviewing the effect of RR 2613 on these systems; (3) reviewing the constraints against MSS service link spectrum at 1-3 GHz to ensure availability of sufficient amounts to accommodate future growth; and (4) reviewing the amount of spectrum for NGSO MSS feeder links to ensure sufficient amounts are available in future for MSS on a worldwide basis.[152]

97. The IAC's Interim Report also identifies several potential subjects for future consideration relating to space services. It advises that WRC-97 consider allocating the 65.0-71.0 GHz band to the inter-satellite service (ISS) on a co-equal primary basis as an alternative to its present co-primary allocation in the 54.25-58.2 GHz band. The ISS will be used by commercial LEO satellite systems for their inter-satellite links and has the potential to interfere with passive earth sensors sharing the band. Specifically, the proposal is intended to protect passive sensing by the Earth exploration-satellite service of oxygen absorption lines that are unique to the 51.4-59.0 GHz band, for weather forecasting and climate studies.[153] The following additional suggestions for future conference items are also described in the IAC Interim Report: (1) upgrading the status of space research in the 410-420 MHz band;

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[149] IVHS comments at 3-4. These comments are supported by Securicor Datatrak Limited's comments at 2-3.

[150] See Teledesic comments at 13-16; COMSAT World comments at 9. See also Notice, 9 FCC Rcd at 2437 n. 46. But see Motorola reply comments at 20-21.

[151] AT&T reply comments at 3; see also IAC Interim Report at 221-22.

[152] IAC Interim Report at 232. Teledesic proposes to the IAC that a future conference may also need to resolve regulatory uncertainty concerning use of frequency bands allocated to FSS by NGSO FSS. Id. at 222-24.

[153] Id. at 234-35. Teledesic also supports this proposal. Id. at 203, 231-32.

(2) reviewing the allocation status for active space-based sensors; and (3) adopting sharing criteria between space services and fixed services in the 2025-2110 and 2200-2290 MHz bands.[154]

98. The IAC Interim Report includes the following additional suggestions which are of a very preliminary nature for consideration as future conference topics. Comments on these nascent proposals are specifically requested. The Telecommunications Industry Association (TIA) suggests consideration of additional international spectrum allocations for terrestrial land mobile services for public safety applications including possible reallocation of the 380-399.9 MHz band.[155] Intelligent Transportation Systems (ITS) proponents are considering frequency bands below 6 GHz for communications and a band above 40 GHz for vehicular collision avoidance. Noting European interest in the 5.8 GHz band, the ITS community has expressed a desire for international compatibility of systems.[156] We also invite comment on which bands would be appropriate for the above services.

99. As we have noted, under the four-year conference planning cycle, WRC-95 will adopt not only an agenda for WRC-97 (subject to Council's approval), but a preliminary agenda for WRC-99. The Notice therefore requested commenters to submit their views on issues for inclusion in the preliminary agenda for WRC-99.[157] Few parties addressed this topic, however. The American Radio Relay League requests that WRC-99 consider adoption of an international amateur radio permit, such as one currently under development by the Inter-American Telecommunications Commission (CITEL).[158] IVHS America posits that consideration of ITS spectrum allocation issues might carry over to the 1999 conference.[159]

100. The opportunity offered at WRC-95 to identify issues for consideration at future conferences is a significant one that should not be overlooked due to the press of current issues. We therefore renew our request and urge the parties to take advantage of this opportunity for long-range planning and to submit their views on issues for consideration at WRC-99 and beyond.

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[154] Id. at 232-35.

[155] Id. at 224-28. It should be noted, however, that the 380-400 MHz band is already allocated to the mobile service.

[156] Id. at 228-31.

[157] Notice, 9 FCC Rcd at 2438.

[158] ARRL comments at 8-9; see also IAC Interim Report at 235.

[159] IVHS America comments at 3-4.