

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554**

In the Matter of)
)
Modifications of Parts 2 and 15 of the) **ET Docket No. 03-201**
Commission’s Rules for Unlicensed)
Devices and Equipment Approval)

To: The Federal Communications Commission

**JOINT COMMENTS
OF
GE MDS LLC,
FREEWAVE TECHNOLOGIES, INC.,
AND DATARADIO, INC.**

GE MDS LLC (“GE MDS”), FreeWave Technologies, Inc. (“FreeWave”), and Dataradio, Inc. (“Dataradio”) (collectively the “Joint Commenters”) are pleased to submit these Joint Comments to the Federal Communications Commission (“Commission”) as the Commission evaluates in this proceeding the need for Spectrum Etiquette requirements for devices operating in the license-exempt bands.¹ As detailed below, the Joint Commenters believe that Spectrum Etiquette is required to ensure the ongoing viability of operations in the 902-928 MHz band, including the operation of Frequency Hopping Spread Spectrum (“FHSS”) devices. In that regard, the Joint Commenters recommend that the Commission adopt the Spectrum Etiquette requirements detailed herein for unlicensed Digitally Modulated transmitters operating in the 902-928 MHz band.

¹ See Modifications of Parts 2 and 15 of the Commission’s Rules for Unlicensed Devices and Equipment Approval, *Further Notice of Proposed Rulemaking*, FCC 07-117, ET Docket ET 03-201 (Rel. June 22, 2007) (“Further Notice”).

I. Introductory Statement

A. GE MDS

GE MDS is a leader in industrial wireless networking solutions with applications in the supervisory control and data acquisition (“SCADA”), automation, telecommunication, public safety, and online transactional market segments. GE MDS designs and manufactures networked high-speed point-to-multipoint and medium and low capacity point-to-point microwave radios in the license-exempt bands for use in oil and natural gas, utility, traffic monitoring, public safety, and lottery industries.

Founded in 1985, GE MDS has delivered solutions providing the lowest possible cost of ownership while still being highly efficient. GE MDS devices are long-range and rugged to survive extreme temperatures and conditions, as well as backward compatible so customers can use existing networks and expand when necessary.

B. FreeWave

Since 1993, FreeWave has been a leader in providing wireless data communications tools for SCADA and telemetry solutions. Freewave’s equipment is designed to provide reliable, error-free data-flow under any conditions and in all environments for industries such as oil and natural gas, utilities, and security as well as the military.

FreeWave’s network design, path studies and pre-installation engineering services are crafted to ensure mission critical data delivery on day one. The company’s products are deployed in the unlicensed and military bands, for provision of a host of applications. Particularly important for this proceeding, FreeWave’s products include both FHSS and Digitally Modulated Part 15 devices. The company has gained extensive knowledge and experience in resolving interference issues in the license-exempt bands.

C. Dataradio

Founded in 1981, Dataradio is a leading designer and manufacturer of advanced wireless data products and systems for mission-critical mobile data and automation and control applications. Dataradio's products include telemetry devices, analog radios, radio modems, and mobile data systems, several of which are designed to operate in the 902-928 MHz band. The company's clients consist of public safety organizations, utilities, local government, water management, and other critical infrastructure operations.

Dataradio's landmark achievements include the first large-scale laptop-based law enforcement mobile data system in 1987, the first 1000+ unit mobile data system designed for a utility company, and the mobile data communications platform for NASA's 1997 Mars Pathfinder mission.

II. Background

The Commission released the Further Notice on June 22, 2007, seeking comment on whether there is a need for unlicensed transmitters operating in the 902-928 MHz license-exempt band to comply with Spectrum Etiquette requirements. In the Further Notice, the Commission noted that flexibility has helped the industry to develop efficient sharing and modulation schemes and that the existing regulations with no etiquette requirements generally have resulted in efficient use of available unlicensed spectrum.

At the same time, the Commission recognized that Digitally Modulated products recently emerging in the 902-928 MHz band are operating at higher power and wider bandwidth than other unlicensed devices. The Commission correctly found that such devices are largely used to provide commercial wireless broadband services. Due to the lack of duty-cycle or bandwidth restrictions placed on Digitally Modulated devices, the Commission noted that these types of

Digitally Modulated devices have the ability to preclude the operation of other devices in the 902-928 MHz band.

Against this backdrop, the Commission is considering the need for Spectrum Etiquette requirements. The Joint Commenters wholeheartedly support the Commission's efforts.

III. Digitally Modulated Devices Present a Serious Concern to the Viability of the 902-928 MHz band

The Commission has opened this rulemaking at an opportune time. Interference in the 902-928 MHz band from Digitally Modulated devices has recently become a significant concern in many areas of the U.S.

While it is true that the key characteristic of operations in the license-exempt bands is that users are required to accept harmful interference from other users, it is also be true that the Commission's rules are intended to provide flexibility for equipment design and deployment. As a result, operation in the license-except bands -- although secondary in nature under the Commission's rules -- often satisfies important communications requirements.

To maximize the potential of the limited license-exempt bands, it is essential that they be used as efficiently as possible without undue preference to any particular technology that could "swallow" the bands. In the case of the 902-928 MHz band, recently developed Digitally Modulated devices, and one Digitally Modulated device product line in particular, are capable of operating in such a manner so as to occupy the entire band to the exclusion of other technologies.

The result threatens to be a "race for the bottom" as a limited number of spectrally inefficient devices become capable of precluding as a practical matter virtually all other technologies from making use of the band. While the Commission's rules for the license-exempt bands are intended to maximize equipment design flexibility, the opposite may result if a single high-bandwidth, 100% duty-cycle device dominates operations in the entire band. This type of

“operational exclusivity” is not beneficial to license-exempt users and is at odds with the Commission’s fundamental policy goals for the band.

In addition, the recent increase in interference threatens mission-critical applications used by a wide range of entities. As detailed above, the Joint Commenters provide 902-928 MHz equipment to a variety of entities including utilities, the oil and natural gas industry, security, and local government. Each of these types of users provides essential services to the public. The potential for interruption to their operations is a serious concern.

The Joint Commenters urge the Commission to act expeditiously in this proceeding. It is vital that the Commission address the interference concerns presented by Digitally Modulated devices in a timely manner.

IV. Digitally Modulated Devices Operating in the 902-928 MHz Band Should be Required to Comply with Spectrum Etiquette

As detailed above, Digitally Modulated devices, which operate without limits regarding duty-cycle or bandwidth, have the potential to occupy the entire 902-928 MHz band on a 24/7 basis. Even given the incompatibility concerns regarding Digitally Modulated devices, the FCC has permitted such devices to co-exist in the 902-928 MHz band side-by-side with other devices, including FHSS, for years. In the past, such issues have been manageable and mitigation of interference due to incompatibility has largely been successful. The recent proliferation of Digitally Modulated devices designed to operate using high bandwidth and maximum power levels permitted under the rules, without duty-cycle limitations, has made the problems associated with the use of differing device technologies painfully clear in many areas of the country.

As a way to resolve the interference issues in the 902-928 MHz band and preserve the band for the future, the Joint Commenters propose the following changes to Part 15 of the Commission's Rules.

Proposed Rule Changes

1. Limit the duty-cycle of Digitally Modulated transmissions on any frequency to less than 1% for transmissions not needed to either send or acknowledge user data. Furthermore, there should be a minimum of 20 ms of quiet time between such "nondata" transmissions on any frequency.

This will allow time, albeit brief, for other users to occupy the band between transmissions. Currently, a Digitally Modulated transmitter is allowed a 100% duty cycle even when not sending any meaningful data. The Joint Commenters are not aware of any applications using Digitally Modulated devices which would be significantly restricted by implementing this restriction. Even so, the Joint Commenters believe that certain Digitally Modulated devices currently on the market are set to transmit with a greater than 1% duty-cycle even when no user data is being sent.

2. Prohibit synchronization between Digitally Modulated transmitters unless the devices are within 500 feet of one another.

This restriction will prevent utilization of the entire 902-928 MHz band by synchronized radios over a broad geographic region, such as a city. Currently, certain Digitally Modulated devices are designed so as to allow synchronization between transmitters operating on different frequencies throughout large geographic areas, thereby effectively "blocking" the use of the frequency by other entities using different technologies.

3. Prohibit frequency synchronization of multiple transmitters for the purposes of avoiding simultaneous occupancy of the same frequency.

In essence, the restriction on FHSS devices should be extended to Digitally Modulated devices. If a Digitally Modulated device also hops around in frequency the manufacturer should

be required to show that any synchronization would not reduce interference to devices to less than what would occur if the transmitters are not synchronized. For example, if the Digitally Modulated transmitter hops over 10 frequencies, any synchronization should not allow self interference to be less than the 10% level that ten random nonsynchronized transmitters would have with each other. If multiple transmitters use the same frequency then they should still be allowed to synchronize with each other only if they are collocated.

4. Raise the ERP limitation for 902-928 MHz FHSS devices using directional antennas to match the rules for the 2.4 GHz band.

Most FHSS networks are point-to-multipoint and interference normally occurs at the central collection points (e.g., master transmitter) which use omni-directional antennas. By allowing the remote FHSS transmitters to have a higher ERP interference will be mitigated. In addition, encouraging the market at large to use directional antenna will minimize background interference levels.

5. For Digitally Modulated transmitters not meeting these new rules, the ERP limitation should be reduced from 4W (+6 dBW) to 0.1W (-10 dBw).

In order to apply these restrictions in a coherent manner, so that all users of the affected license-exempt bands may receive the benefits, the Joint Commenters urge the Commission to impose ERP limitations as described above for any Digitally Modulated transmitters not meeting the requirements of these new rules.

* * *

In addition, the FCC has asked whether “listen-before-talk” Spectrum Etiquette requirements should be imposed. The Joint Commenters feel that such a restriction will be of little benefit in reducing interference and therefore are opposed to it. The phenomenon known as the "hidden transmitter syndrome" is relevant to this point. Although a remote device may have

line-of-sight availability to its access point, remotes generally do not have line-of-sight to other remotes. For this reason, it is often difficult or impossible for one remote to “hear” transmissions from another remote. Listening before transmitting, therefore, would succeed only in reducing throughput with little or no practical benefit.

V. Conclusion

The Joint Commenters respectfully submit the foregoing Comments and urges the Commission to act in a manner consistent with the views expressed herein.

Respectfully submitted,

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