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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	MM Docket No. 97-217
Amendment of Parts 1, 21 and 74 to Enable	)	
Multipoint Distribution Service	)	
and Instructional Television Fixed	)	File No. RM-9060
Service Licensees to Engage in Fixed	)	
Two-Way Transmissions	)	

PETITION FOR RECONSIDERATION OF SPIKE TECHNOLOGIES, INC.

Spike Technologies, Inc. ("Spike"), by its attorneys and pursuant to Section 1.429 of the Commission's Rules, hereby requests reconsideration of the Commission's *Report and Order* in the above-captioned rulemaking proceeding, released September 25, 1998.[1] In support whereof, Spike shows as follows:

Discussion

Spike, a communications service provider and designer and manufacturer of microwave equipment for two-way wireless communications, applauds the Commission's landmark decision.[2] The *Order* deftly balances the interests of operators and licensees, while providing much needed flexibility in the design, construction and operation of advanced, two-way systems.

Nevertheless, for the full benefits of the Commission's action to be realized, certain of the technical proposals need further refinement and/or clarification. Specifically, it is imperative that the rules reflect the Commission's recognition that frequency tolerance is not relevant to non-VSB digital transmissions, and that the Commission conform its spectral mask rules to make clear that the

[1]*See Report and Order*, 13 FCC Rcd 19112 (1998) ("*Order*"). This Petition is timely filed pursuant to Section 1.4 of the Commission's Rules. The *Order* was published in the Federal Register on November 25, 1998.

[2]Spike filed Comments, Reply Comments and further Comments in this proceeding.

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attenuation of out-of-band emissions is measured relative to licensed average channel power. These changes and clarifications will serve to further competition and the provision of advanced services to the public under the new two-way scheme by making transmitting equipment more affordable, without increasing the potential for harmful interference.

I. THE RULES SHOULD REFLECT THAT FREQUENCY TOLERANCE IS NOT RELEVANT TO DIGITAL MODULATION TECHNIQUES THAT DO NOT UTILIZE CARRIER FREQUENCIES.

The Commission has time and again recognized that frequency tolerance, the degree to which a carrier frequency transmission deviates, is *not* relevant to most digital signals. In the Digital Declaratory Ruling, for example, the Commission plainly and unequivocally stated that "[w]e concur that frequency tolerance is not relevant to the digital modulation systems involved herein, with the exception of the pilot carrier frequency in VSB systems."[3] In recognition of this fact, the Commission declined therein to mandate frequency tolerance standards for most digital modulation methods.[4] Similarly, in the Notice of Proposed Rulemaking in this proceeding, the Commission again recognized frequency tolerance rules to be "incompatible with digital transmissions" and sought comment as to whether it "should continue not to impose a frequency tolerance requirement for digital transmissions.[5] Not a single commenter in the proceeding advocated the imposition of frequency

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[3]*Declaratory Ruling and Order, In the Matter of Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations*, 11 FCC Rcd 18839,18858 (1996) ("*DDR*").

[4]*Id.*

[5]*Notice of Proposed Rulemaking, In the Matter of Amendment of Parts 1, 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions*, 12 FCC Rcd 22174, 22185 (1997) ("*NPRM*").

tolerance standards on non-VSB digital transmissions. In its Reply Comments filed February 9, 1998 ("Spike Reply Comments"), Spike offered support for the Commission's recognition in the *DDR* and *NPRM* that such standards are inapplicable to non-VSB digital transmissions.[6]

Despite the foregoing, the rules adopted in the *Order* carry forward the previously-existing analog standard of +/- 1 kHz for *all* digitally modulated signals for main stations and high-power booster stations.[7] Not only is this unjustified from a technical standpoint as the Commission has recognized, but such a standard adds unnecessarily to the cost of digital transmission equipment, making new digital services considerably more expensive than they need to be, and thereby less competitive.

For example, in Spike's experience, in order to meet the +/- 1 kHz frequency tolerance standard, the commonly utilized crystal reference oscillator ("CRO") in the transmitter must be replaced by an "ovenized" CRO, at approximately ten times the cost. Imposing such unnecessary, additional up-front costs on wireless operators and other users of the spectrum places them at a competitive disadvantage, contrary to the Commission's oft-stated goal of maximizing robust competition in the video and data services marketplace.

Spike urges the Commission to make clear that frequency tolerance is not relevant to non-VSB digital transmissions, and to revise its rules accordingly.

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[6]*See* Spike Reply Comments at 8-9.

[7]*Order* at Appendix C, Section 21.101 at footnote 2.

II. THE COMMISSION SHOULD CORRECT AN INCONSISTENCY IN THE RULES PERTAINING TO THE SPECTRAL MASK REFERENCE LEVEL.

In its Comments filed on July 2, 1998 in response to the Commission's Public Notice[8] inviting comment on *ex parte* presentations made in the course of this proceeding ("Spike Comments"), Spike demonstrated that while the text of new Sections 21.908(a) and (d) correctly reference the spectral mask to the licensed average channel power, the associated equations set forth in Section 21.908(e) for determining the spectral mask mistakenly reference the mask to the "flat top" of the digital wave form. Spike further demonstrated that this inconsistency results in an emission mask standard that could be interpreted as being 18 dB more restrictive than intended, which will result in needless additional equipment costs.[9]

For example, under the time-tested average channel power reference point for spectral mask which remains in the text of Sections 21.908(a) and (d), a licensee or operator may integrate into its transmission system a high-quality, inexpensive, off-the-shelf cable modem that meets the spectral mask guidelines.[10] If, however, the inconsistent equations of Section 21.908(e) are literally applied, the out-of-band emissions standard becomes 18 dB more stringent, and expensive, made-to-order equipment would be required in order to meet this standard. Such additional expense will not, in fact,

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[8]*See Public Notice*, DA 98-1119, released June 12, 1998.

[9]*See* Spike Comments at 3-8.

[10]It is important to note that existing cable modems were designed to comply with spectral mask standards which specify out-of-band emissions attenuation requirements relative to average (6 MHz) channel power, whereby off-channel emissions are specified relative to total in-channel power. With hundreds of thousands of such modems deployed worldwide, these performance standards have been amply demonstrated to ensure interference-free adjacent channel operation.

result in any additional interference protection, as Spike demonstrated in its Comments.[11]

The Commission's stated goals in revising the rules -- fostering competition in communications services and making advanced services more readily available to the public -- will not be served by implementation of inconsistent technical rules that would result in equipment expenditures greater than required to provide quality, interference-free services. Spike again urges the Commission to conform the equations of Section 21.908(e) with the remainder of the rule.[12] Those seeking to comply with the Commission's rules should not be required to guess whether the text of the rule language or the equations are intended to govern the reference point for the spectral mask standards.

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[11] *See* Spike Comments at 6-8, and Exhibit C.

[12] In order to make the Section 21.908(e) equations consistent with Sections 21.908(a) and (d), the equations must relate the specified attenuation values (e.g., 25,35,40,60) to attenuation below channel power. "A" must be re-defined as "A_{FT}" to clearly indicate the measurement of attenuation from the "flat top" of the digital wave form. By so doing, the specified mask will be properly referenced to the licensed average digital 6 MHz channel power. In addition, the ability to utilize various resolution bandwidths is retained with this refinement, a feature which will be useful for measurement in the context of sub- and superchannelization:

For absolute power measurements:

$$\text{Attenuation in dB (below channel power)} = A_{FT} + 10 \log (C_{BW} / R_{BW})$$

For relative power measurements:

$$\text{Attenuation in dB (below flat top)} = A_{FT} + 10 \log(R_{BW1}/R_{BW2})$$

Where:

Attenuation in dB (below channel power) = Attenuation specified for spectral point (e.g., 25, 35, 40, 60 dB)

A_{FT} = Attenuation in dB (below flat top)

Attenuation in dB (below flat top) = Attenuation in dB (below channel power) - 10 log (C_{BW} / R_{BW})

C_{BW} = Channel bandwidth (for absolute power measurements)

R_{BW} = Resolution bandwidth (for absolute power measurements)

R_{BW1} = Resolution bandwidth for flat top measurement (relative)

R_{BW2} = Resolution bandwidth for spectral point measurement (relative)

Conclusion

The Commission should take this opportunity to refine its rules to reflect that frequency tolerance is not at all relevant to most digital modulation methods, and conform the spectral mask guidelines so that the mathematical equations used to describe the reference point for the attenuation of out-of-band emissions are consistent with the text of the rules. These refinements will serve the public interest by facilitating the transition from analog, one-way service to advanced two-way operations, and make ITFS and MDS service offerings more affordable and competitive by reducing equipment and system design costs, goals the Commission has consistently championed.

Respectfully submitted,

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