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

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| In the Matter of | ) | |
| | ) | |
| Amendment of Parts 1, 21 and 74 to Enable | ) | |
| Multipoint Distribution Service and | ) | MM Docket 97-217 |
| Instructional Television Fixed Service | ) | |
| Licensees to Engage in Fixed | ) | |
| Two-Way Transmissions | ) | |
| | ) | |
| | ) | |

**COMMENTS IN RESPONSE TO**
**FURTHER NOTICE OF PROPOSED RULEMAKING**

The over 110 wireless communications system operators, Commission licensees, equipment manufacturers and consultants who were parties to the Petition for Rulemaking that commenced this proceeding (collectively, the "Petitioners"), by their attorneys, hereby submit their initial comments in response to the *Further Notice of Proposed Rulemaking (*the "*Further Notice*") released in this proceeding on July 21, 2000.[1] For the reasons discussed below, the Petitioners urge the Commission to adopt the restrictions on emissions by response stations proposed in the *Further Notice*, subject to the one minor modification discussed below.

The *Further Notice* seeks comment on an issue initially raised by the Petitioners in their February 10, 2000 Consolidated Comments and Partial Opposition – the establishment of rules governing emissions by a Multipoint Distribution Service ("MDS") or Instructional Television Fixed Service ("ITFS") response station when it is not engaged in transmissions.[2] As the

[1] See Amendment of Parts 1, 21 and 74 of the Commission's Rules to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions, MM Docket No. 97-217, FCC 00-244 (rel. July 21, 2000)[hereinafter cited as "Further NPRM"].

[2] *See id.* at ¶¶ 38-40.

Petitioners explained at that time, they are concerned that, absent the adoption of restrictions on emission by response stations when not engaged in communications with their response station hubs, interference may result. The simple fact is that a transverter (the upconverter and amplifier of a response station) will inevitably radiate some amount of energy in the form of wideband noise, even when not transmitting to its associated response station hub. The amount of such radiated energy depends upon the output noise from the combination of the modulator, one or more upconversion stages, and the output amplifiers, plus the gain of the antenna used for each installation. This wideband noise will appear on all the channels in the band on which the transverter is designed to operate, even channels that are not used by the particular system operator.

And therein lies the problem. If there were but one system operator in a given geographic area, the Commission could allow the marketplace to establish appropriate standards for transceiver performance. The sole operator in each market could make its own assessment of the need to control wideband noise (which need increases as the number of transceivers increases) and utilize transceivers that minimized equipment costs without jeopardizing the desired quality of service. However, there are numerous markets, including some of the largest in the country, in which more than one entity has acquired or leased MDS/ITFS channels to deploy competing wireless broadband systems. In this environment, a marketplace solution to the issue of transceiver noise will not work.

The nature of the problem is best illustrated by example. Assume an operator with just a handful of channels that desires to deploy inexpensive, but "noisy" equipment to provide a low-cost, low speed, low-quality service. Its decision to utilize transverters that generate excessive

wideband noise not only dictates the nature of that operator's service, but jeopardizes the other operator's ability to productively utilize the bulk of the channels in the market for a higher quality service offering.[3] In other words, absent a reasonable restriction on the emission of wideband noise by inactive transceivers, the lowest common denominator will control the nature of all services offered in a given market.[4]

The challenge for the industry and the Commission in this proceeding is to carefully balance the benefits of any restriction under consideration against the costs. It goes without saying that the tighter the restrictions, the more response station equipment is likely to cost. And, if the cost becomes too great, MDS/ITFS-based wireless broadband services will not be viable in the marketplace. On the other hand, if wireless broadband services in the 2.1 GHz and 2.5 GHz bands are subject to excessive interference, the resulting service disruptions could also doom the service in the marketplace.

To assure that all operators can provide a reasonably high-quality service to the public, the Petitioners proposed in their May 11, 2000 *ex parte* submission that the Commission amend Sections 21.909(m) and 74.939(o) of its rules to specifically provide that when a response station is not in communications with its associated hub, it must restrict the field strength of its

[3] Although the wideband noise generated by any single transverter will be quite small, within a given response service area there are can be a relatively large number of transverters all aimed at a single hub. Consequently, without appropriate power limitations, the power that might be accumulated at the receiving hub from all the off-state transverters could become sufficient to interfere with desired communications. The worst case of interference will occur when the two operators have collocated their hubs.

[4] By the same token, the Commission should avoid adopting restrictions that are so conservative, they drive transceiver costs to commercially non-viable levels. Those wireless broadband system operators who participated in last week's initial filing window for response station hubs and boosters learned first-hand that the Commission's interference protection rules – rules based on a cascading series of worst-case assumptions that, in the real world, will never arise – unreasonably restrict the deployment of two-way broadband systems. Response service areas proposed during the window were in many cases unduly restricted in size in order to comply with the highly-conservative rules. While this is not the appropriate forum to revisit those rules, The Commission should make certain not to exacerbate the situation by imposing unduly harsh restrictions on response station emissions.

emissions. Recognizing that it is more practical to measure the unwanted emissions as radiated emissions after antenna gain,[5] among other reasons, the Petitioners and IPWireless, Inc. (the only other party to address the issue during the further reconsideration phase of this proceeding) agreed upon a two-prong restriction, with the level of permissible emissions depending upon whether the gain of the response station antenna exceeds 6 dB. Specifically, they proposed that Sections 21.909(m) and 74.939(o) be revised by adding at the end of each the following language:

> When not engaged in communications with its associated response station hub, a response station shall maintain the field strength of its emissions to no more than:
>
> $$E_{Toff} \leq 10\,\mu V/m \quad \text{for} \quad G_A \leq 6\ dB$$
>
> $$E_{Toff} \leq 10 \times 10^{\frac{(G_A - 6)}{20}}\ \mu V/m \quad \text{for} \quad G_A > 6dB$$
>
> Where $E_{Toff}$ = Field strength in microvolts/meter (measured at a distance of 3 meters with a 1 MHz resolution bandwidth) of a response station in the "off" state
>
> $G_A$ = Gain in dB of the response station antenna

In the Petitioners' view, this approach best balances the need to restrict emissions in order to assure a minimum quality of service against the cost impact of any restriction. The Petitioners objective has been to provide response station hubs with a level of protection from transverter noise interference afforded to response station hubs similar to that provided from co-channel and adjacent channel interference pursuant to Sections 21.909(i) and 74.939(i). If one

[5] There are two ways in which to measure the transverter noise output. One is to measure the actual noise power between the amplifier and the antenna. The other is to measure the radiated noise level as emitted by the antenna. Many transverters use integrated amplifiers and antenna driven elements. These designs do not provide interfaces to enable disconnecting the antenna and connecting instrumentation in a way that would yield reasonably accurate measurements of the actual noise power between the amplifier and the antenna. Consequently, as a practical matter, specification of the noise limit on a radiated signal measurement is required.

makes reasonable assumptions regarding likely system deployment scenarios, this proposal achieves that objective, without adding unnecessary costs to the manufacture of transceivers.

For these reasons, the Petitioners generally applaud the proposal advanced in the *Further Notice.* However, the Petitioners are concerned that the proposal has been expressed in the *Further Notice* in a manner that could be read to increase by six-fold the permissible levels of emissions. Specifically, the *Further Notice* proposes limits based on "10 microvolts/meter per 1 MHz bandwidth" or "10 microvolts/meter x 10exp[(antenna gain – 6 dB) / 20] per 1 MHz bandwidth", depending on whether the antenna gain exceeds –6 dB.[6] The Petitioners had intended that the limits they proposed be measured over a 1 MHz resolution bandwidth. However, they had not intended for emissions up to 10 microvolts/meter for each 1 MHz – which could lead to emissions of 60 microvolts/meter for a 6 MHz channel. That level of wideband noise would be intolerable. Therefore, the Petitioners urge the Commission to make

[6] *Further Notice*, at ¶ 38.

clear that a 1 MHz resolution bandwidth is to be used for measurement purposes only.

Respectfully submitted,

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