

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

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In the Matter of

Amendment of Part 25 of the  
Commission's Rules to Update  
Out-of Band Emissions From  
Satellite Networks

RM-9740

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

To the Commission:

**COMMENTS ON PETITION FOR RULEMAKING**

Motorola, Inc. ("Motorola") hereby submits these comments in response to the Public Notice issued in the above-captioned matter.<sup>1</sup> Motorola, jointly with Teledesic Corporation and Hughes Space and Communications Corporation, requested that the Commission initiate this proceeding to update the spectral mask contained in Section 25.202 of the Rules, 47 C.F.R. §25.202, relating to out-of-band emissions ("OOB") from satellite networks. This proceeding is necessary because the next generation of satellite systems, such as those licensed and proposed in the Ka-band and other spectrum, feature technical parameters that were not contemplated when the current rules were promulgated over twenty years ago. Moreover, there is work underway within the ITU-R which warrants revisiting the Rules.

In its Public Notice, the Commission seeks comment on five questions in order to decide how it should proceed, and to define the scope of the issues to be addressed in a future Notice of Proposed Rulemaking. Motorola offers comments on each of the questions posed by

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<sup>1</sup> Public Notice, DA 99-2601 (November 19, 1999).

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the Commission. Before the Commission considers issuing a Notice of Proposed Rulemaking in this proceeding, however, it should consider sponsoring an informal industry working group to develop specific rule proposals. This approach has been used successfully in other proceedings to hasten the development of technical rules.<sup>2</sup>

**A. Should the Generic Out-of-Band (OOB) Mask be in dBc, dBs, PFD Units or Some Combination?**

Motorola recommends that dBs be used as the generic OOB measurement unit for purposes of changes in Section 25.202 of the Rules. dBs is preferred because it allows greater consistency of measurement, comparison and evaluation.

A mask based on dBc or dBs units compares the power level within the authorized bandwidth with a power level just outside the licensed band. There is a very important difference between the two masks. In the case of the dBs mask, the maximum mean in-band power level over a reference bandwidth is compared with an OOB maximum mean power level over the same reference bandwidth.<sup>3</sup> The maximum mean power is measured within the authorized bandwidth and the reference bandwidth is generally a small fraction of the authorized bandwidth.

In the case of the dBc mask, the total mean power over the entire authorized bandwidth is compared with an OOB mean power level measured in a reference bandwidth generally smaller than the authorized bandwidth. In the dBc approach, the OOB power spectral

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<sup>2</sup> See, e.g., Second Report of the GSO FSS Ka-Band Blanket Licensing Industry Working Group; IB Docket No. 98-172, September 27, 1999.

<sup>3</sup> Mean power refers to a temporal mean and maximum power refers to a spectral maximum.

density can be higher than the in-band power spectral density due to the difference in measurement bandwidths, an anomalous result that weighs heavily against the use of dBc generally.

A PFD mask, like the dBc mask, would compare a measured power density level with OOB emission levels in a reference bandwidth centered at a frequency outside the authorized bandwidth of the transmitted signal. Moreover, PFD levels are measured at a receiver on Earth, not a transmitter. Because PFD levels vary as a function of geography, topology and path, they do not establish a stable reference that is required for purposes of assessing OOB compliance.

In sum, Motorola recommends that dBs be used as the generic OOB measurement unit for Section 25.202 of the Rules. It allows the direct comparison of mean power levels over the same reference bandwidth, and offers greater consistency of measurement, comparison and evaluation.

**B. Should the Emissions of a Multi-Carrier System With a Wideband Frequency Allocation be Treated Differently Than Those of a System With a Single Broadband Carrier?**

Motorola recommends that just one wideband mask be used, independent of the number of carriers used within the subject bandwidth. The concern for harm from OOB is not strictly a function of the number of carriers. In a multi-carrier wideband system, different OOB sources may exist, including intermodulation products. While these sources may make it more burdensome for a multi-carrier wideband system to meet a given generic OOB mask than would a single carrier broadband communication system, treating the two systems differently could expose adjacent services to excess interference.

**C. Should the Mask be Defined as a Function of Authorized Bandwidth (FCC Approach) or Necessary Bandwidth (ITU Approach)?**

The definition of “necessary bandwidth” is not consistent in international Radio Regulations and ITU-R Recommendations, lending uncertainty as to which meaning is applicable in a specific case or generally. Radio Regulation S1.152 defines “necessary” bandwidth as follows: “For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.” In ITU-R Recommendation 329.7, the following language is added to S1.152: “For application to multi-channel or multi-carrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the necessary bandwidth is taken to be the transmitter or transponder bandwidth.” Thus, the definition of “necessary bandwidth” has not been refined sufficiently to serve as a reference or standard for regulatory purposes.

Plainly, the definition of “necessary bandwidth” is still evolving, and it is therefore not appropriate to use it in the Commission’s Rules. Before doing so, there must be a clearer definitional relationship between “necessary bandwidth” and “authorized bandwidth.” In the meantime, “authorized bandwidth,” which has been relied upon consistently for many years and is generally well understood in the context of the Commission’s Rules, should be used in any revision to Section 25.202.

**D. Should a Generic Mask be Used for All Space Service Allocations Unless Otherwise Specified?**

Motorola recommends that more than one generic OOB mask should be used by the Commission for all space service allocations. Because different technologies are used for

wideband and narrowband system transmissions, different OOB masks should be used for each. As discussed above, all wideband systems should use a common generic OOB mask. Similarly, all narrowband systems should comply with a single mask, one which may be different from the wideband mask. The only question is how many bandwidth categories are appropriate. For purposes of this proceeding, Motorola suggests that at least two are necessary, narrowband and wideband. The Commission may choose to further categorize signal bandwidths into additional ranges, such as very narrowband, narrowband, wideband, ultra-wideband.

**E. Should the FCC Rules Incorporate Out-of-Band Values Agreed in Recommendations of the ITU-R?**

It is in the public interest to establish consistency in OOB levels on a global basis. Motorola therefore generally supports the incorporation of ITU-R Recommendations for OOB in the Commission's Rules where the United States has been an active participant.<sup>4</sup>

While not every satellite is used to provide services outside the United States, all are capable of providing international services, and virtually all are part of systems that are designed to operate on a regional or global basis. The most commonly accepted set of OOB standards are those adopted through ITU-R Recommendations. Meeting these standards is generally sufficient to satisfy the OOB requirements of most regulatory authorities. While some ITU-R OOB Recommendations may be more restrictive than necessary under some circumstances, they do provide a common denominator by which both domestic and international satellites systems can be measured.

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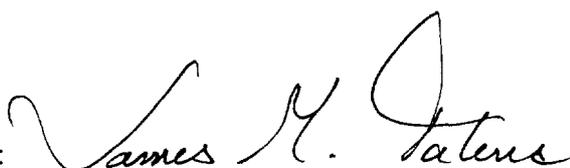
<sup>4</sup> See, e.g., Section 25.251(b), which refers to ITU-R Recommendations.

**F. Conclusion**

Motorola urges the Commission to support the convening of an informal industry working group whose function will be to develop specific rule recommendations that the Commission can use in its Notice of Proposed Rulemaking in this proceeding. This approach should hasten the promulgation of needed revisions to Section 25.202 of the Rules so that advances in satellite technology can be implemented under standards that assure a common understanding of out-of-band emissions.

Respectfully submitted,

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