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ATTORNEYS AT LAW

January 31, 2005

Delivered Electronically

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Reconsideration in the 70/80 GHz Band *(WT Docket No. 02-146)*

Dear Ms. Dortch:

In response to questions raised at a meeting last week with officials from the Office of Engineering and Technology and the Wireless Telecommunications Bureau, members of the WCA Above 60 GHz Committee are providing a written statement explaining the economic benefits of the "power/gain tradeoff" proposal that the industry has unanimously advanced in the above-captioned proceeding. This letter provides that information, and supplements the case made for the WCA's proposal in *ex parte* presentations of August 24, 2004, October 8, 2004, and January 27, 2005.

To begin, it may be useful to restate three conclusions that seem to be universally accepted.

- First, if one assumes maximum EIRP, then operation with a 43-dBi gain antenna under the industry's proposal actually produces less interference than operation at maximum EIRP under the rule in the Commission's *Report and Order,* which specifies a 50-dBi gain antenna. That is, although the half-power beamwidth of the 43-dBi gain antenna is twice as wide as for the 50-dBi antenna, the maximum EIRP of the 43-dBi antenna's transmitter is 12 dB lower under the industry's power/gain rule, reducing overall interference.

- Second, if one assumes instead that power levels are so far below the maximum that it would be possible to switch from a 50-dBi antenna to a 43-dBi antenna without sacrificing any transmitter power, then the wider half-power beamwidth of the 43 dBi antenna could interfere with nearby links that would experience no interference under the current rule.

- Third, because the radiation patterns produced by either of these alternatives will in any event be very small "pencil" or "needle" beams, the only scenario in which the industry's proposal might lead to fewer link deployments than would

> occur under the current rule is in the case of a very-high-density, hub-and-spoke configuration that one might find on the roof of a skyscraper in an urban core.

Deciding whether the power/gain tradeoff better serves the public interest is therefore not a strictly technical matter; instead, it calls for a practical assessment of the costs and benefits of the industry's proposal in the situations where 70/80 GHz radios are likely to be deployed.

WCA members are unanimous in the view that the potential reduction in deployment density on relatively few large buildings pales in comparison to the much larger benefit of making the service attractive in lower-density business locations. The reasons for this cost/benefit judgment can be stated fairly simply.

On the one hand, the "cost" of the industry's proposal – a theoretical reduction in the maximum density of hub-and-spoke links on a single rooftop – will be limited to a very small subset of potential deployments. Gigabeam (which is focusing on this higher-density end of the market) has performed a technical analysis showing that it is possible to place 200 simultaneous two-way gigabit-class links on a large skyscraper rooftop using 43-dBi gain antennas. While the use of 50-dBi gain antennas might make it possible to double the density to 400 on the same rooftop, there simply are not that many rooftops where there is any reason to worry about how to deploy more than 200 gigabit-class radios. In any event, the industry's proposal would not *prevent* the use of 50-dBi gain antennas; it would only provide the additional flexibility for lower-gain, lower-power applications on *other* rooftops.

While the cost of the industry's proposed rule is therefore low, substantial benefits accrue because the proposed rule allows the flexibility to deploy lower-power, lower-gain antennas to significantly more business locations. Some of the benefits have already been fully explored in the record of this proceeding. Many of them follow directly from the fact that the industry's proposal will make it possible to use smaller antennas. The advantage is not just that IT professionals prefer smaller antennas (though that is true) but also that smaller antennas are cheaper to produce and cheaper and easier to mount. The larger dish required under the existing rule must be made of material that is stiff enough not to cause deflection; otherwise, deflection could cause the antenna not to receive a signal. Mounting such an antenna requires a heavy-duty pole to avoid having the antenna shift in the wind. And because the existing rule requires such a narrow half-power beamwidth, it leaves very little tolerance for any wind-related twist or sway. In contrast, the smaller dish that could be used under the industry's flexible proposal could be composed of either plastic or metal. In either case, the manufacturing process is much less expensive, because the material can be relatively thin. Also, a smaller antenna can be integrated into the transmitter's housing; consequently, the housing itself provides for the majority of the overall antenna stiffness. Moreover, all antennas – large or small – must be manufactured with low surface tolerances in order to meet the FCC's sidelobe requirements. Typically designs use a surface flatness of $1/20^{th}$ the wavelength, which for the 70/80 GHz band is ± 0.2mm. It is far more expensive and difficult to produce such low surface tolerances for larger antennas than for small ones for the simple reason that there is a larger surface area. Driving costs out of antennas by making them smaller is an obvious way to help ensure that the final price of the link can be the most competitive price possible.

With the industry still in its early days, Committee members have seen antenna vendors quoting price ratios of approximately 1:3 to 1:8 between vendor prices for the smaller antennas that can be used for the slightly wider beamwidth permitted under the industry's rule, and the larger antennas currently required. In other words, depending on the vendor, the antennas required by the Commission's current rule might cost from 3 to 8 times as much as antennas would cost under the industry's proposed rule. This is not a small difference. In fact, the magnitude of the difference is suggested by the experience of one Committee member that recently requested bids from seven different vendors. While most of the seven vendors refused even to bid on the 24-inch antenna that would meet the Commission's current specification, several offered to produce the 13-inch version with relaxed sidelobes for $60-$100 per antenna (plus non-recurring costs of $200,000-$300,000). For this particular Committee member, entering the 70/80 GHz radio market makes sense with the smaller antenna called for by the power/gain tradeoff proposal, but does not make sense with the 24-inch antenna required to meet the current rule.

Furthermore, although the cost of the antenna will be only a small portion of the total cost of *early* 70/80 GHz installations, it will become more significant as the radio and other costs are reduced. A one-size-fits-all approach to the antenna means that the antenna cost at the lower end of the market will become a significant portion of the retail price for the link, causing prices to be higher than they need to be, and demand to be suppressed. Industry believes that the difference is large enough to adversely impact the development and use of the bands.

There are, of course, segments of the market that are and will always be relatively insensitive to price. For businesses in higher-density areas, there may be non-price reasons to install virtual fiber (*e.g.*, redundancy), or heavy data traffic may make it worthwhile to pay more for 70/80 GHz links than for alternative technologies. In other situations, the choice of technology may be determined by a service provider rather than by the customer. These are all important parts of the market for 70/80 GHz links, but they are not the entire market or even the bulk of it. The "other half" (or more) of the market is in lower-density locations – businesses in campus or office park settings, with buildings of just two or three stories. These customers will initially deploy 1 Gb/s Ethernet links, and are price-sensitive—they will not buy if the price is too high. Committee members have different business plans for various segments of the market, reflecting different underlying beliefs about how the market will respond to virtual fiber in this band. Nonetheless, our consensus estimate is that the practical result of our "power/gain tradeoff" proposal would be to expand the addressable market for 70/80 GHz radios dramatically, from perhaps 20-25% of business locations to perhaps 75-80% of business locations. In econometric terms, this is referred to as "not peanuts."

As everyone seemed to acknowledge in our meeting with the Commission's staff last week, neither the current rule nor the industry proposal is required as a matter of mathematical necessity; it is rather a question of practical judgment based on an assessment of the market. The unanimous opinion of the members of the WCA Above 60 GHz Committee is that the benefits of the power/gain tradeoff proposal would not only outweigh the costs, but outweigh them in a way that dramatically expands the addressable market. We once again urge the Commission to adopt our proposal.

I am submitting a copy of this notice for the record pursuant to section 1.1206(b) of the Commission's rules. Please feel free to contact me with any questions about this submission.

Respectfully submitted,

/s/

Mark A. Grannis