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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Amendment of Parts 2, 15, and 97 of the	)	ET Docket No. 94-124
Commission's Rules to Permit Use of Radio	)	RM-8308
Frequencies Above 40 GHz for New Radio	)	
Applications	)	

To: The Commission

COMMENTS OF THE MILLIMETER WAVE COMMUNICATIONS WORKING GROUP

The Millimeter Wave Communications Working Group ("MWCWG") hereby comments on the Fourth Notice of Proposed Rulemaking ("the Fourth NPRM") in the above captioned proceeding, released August 14, 1997.

I. BACKGROUND AND STATEMENT OF INTEREST

In the First Report and Order issued in this proceeding (the "First R&O"), the Federal Communications Commission ("Commission") made available the 59-64 GHz band ("60 GHz band") for use by general unlicensed communications devices. In a Second Notice of Proposed Rulemaking issued contemporaneously with the First R&O ("the Second NPRM"), the Commission requested comment on whether a spectrum etiquette should be adopted for the 60 GHz band and gave industry one year within which to develop and submit its recommendations on such an etiquette. In response to the second NPRM, parties interested in the

development of the 60 GHz band for unlicensed commercial applications formed the MWCWG. The MWCWG is comprised of representatives from manufacturers with a potential interest in developing 60 GHz unlicensed products, including builders of hardware, components and devices. Not surprisingly, the MWCWG's members have a wide range of views and, on many issues, widely differing perspectives. From the outset however, they have agreed on two fundamental concepts: that the Commission's allocation of the 60 GHz band for unlicensed uses is of enormous value, and that the adoption of some common "rules of the road" governing operation in this band is necessary to protect the allocation and maximize the band's usefulness. In addition, the MWCWG's members have agreed that the 60 GHz band likely will be used to support a wide range of uses.

Therefore, the rules governing operation in the band should be simple, should not be biased in favor of any one technology, and should not exclude any potential product. After a year of deliberations, during which all views on the etiquette were carefully considered and thoroughly discussed, the MWCWG developed an effective, simple etiquette that will benefit all potential users of the band. The MWCWG submitted this etiquette to the Commission on December 13, 1996.

In the Fourth NPRM, the Commission proposed to adopt the etiquette developed by the MWCWG and requested comment on this proposal. At the same time, it issued a Memorandum Opinion and Order ("MO&O") permitting the operation of authorized unlicensed devices in the 60 GHz band on an interim basis, subject to compliance with the proposed spectrum etiquette.

II. THE COMMISSION SHOULD ADOPT THE PROPOSED SPECTRUM ETIQUETTE IN ITS ENTIRETY

A. The Commission Should Not Modify the Proposed Etiquette.

The MWCWG strongly supports the Commission's proposal to adopt the MWCWG's proposed spectrum etiquette. This relatively simple set of rules will promote the efficient use of the 60 GHz band without unnecessarily constraining the development of new products and services. Furthermore, the rules will serve as a foundation for continuing industry efforts to adopt consensus standards, including a standard implementing the "coordination channel" and a format for the transmitter ID.

B. The Transmitter ID will Help to Ensure Efficient Use of the 60 GHz Band and will be Increasingly Important as the Band Becomes More Heavily Used.

Under the proposed spectrum etiquette, each 60 GHz transmitter with an output power of 0.1mW or greater would be required to periodically transmit a "transmitter ID" containing the device's FCC ID number, its serial number and a user-definable field of up to 24 bytes of information. In the Fourth NPRM, the Commission specifically requested comment on this aspect of the etiquette. The MWCWG carefully considered the benefits and burdens of a transmitter ID requirement prior to including this requirement in the proposed etiquette. In the end, the MWCWG's members concluded that the universal availability of a transmitter ID will be an important element in promoting efficient use of the 60 GHz band.

As the Commission is aware, the successful operation of Part 15 devices depends on the ability of a multitude of users, employing devices made by different manufacturers with different characteristics, to share spectrum harmoniously. To some extent, sharing is made possible through technical means, including strict limits on power. In some cases, however, other

approaches including informal "coordination" between users and deployment strategies that take into consideration the existence of nearby transmitters also are necessary. These additional avenues for ensuring successful sharing often depend on the ability of one user to identify all devices and users operating in the local environment. The universal existence of a transmitter ID will make it possible for those using unlicensed 60 GHz devices to identify all other 60 GHz devices operating within interference range and, thereby, to plan their deployments in a manner that minimizes the risk of harmful interference. In addition it will help users to identify the source of harmful interference when such harmful interference occurs and, thereby, will increase their capacity to resolve inconsistent spectrum uses. The ability to plan around other devices and to identify the source of objectionable interference will become increasingly important as the 60 GHz band becomes more heavily occupied. As a result, the MWCWG believes that the transmitter ID will become an increasingly valuable tool, enabling users to monitor and respond to local operating conditions.

The MWCWG also has concluded that the transmitter ID requirement will not impose a substantial burden on product developers. If such a capability is incorporated into all devices from the outset, it can be integrated without causing delays or measurably increasing costs. The MWCWG purposefully has left open the specific details of the transmitter ID requirement. This flexibility and openness will give industry an opportunity to agree at a future date on a standard way to present the ID information, as well as a standard modulation format to use. While it would be premature to dictate these specifics at this time, by requiring transmitter IDs to be incorporated into 60 GHz transmitters from the outset, the Commission will prompt

manufacturers to develop the necessary "hooks" that later can be used to support a more refined industry-sanctioned transmitter ID standard.

C. The Coordination Channel is Important to the Future Effective Use of the 60 GHz Band.

The proposed etiquette would set aside a small portion of the 60 GHz band from 59.0-59.05 GHz, for a "coordination channel" that would be used exclusively for transmissions designed to help to mitigate or eliminate interference. The Fourth NPRM requested specific comment on this aspect of the etiquette. The MWCWG concluded that the coordination channel, like the transmitter ID, will play an essential role in ensuring the future effective use of the 60 GHz band. While precise methods for using a coordination channel are still being developed, the MWCWG's members strongly believe that industry will be able to define on a consensus basis, methods for using this channel that will make it possible to avoid interference and, thereby promote efficient spectrum use and the value and reliability of unlicensed 60 GHz devices.

While the potential benefits of a coordination channel are great, the "costs" of reserving spectrum for this channel are small. The reserved spectrum constitutes only one percent of the available spectrum, leaving an unprecedented amount of bandwidth available for communications use. Moreover, it will take several years of use of the 60 GHz band to fully develop. If industry fails to agree on an approach for using a coordination channel by the time that the 60 GHz band is beginning to become congested, the Commission can reconsider, at that time, whether the continued reservation of coordination channel spectrum is in the public interest. If, however, the Commission declines at this time to set aside spectrum for a coordination channel, equipment will

be developed that uses the lower 50 MHz of the band for other purposes. As a result, the opportunity for establishing such a channel would be lost.

D. The Commission Should Move Quickly to Adopt the Etiquette.

The MWCWG urges the Commission to act quickly in adopting the etiquette. Pursuant to the MO&O, 60 GHz product deployment may now proceed on an interim basis. Manufacturers and users, however, will benefit from the certainty and stability that will accompany the adoption of final rules.

III. CLARIFICATIONS

In its Fourth NPRM, paragraph 26, the Commission made three comments of a technical nature that bear clarification.

First, it stated that the term "radiated power" in the MWCWG's report actually referred to "transmitter output power." The Commission is correct in recognizing that the power referred to is the actual power flowing from the transmitter into space through the antenna, and that it does NOT include any factor accounting for antenna gain (i.e. it does NOT refer to ERP or EIRP). The term "radiated power" was intended to imply that the total power radiated from the antenna is the power of interest, not the power delivered to a dummy load by the transmitter. It is important to realize that actual millimeter wave transmitters will often combine output amplifier and antenna functions into a single unit, so that it may be impossible to measure the transmitter output power in any way other than by measuring it with a test receiver in free space. Hence, the term "radiated power" was used.

Second, the Commission stated that a "pulse desensitization factor" must be applied when measuring the peak power as defined in the MWCWG report. While it is true that measurements made with spectrum analyzers may require the application of a "pulse desensitization factor," the measurement as defined in the MWCWG report is a time domain measurement in which a voltage pulse proportional to power is detected, displayed, and converted to power. No desensitization factor is required in this measurement. However, if the measurement is displayed in the frequency domain using a spectrum analyzer, corrections must be applied to properly infer the peak power from the spectrum analyzer's display.

Third, in footnote 33, the Commission rightly pointed out the absence of language referring to the 1 MHz minimum bandwidth requirement in 15.35(b). This was a typographical error on the MWCWG's report. The intention of supplying recommended modifications to 15.35(b) and 15.35(c) was to **ADD** language referring to a subsequent millimeter wave section. Here, for clarification, are the corrected proposed changes to 15.35(b) and 15.35(c), with the added language enclosed in square brackets[ ]:

> **15.15(b)** On any frequency or frequencies above 1000 MHz, unless otherwise stated, the radiated limits shown are based on the use of measurement instrumentation employing an average detector function. When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated [or, where applicable, to the limits set forth in Section 15.255]. Unless otherwise specified, measurements above 1000 MHz shall be performed

using a minimum resolution bandwidth of 1 MHz. Measurements of AC power line conducted emissions are performed using a CISPR quasi-peak detector, even for devices for which average radiated emission measurements are specified.

NOTE: While 15.35(b) refers to using a MINIMUM resolution bandwidth of 1 MHz "unless otherwise specified," the intention of the proposed language is that the added phrase "...where applicable, to the limits set forth in Section 15.255," constitutes an "otherwise" specification. The measurement technique specified in the proposed Section 15.255 calls for the equivalent of a 5 GHz resolution bandwidth and a 10 MHz video bandwidth for 59-54 GHz millimeter wave measurements.

Thus, the "otherwise specified" resolution is greater than 1 MHz, and is therefore compatible with the language of section 15.35(b).

15.15(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measured field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in those cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. [For devices operating in the 59.0-64.0 GHz band, average field strength shall be determined in accordance with Section 15.255(b) rather than pursuant to this paragraph.] The exact method of calculating the average field strength shall be submitted

with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

IV. CONCLUSION

For the reasons discussed above, the MWCWG strongly urges the Commission promptly to adopt, in its entirety as corrected and clarified, the etiquette developed by the MWCWG and proposed by the Commission in the Fourth NPRM.

Respectfully submitted,

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