

SUMMARY

Motorola Satellite Systems, Inc. ("Motorola") hereby submits these Comments in response to the Commission's Notice of Proposed Rulemaking, which addresses spectrum issues for the Fixed-Satellite Services ("FSS") and other services in the frequency band 37.0-51.4 GHz ("40 GHz band").

Motorola has been actively seeking spectrum allocations for FSS in the 40 GHz band. A year ago, it filed a petition for rulemaking in which it asked the Commission to allocate the 37.5-38.6 GHz band to FSS. At the same time, Motorola filed an application with the Commission for its M-Star System, an advanced global broadband satellite network consisting of 72 satellites that will provide data services of up to 51.84 Mbps in the 37.5-40.5 GHz and 47.2-50.2 GHz bands. As a strong supporter of the 40 GHz band, therefore, Motorola welcomes the Commission's initiative in this proceeding. However, Motorola finds that the Commission has offered several proposals which, if adopted, could seriously impede the development of broadband satellite services in the 40 GHz band and may harm United States leadership in telecommunications technology implementation.

In an effort to accommodate competing interests in the 40 GHz band, the Commission offers proposals that substantially reduce the usable spectrum currently available to FSS under the International Table of Allocations. Specifically, the Commission proposes to designate only 4 GHz for use by the FSS, whereas it proposes a total of 8.6 GHz for use by Fixed Services ("FS"). Such a reduction in global satellite spectrum significantly increases the business

risks for any broadband FSS network operator proposing to offer global service in the 40 GHz band.

Also, the Commission proposes a new "underlay" license status for use by FS licensees only in the FSS portions of the 40 GHz band. This license status has not been defined, so that the extent to which it would protect current or future primary FSS users against harmful interference is unclear. Furthermore, the underlay license is not recognized by any international body and is not on the WRC-97 agenda for discussion. Motorola urges the Commission not to adopt underlay licensing at this time. Should it do so, however, Motorola recommends that conditions be included in the underlay licenses to protect primary users of the bands, and that FSS be afforded the same underlay rights in the FS bands as FS operators would have in the FSS bands.

Finally, Motorola urges the Commission to delay making any final decisions in this proceeding until it has had the opportunity to evaluate the spectrum needs of all applications filed in response to Motorola's M-Star System proposal, which has not yet appeared on public notice. In addition, due to the uncertainty associated with the upcoming World Radio Conference (WRC-97), the Commission should await the outcome of WRC-97 before issuing a Report and Order in this proceeding.

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**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Allocation and Designation of Spectrum)	IB Docket No. 97-95
for Fixed-Satellite Services in the)	
37.5-38.5 GHz, 40.5-41.5 GHz, and)	
48.2-50.2 GHz Frequency Bands;)	
Allocation of Spectrum to Upgrade Fixed)	
and Mobile Allocations in the 40.5-42.5)	
Frequency Band, Allocation of Spectrum)	
in the 46.9-47.0 GHz Frequency Band for)	
Wireless Services; and Allocation of)	
Spectrum in the 37.0-38.0 GHz and)	
40.0-40.5 GHz Frequency Bands)	
for Government Operations.)	

COMMENTS

Motorola Satellite Systems, Inc. ("Motorola"), a wholly-owned subsidiary of Motorola, Inc., hereby submits its comments in response to the Commission's Notice of Proposed Rulemaking in the above-captioned proceeding.^{1/} Motorola's interest in this proceeding stems principally from its recent application to construct, launch and operate the M-Star System in the millimeter wave bands.^{2/} The M-Star System will consist of a constellation of 72 operational non-geostationary orbit (NGSO) satellites

^{1/} Notice of Proposed Rulemaking, FCC 97-85 (released March 24, 1997) ("40 GHz Notice").

^{2/} Motorola's application was submitted to the Commission on September 4, 1996. The Commission has not yet placed this application on Public Notice.

offering an array of real time voice and data transport services in the Fixed-Satellite Service (FSS). Motorola has requested use of the 37.5-40.5 GHz band (space-to-Earth) and the 47.2-50.2 GHz band (Earth-to-Space) for both its service and TT&C links.^{3/}

First, Motorola welcomes the Commission's initiative to bring the promise of millimeter wave communications closer to reality. Motorola is particularly pleased that the Commission has concluded that satellite operations should be a significant part of its 40 GHz band plan. The amount of spectrum proposed for designation to FSS, however, is insufficient to accommodate the anticipated needs of the satellite industry.

Second, Motorola is concerned that the Commission's proposals are inconsistent with the worldwide primary FSS allocations in these bands. As the Commission is well aware, there are few bands allocated for worldwide FSS use, while the range of potential applications for satellites continues to grow rapidly -- and with it the need for additional usable spectrum. The current international FSS allocations support this need. The Commission should modify its spectrum proposals in order to better conform them to the worldwide FSS allocations.

Third, the Commission has proposed to establish a new, undefined "underlay" authorization for Fixed Service (FS) licensees operating in parts of the 40 GHz band allocated on a primary basis to FSS. Motorola has serious concerns with the impact of this proposal on United States satellite licensees. Should the Commission

^{3/} Motorola has also requested use of the 59-71 GHz band for inter-satellite service (ISS) links.

adopt such a proposal, however, it must at the very least allow FSS systems to operate on an underlay basis in the 40 GHz bands where FS is allocated on a primary basis.

Fourth, before the Commission makes any final decisions in this proceeding, it should place the M-Star System application on public notice, open a filing window, and accept applications from other satellite system operators in these bands. In addition, due to the uncertainty associated with the upcoming World Radio Conference (WRC-97), the Commission should await the outcome of WRC-97 before issuing an Order.

I. BACKGROUND

The Commission's 40 GHz band proposals represent the first major step in establishing millimeter wave bands as the next frontier for a new generation of telecommunications services. As the upper boundary of the usable spectrum expands, the promise of worldwide broadband communication satellite systems -- an integral piece of the Global Information Infrastructure -- comes closer to reality. Motorola's M-Star System represents a major step forward toward fulfilling this promise.

The Commission has previously recognized the vast potential of the millimeter wave bands.

The millimeter wave region of the spectrum is a major resource that is essentially undeveloped and is unavailable today for commercial use...

[T]he wide bandwidth that is possible in the millimeter wave spectrum can support the operation of wireless communications links with capacity approaching that of coaxial cable and fiber-optic systems.

Because of the large amount of bandwidth available in the millimeter wave spectrum, transmission of data rates ranging from 50 Megabits/second up to 5,000 Megabits/second, or more, are possible depending upon the frequency band.^{4/}

The Commission also has concluded that designating these bands for commercial use will foster the growth of entire new industries, promote new jobs, promote new services for consumers, facilitate technology transfer from the military sector, and develop technologies for export to other nations.^{5/}

Motorola believes that there is great commercial potential for the 40 GHz band to support the provision of broadband satellite services on a global basis. Among the many such services Motorola intends to offer through its M-Star System are wireless backhaul and LAN-to-LAN. Wireless backhaul service will permit wireless operators to interconnect to the global telephone network. A similar service may be provided to interchange carriers as well. Motorola also expects to offer LAN-to-LAN interconnection between remote locations and a customers' headquarters and vice versa. These services will require broadband communications channels ranging from 2.084 Mbps to 51.84 Mbps -- data rates that are feasible in the 40 GHz region of the radio spectrum.

^{4/} Amendment of Parts 2 and 15 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, Notice of Proposed Rulemaking, 9 FCC Rcd 7078, 7081-82 (1994).

^{5/} Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, First Report and Order and Second Notice of Proposed Rulemaking, 10 FCC Rcd, 4481, 4483 (1995).

Motorola recognizes that implementing a global broadband satellite network capable of supporting these data rates will be costly, but as it explained in its M-Star System application:

[T]he M-Star System will ensure a ready-to-use broadband infrastructure at a much lower cost and in less time than necessary to build out a terrestrial worldwide fiber optic network. While the cost of constructing the system will be high in absolute terms, the system's global reach makes it possible to spread that cost over a large number of potential users, resulting in a fraction of the per-user cost that would need to be incurred to build out a terrestrial broadband network, whether nationwide or international. The cost of a comparable terrestrial network infrastructure would easily be several trillion dollars.⁶¹

Bringing the promise of broadband satellite networks to reality requires, above all else, the allocation of sufficient spectrum to FSS on a global basis. Without adequate spectrum resources, no realistic business plan can be developed or implemented.

II. MOTOROLA URGES THE COMMISSION TO DESIGNATE MORE SPECTRUM TO FSS IN THE MILLIMETER WAVE BANDS DOMESTICALLY AND TO PROPOSE ADDITIONAL SPECTRUM FOR FSS AT WRC-97

The Commission has tentatively concluded that it will designate only 4 GHz of spectrum in the 40 GHz band for FSS. Motorola respectfully submits that such a limited amount of FSS spectrum would severely impair the viability of broadband satellite systems worldwide. The Commission instead should, at a minimum, allow for up to 6 GHz (3 GHz uplink and 3 GHz downlink) of spectrum to be used by FSS

⁶¹ M-Star System Application at 6 (footnote deleted).

systems in these bands. This would meet the demonstrated system needs of the M-Star System and the expected demand for spectrum by other FSS system operators.

Motorola submitted a petition for rulemaking in 1996 in which it asked the Commission to designate the 37.5-38.6 GHz band to FSS.^{7/} In its petition, Motorola noted that the 37.5-40.5 GHz band is already allocated on a primary basis to FSS on an international basis but that domestically only the 38.6-40.5 GHz band was allocated on a primary basis to FSS. Motorola further noted that the 37.5-40.5 GHz band, together with its associated uplink band, could be used for satellite systems providing high-speed broadband voice, video and data services worldwide. While Motorola is pleased that the Commission now proposes to designate the 37.5-38.5 GHz band to FSS, the Commission's proposals to designate certain portions of the 37.5-50.2 GHz bands solely for FS use is in conflict with the international allocation.^{8/}

Before the Commission makes any final decisions in this proceeding, Motorola urges it to place the M-Star System application on Public Notice, open a filing window, and accept applications from other satellite system operators for use of these bands. Only then will the Commission be able to assess the actual spectrum requirements for FSS above 30 GHz and make a determination as to the relative requirements of FSS and FS, including the potential of such systems to share

^{7/} In the Matter of Amendment of Parts 2.106 and 25.202 of the Commission's Rules to Allocate the 37.5-38.6 GHz Band to the Fixed-Satellite Service and to Establish Technical Rules for the 37.5-38.6 GHz Band, RM No. 8811, filed March 4, 1996.

^{8/} See discussion, *infra*, at Section III.A.

spectrum. The Commission does not yet have a full record on which to make spectrum designation decisions for these bands.^{9/}

A. The Commission Should Designate NGSO and GSO Spectrum for Satellites Consistent with the Current Global FSS Allocations and Overall Spectrum Requirements

The Commission's spectrum proposals do not adequately take into account the current international allocations for FSS nor the operational needs of a broadband satellite network. In designing its M-Star System, for example, Motorola relied on all of the international allocations to create a viable network. As Motorola demonstrated in its M-Star System application, the peak demands on the system are a key determinant of its overall spectrum requirements. The NGSO constellation geometry, in conjunction with payload and antenna design, creates relatively small beam coverage areas in the satellite coverage footprint, which are critical in supporting the highly peaked traffic demands. A single space vehicle will support as many as 1,800 cell sites, each operating at E-1 rates (2.048 Mbps) with as many as 250 cell sites in a single beam coverage area. Based on conservative factors, the system can support greater than 43,000 simultaneous equivalent E-1 channels on the user service links over land mass. Additionally, the constellation can provide over 1,500 equivalent OC-1 (51.84 Mbps) channels globally. Projected revenues for the M-Star System are sufficient to recover all of the estimated operating expenses over the life of the

^{9/} See 40 GHz Notice at 2-5.

system.^{10/} Put simply, the business plan developed by Motorola requires the amount of spectrum that Motorola seeks in its M-Star System application.

As the Commission is aware, overall demand for spectrum in the C, Ku, Ka, L, S and now the millimeter wave bands has accelerated, due to technological advances and market stimulation for satellite-delivered communications. Satellite providers recently have been seeking additional spectrum and orbital locations before the Commission, other licensing authorities, and the ITU.^{11/} This spectrum and orbit shortage is exacerbated by the technical constraints imposed by frequency and operational sharing with other commercial and government FSS systems, NGSO/GSO networks, and terrestrial fixed and mobile operations.

In this regard, Motorola supports the Commission's proposal to bifurcate the proposed FSS band between NGSO and GSO systems. Such an approach is consistent with the Commission's 28 GHz band plan. Motorola expects that it will need to employ interference mitigation techniques such as space diversity, cross-polarization and access schemes in order to achieve co-frequency sharing with any other NGSO system in the band. Introducing GSO systems into the same band on a co-primary basis could significantly limit system capacity.

^{10/} These projections represent a rate of return which sufficiently compensates Motorola for the risks associated with this telecommunications venture. See M-Star System Application at 50, 78-82.

^{11/} Indeed, even NTIA has failed to predict accurately the burgeoning need for more FSS spectrum stemming from broadband applications and NGSO capabilities. See U.S. National Spectrum Requirements; Projections and Trends, NTIA, March 1995.

Motorola also supports the Commission's proposal to limit new satellite use in these bands to the FSS, and not MSS. As Motorola explained in its M-Star application, co-frequency sharing between NGSO FSS and MSS systems is not feasible.^{12/}

In terms of core spectrum needs, Motorola requires FSS spectrum at the lowest end of the frequency range available, viz., 37.5-38.5 GHz, due to the rapidly increasing atmospheric attenuation problems at higher frequencies.^{13/} Furthermore, in order to achieve compatibility with European high density fixed service (HDFS) usage just below 39.5 GHz, FSS should be assured access to the 39.5-40.5 GHz (downlink) band.^{14/} Also, Motorola suggests that the 40.5-42.5 GHz band be allocated to FSS/BSS at the Conference. Moreover, Motorola believes there is sufficient spectrum to accommodate Sky Station type systems in the 51.2-52.2 GHz band, which would allow the FSS to utilize the full 47.2-48.2 GHz band. FSS systems should also be able to utilize the 48.2-50.2 GHz band as proposed in the 40 GHz Notice.

B. The Commission Should Consider Alternatives for Providing FSS With Additional Usable Spectrum

^{12/} See M-Star Application at 72. In order to maintain MSS allocations for future systems and given that MSS cannot share with FS or FSS, an FSS/MSS allocation in the 40.5-41.5 GHz and 45.75-46.25 GHz bands (with some flexibility in the latter) might be considered.

^{13/} In addition, there are radio astronomy downlinks in the 42.5-43.5 GHz band.

^{14/} WRC-97 Agenda Item 1.9.6 calls for the identification of allocations above 30 GHz for the use of high density fixed applications. These allocations may not be compatible with FSS allocations.

Apart from increasing the FSS spectrum designations to comport with the existing international allocation, the Commission should consider alternative proposals for increasing the availability of usable spectrum for FSS. These alternatives include liberalized sharing rules with Government users and "underlay" rights for FSS in bands designated primarily for the FS.

Motorola fully supports the Commission's initiatives to promote Government/Non-Government sharing.^{15/} The Commission should encourage Government users (through NTIA) to cooperate in making the most efficient use of the millimeter wave and other FSS bands.^{16/} To the extent non-Government users can provide more efficient use of the spectrum, Government users should consider private agreements under which they would become "protected" users on commercial satellite systems or simply use commercial operators' systems.^{17/} Motorola believes that almost all Government bands can be opened to commercial use simply by issuing licenses that are conditioned upon reaching coordination agreements with the existing Government users.^{18/}

^{15/} 40 GHz Notice at ¶ 19-20.

^{16/} Motorola has acknowledged the requirement to share FSS downlinks in the 37.5-38.0 GHz band and FSS uplinks in the 40.0-40.5 GHz band with the Space Research (SR) and Earth Exploration-Satellite (EES) services operated by the National Aeronautics and Space Administration (NASA). See M-Star Application at 73. This sharing is potentially more burdensome if NGSO FSS designations are limited to 2 GHz.

^{17/} Id. at ¶ 20.

^{18/} For example, the 43.5-45.5 GHz band, currently allocated to FSS (Military), could be used by commercial FSS operators subject to reaching a coordination agreement with the Government.

In Section IV, infra, Motorola addresses in detail the Commission's proposal to establish "underlay" FS licenses. While Motorola has serious concerns about this Commission proposal, in the event the Commission adopts some version of underlay licensing, fairness requires that it also establish underlay rights for FSS operators in FS bands on terms that are comparable to the rights that would be granted to FS operators in the FSS bands. In its proposal, the Commission has included "underlay" FS designations in all 4 GHz of the spectrum designated for FSS.^{19/} However, the Commission has not proposed FSS underlay designations in any of the 4.6 GHz of spectrum assigned exclusively for FS use.^{20/} Given the largely reciprocal nature of the potential for interference between FS and FSS, any overlay approach that is not similarly imposed on both FS and FSS appears unfair and technically unsupportable.

Motorola has indicated that it is possible to share its FSS spectrum with properly engineered FS operations.^{21/} To date, however, FS operators have not

^{19/} 40 GHz Notice at ¶ 14. Motorola considers the concept and implementation of underlay allocations anomalous and inadvisable for a variety of reasons, which are discussed below.

^{20/} Id. The Commission's proposed designation of spectrum for FS use, including both exclusive assignments and underlay availability, totals 8.6 GHz.

^{21/} Motorola has stated that M-Star System earth stations operating in the 37.5-40.5 GHz band can accept interference from FS stations located 1 km away at the level of $I_0/N_0 = -13$ dB. For FS transmitters with clear air EIRP density less than -28.4 dBW/MHz, no coordination is required. FS can exceed this limit by means of adaptive power control only to the extent where link propagation attenuation exceeds the clear air value due to precipitation. Higher power terminals must be coordinated with FSS operations. See M-Star System Application at Appendix B.

demonstrated a similar willingness to fashion sharing arrangements with FSS.^{22/} Such sharing makes sense only if there is enough spectrum made available for use by FSS operators.

The Commission's proposal to designate the 38.5-38.6 GHz subband to FS solely because it is "unaccounted for" in the overall assignment of spectrum to FSS and FS in the 37.5-38.5 GHz and 38.6-40.6 GHz subbands also should be modified.^{23/} As already shown, the total spectrum proposed for assignment to FSS is substantially less than the amount of spectrum proposed for assignment to FS. By assigning the 38.5-38.6 GHz and 46.9-47 GHz subbands to FSS rather than to FS, some of this inequity would be ameliorated.^{24/}

III. THE COMMISSION SHOULD NOT TAKE FINAL ACTION ON THE 40 GHZ BAND PLAN UNTIL AFTER IT HAS AUTHORIZED THE FILING OF SATELLITE APPLICATIONS AND AFTER WRC-97 HAS CONCLUDED

Motorola strongly urges the Commission to delay any spectrum decisions in the millimeter wave bands until it has had the opportunity to evaluate the demonstrations of spectrum required in response to a public notice of the M-Star

^{22/} See, e.g., Ex Parte Submission of Walter Sonnefeldt & Associates on ET Docket 95-183, ET Docket 94-124, December 11, 1996 ("Sharing between co-channel FS and FSS systems in bands above 30 GHz does not appear to be operationally or economically feasible.")

^{23/} 40 GHz Notice at ¶ 29.

^{24/} In view of current international allocations, an alternative would be to designate the 48.1-48.2 GHz subband to FSS in lieu of the 46.9-47.0 GHz subband. This would provide contiguous spectrum with other designations for both FSS and FS. Contiguous spectrum for uplink or downlink transmissions tends to facilitate the design of radio equipment, reduces equipment production costs and results in lower service prices.

System application, and until it can evaluate the decisions reached in WRC-97. Both of these events will provide much needed information from which the Commission can make a more informed decision.

In the 40 GHz Notice, the Commission informed the satellite industry that the M-Star application will soon be placed on public notice and both NGSO and GSO FSS systems would be invited to apply in the bands sought by Motorola in its application and those proposed in the 40 GHz Notice.^{25/} The Commission has now announced that there will be a significant delay in release of this Public Notice and the subsequent filing of FSS applications in these bands.^{26/}

Until a filing window is closed and all of these FSS applications are on file, it is difficult if not impossible for the Commission to make reasoned assessments of spectrum requirements for FSS in the millimeter wave bands. In other proceedings, the Commission has recognized that the long construction lead times and unique coordination requirements of satellite systems dictate that applications be filed before spectrum allocation and service rules can be finalized.^{27/}

Motorola and other satellite operators are placed at a severe disadvantage in advising the Commission of core spectrum requirements and possible sharing mechanisms because there are no alternative proposals or applications before

^{25/} 40 GHz Notice at ¶ 22.

^{28/} International Bureau Announces Anticipated Procedures for Foreign Satellites to be Considered in Processing Rounds, Public Notice SRB-80, April 16, 1997.

^{27/} For example, in the Big LEO, Little LEO, DARS, and the Ka band satellite service proceedings, the Commission received applications well before allocation or service rules were proposed.

them on which they may base their analyses. While Motorola has completed an initial sharing analysis,^{28/} neither it nor other FSS operators have sufficient data before them to offer definitive guidance on their spectrum requirements.

Spectrum designation decisions in this band would be premature in another crucial respect. The Commission's proposals in this proceeding would require changes in the current International Table of Allocations, but the Commission cannot be assured that such changes will be adopted at the upcoming Conference. For example, it is not clear that WRC-97 will add an international FSS allocation to the 40.5-41.5 band to match the Commission's proposed domestic band plan. The Commission itself recognizes this risk when it observes that the issue may not even be on the WRC-97 agenda.^{29/} The Commission should not eliminate any internationally-allocated FSS spectrum through adoption of a domestic band plan until it is sure that this spectrum will be "replaced" at WRC-97.^{30/}

^{28/} See M-Star Application at 67, and Appendix B.

^{29/} 40 GHz Notice at ¶ 34.

^{30/} Again, Motorola believes that the 4 GHz designated for use by FSS under the FCC's domestic plan is inadequate to meet the needs of the FSS community. Premature action on the instant proposal threatens the availability of this internationally allocated spectrum even in the U.S. Motorola is also concerned about the amount of primary FSS spectrum that will be available after WRC-97. This concern stems from the uncertainty regarding the extent to which there may be additional allocations for high density fixed services, and whether any new proposed FSS allocations will be accepted.

IV. THE COMMISSION MUST CAREFULLY CONSIDER ITS PROPOSAL TO CREATE A NEW "UNDERLAY" LICENSE STATUS

The Commission seeks comments on a new license category in the FSS band that it proposes to call "underlay" licenses.^{31/} Motorola has serious concerns with this hybrid concept for determining interference protection rights in the millimeter wave bands. If the Commission intends this new status to provide FS with co-primary rights in the FSS bands without clear, globally enforceable technical limitations, Motorola cannot offer its support. In any event, should the Commission conclude that "underlay" rights are a workable concept for FS use of FSS bands, then it should also allow FSS operations to have "underlay" rights in the bands designated for FS use.

While Motorola believes that co-channel sharing is possible even with high density FS operations, the FS industry has vehemently argued that sharing is not feasible under any circumstances. These statements should give the Commission pause in suggesting a co-primary status for FS in the few bands available for FSS operations under the Commission's current proposal. Implementation of this hybrid concept also could create widespread confusion and threaten global satellite operations in regions where restrictions associated with "underlay" status are not recognized or are not associated with FS co-primary status. For these and other reasons, consequential changes in the international allocation for FS and mobile operations to co-primary status would be premature, if not ill-advised.

^{31/} 40 GHz Notice at ¶ 23-24.

A. The Commission's "Underlay" Proposal Must Be Clarified

The Commission offers little insight into its intended meaning of "underlay" licenses, yet the potential impact of this new category of license on FSS is critically important to all millimeter wave satellite service providers. For example, the proposal is unclear as to what protection rights come with an underlay licensee's new status as compared with secondary users and primary FSS users in the same bands. The Commission seems to be describing an array of features and obligations that more properly characterize secondary status in a band, because the Commission states that FS operations in the FSS bands would be conducted "in a manner that would not interfere with the predominant use."^{32/} The Commission further states that "[a]n underlay service would be a type of service that fits within existing or subsequently modified spectrum allocations, but is not our designated predominant use of a particular frequency band."^{33/} These statements comport with the Commission's definition of secondary service:

Stations of a secondary service shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date. Stations of a secondary service cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are already assigned or may be assigned at a later date.^{34/}

^{32/} 40 GHz Notice at ¶ 23.

^{33/} Id.

^{34/} 47 C.F.R. § 2.105(c)(3)(i) and (ii).

Motorola cannot distinguish the features of underlay status from those of secondary status.

If the Commission's underlay proposal is not intended to create rights against primary licensees exceeding those of secondary users, Motorola can support the proposal, subject to certain conditions. First, the Commission should not grant underlay licenses in a particular band until after FSS services are licensed and operating. This will ensure that new FSS operations do not face already congested bands that must be cleared. Second, no permanent underlay license should be granted until after a tentative FS licensee demonstrates to the satisfaction of FSS licensees and the Commission that their systems do not actually interfere with an existing primary FSS user in the band.^{35/} Third, no underlay licensee should be permitted to hold any preferred interference protection status as against a subsequently licensed (or modified) primary FSS system.^{36/} This last condition is crucial because FSS systems require a longer development and implementation period than do FS systems.

The Commission appears to propose to upgrade the status of fixed and mobile services in the 40.5-42.5 GHz band to "primary" and links this to "underlay" status for FS in the 40.5-41.5 GHz band, which is also assigned to "predominantly"

^{35/} Issuing secondary or underlay licenses subject to "not causing interference to primary licensees in the band" prior to licensing primary operators is inadvisable because identifying and resolving sources of interference at commencement of operation by a primary user is a more difficult technical and operation burden than issuing such a secondary authorization after the primary licensee is in place.

^{36/} Id.

FSS.^{37/} The Commission then recognizes that its domestic "underlay" licenses "would not be afforded international protection if fixed and mobile service remain secondary in the International Table of Allocations."^{38/} This recognition signals that the Commission views "underlay" status as having greater protection rights than secondary status. Motorola respectfully submits that such a position would cause havoc in resolving interference situations and threatens the viability of the already restricted FSS primary bands.

While Motorola has stated that sharing is possible between FSS and FS licensees,^{39/} there has been no agreement with the FS community in this regard. In fact, the FS community has summarily concluded that "sharing between co-channel FS and FSS systems in bands above 30 GHz does not appear to be operationally or economically feasible."^{40/} In the Ad Hoc Millimeter Wave Report, the FS community expresses an even more pessimistic view:

Specifically, in the bands above 30 GHz there should be a coherent international separation of FS and FSS spectrum utilization. This separation of services is necessary to preclude interference to FS systems from low-elevation foreign or international FSS systems transmitting at the maximum allowable flux density limits, as well as

^{37/} 40 GHz Notice at ¶ 28. FS is proposed as a primary service in the 41.5-42.5 GHz band.

^{38/} Id. at ¶ 35.

^{39/} 40 GHz Notice at ¶ 23; See also, M-Star Application at Appendix B; Report of the Millimeter Wave Drafting Group on U.S Proposals for Agenda Item 1.9.6 of WRC-97 ("Ad Hoc Millimeter Wave Report"), Section 4.1.

^{40/} Ex Parte Submission of Walter Sonnefeldt & Associates on ET Docket 95-183, supra.

transborder interference between FS stations and earth stations in downlink and uplink bands...[T]he United States should move expeditiously to formulate WRC-97 agenda item 1.9.6 proposals that will result in separation of FS and FSS operations in bands above 30 GHz.^{41/}

To the extent that FS and FSS can share the bands above 30 GHz -- a matter that is under discussion in industry forums -- any upgrade of FS from secondary status before sharing is demonstrated as feasible would place FSS at an operational and technical disadvantage to FS operations that are unable or unwilling to resolve interference problems. The Commission must establish a means of protecting the "predominant" user of the band from underlay operations before it creates co-primary status for an underlay licensee. At the very least, the Commission should defer its "underlay" proposal and all its engenders until the FS-FSS sharing issue can be fully resolved.

While the Commission implies that an underlay licensee should not cause harmful interference to a primary user in the same band, there is reason to doubt the technical and operational practicality of that position. If the underlay licensee is co-primary and operating within the technical requirements of its license, there is no procedural or technical mechanism for resolving interference that does occur. Absent secondary status, the underlay licensee would be under no affirmative obligation to cure the harm caused to the primary licensee. In effect, the Commission's underlay proposal appears to remove the burden on the lower status licensee to prevent and cure incidents of harmful interference and impose it instead on the primary licensee.

^{41/} Ad Hoc Millimeter Wave Report at Section 4.2.

This approach turns the traditional domestic and international meaning of harmful interference resolution on its head and creates an environment of technical anarchy.

B. The Commission Should Not Unilaterally Change the Designations of Use of the Table of Allocations Without First Creating an International Consensus as to the Meaning and Impact of its Underlay License Proposal

The Commission is proposing to implement its domestic underlay proposal internationally by seeking co-primary international status for FS operations in the millimeter wave FSS bands. This proposal is premature and would cause significant confusion with other Administrations to the detriment of FSS.

As the Commission knows, ITU regulations do not contemplate the concept of underlay licenses. If FS operations are permitted on a co-primary basis by other Administrations who do not adopt the express conditions reflected in a U.S. underlay license for FS operations, U.S. FSS operators will face varying interference problems around the world.^{42/} And in those countries not adopting the underlay conditions, FSS operators would have no uniform legal means of addressing and resolving claims of potential or actual harmful interference caused by FS operations in their bands.^{43/}

^{42/} This assumes, of course, that there are conditions similar to those proposed by Motorola, supra.

^{43/} Likewise, foreign-licensed FSS operators would experience similar problems over parts of the U.S. if the U.S. unilaterally adopts an underlay status for FS. Over parts of the U.S., these operators could experience interference problems with no means of resolution possible.

Unilaterally adopting "underlay" license status in the U.S. and upgrading FS to co-primary status internationally together will create significant confusion and dilute the advantages now enjoyed by primary licensees. The international community must accept the new nomenclature and define the array of rights and responsibilities that go with it before the Commission can adopt its proposals.

V. CONCLUSION

Motorola welcomes the Commission's initiative to bring use of the millimeter wave bands closer to reality. However, Motorola views the Commission's proposed domestic allocation of spectrum for FSS to be substantially short of the industry's anticipated needs. Indeed, Motorola's own M-Star System proposal requires a total of 6 GHz of spectrum, and it is not clear how many other satellite system proposals will be filed once there is public notice of the M-Star System application. Motorola therefore recommends deferring any decisions on spectrum designation in the 40 GHz band until the Commission has before it all other FSS applications.

Also, the Commission's proposals are inconsistent with the International Table of Allocations, which supports global use of the 37.5-40.5 GHz and 47.2-50.2 GHz bands for FSS. At a minimum, the Commission should await the outcome of WRC-97 before making any final decisions in this proceeding.

Motorola believes the Commission's "underlay" FS licensing proposal is unclear and potentially harmful to any future FSS operation in the same band. Because the term is not known internationally, it will create interpretation and implementation