

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

REPLY COMMENTS OF ITRON, INC.

Itron, Inc. ("Itron"), by its attorneys, respectfully submits these Reply Comments in response to the Comments filed on the Notice of Proposed Rulemaking ("*NPRM*") issued in the above-captioned proceeding.¹ As the nation's leading manufacturer and supplier of Automatic Meter Reading ("AMR") technologies using unlicensed Part 15 devices that operate in the 902-928 MHz band, Itron urged the Commission in its Comments to take into consideration the distinct RF environment of the 902-928 MHz unlicensed band in revising its Part 15 rules.² Unlike the 2.4 GHz and 5.7 GHz bands, which increasingly are being used by high power devices with long duty cycles, such as wireless internet devices, the 902-928 MHz unlicensed band is populated primarily by low power devices (*i.e.*, operating at less than 1 mW and compliant with the field strength limits in Section 15.249) with short duty cycles, such as AMR.

In these Reply Comments, Itron responds to Comments filed by other parties asking that certain rule changes be applied uniformly to all of the ISM bands, or even to unlicensed bands generally. Itron opposes these requests, because many of the high

¹ See *In re Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, Notice of Proposed Rulemaking, 18 FCC Rcd 18910 (2003) ("*NPRM*"). By Order released December 24, 2003, the Office of Engineering and Technology ("OET") extended the deadline for filing reply comments in this proceeding to February 7, 2004. See Order Granting Extension of Time, ET Docket No. 03-201, DA 03-4096 (rel. Dec. 24, 2003). As that deadline was a Saturday, Itron submits these Reply Comments on the next business day.

² See Comments of Itron, Inc., ET Docket No. 03-201 (filed Jan. 23, 2004) ("Itron Comments").

power advanced technologies contemplated for operations in the 2.4 GHz and 5.7 GHz bands would pose a serious risk of harmful interference if permitted in the 902-928 MHz band. Accordingly, the Commission should limit any rules facilitating these high power technologies to the 2.4 GHz and 5.7 GHz bands.

I. ADVANCED ANTENNA TECHNOLOGIES SHOULD NOT BE PERMITTED IN THE 902-928 MHz BAND.

In the *NPRM*, the Commission proposed to establish rules permitting the use of sectorized and phased array antennas with spread spectrum systems operating in the 2.4 GHz band.³ In its Comments, the Consumer Electronics Association (“CEA”) asks the Commission to permit the use of these advanced antenna technologies generally in the other unlicensed bands, in particular the 5.7 GHz band, but does not mention the 902-928 MHz band specifically.⁴

While Itron does not oppose the authorization of advanced antenna technologies in the 2.4 GHz and 5.7 GHz bands, such relatively higher-powered systems would pose a serious risk of harmful interference to the low power AMR systems operating in the 902-928 MHz band. While CEA generally advocates the expansion of the use of sectorized and phased array antennas to other bands, it does not address this interference issue. In light of the potential for harmful interference, the Commission should not authorize the high power advanced antenna systems described in the *NPRM* in the 902-928 MHz band.

The Commission already has recognized that the distinct RF environments of the unlicensed bands warrant different treatment under the rules. For example, the Commission’s rules currently treat antenna gain differently depending on the band in which the unlicensed device operates. Devices operating in the 902-928 MHz band may use a directional antenna gain of > 6 dBi as long as the output power is reduced by the amount in dB that the directional gain of the antenna is over 6 dBi.⁵ For devices

³ See *NPRM* at ¶ 10.

⁴ See Comments of the Consumer Electronics Association, ET Docket No. 03-201 (filed Jan. 23, 2004) at 3-4 (“CEA Comments”).

⁵ See 47 C.F.R. § 15.247(b)(4).

operating in the 2.4 GHz band, the output power is required to be reduced only by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.⁶ Finally, for devices, operating in the 5.7 GHz band, there is no requirement to reduce power with the directional gain of the antenna.⁷

In adopting these rules, the Commission recognized that “[t]here are a significant number of mobile operations in the 915 MHz band” and “for this reason . . . decided not to eliminate the antenna gain limits for the 915 MHz band” even though it did so for the 5.7 GHz band.⁸ This same rationale applies today for distinguishing the 902-928 MHz band from the other unlicensed bands.

If the Commission decides to authorize advanced antenna technologies in the 902-928 MHz band notwithstanding the potential for harmful interference, Itron requests that, at a minimum, the antenna gain rules described above be kept intact. Specifically, devices operating in the 902-928 MHz band should still be required to reduce output power by 1 dB for every 1 dB that the antenna gain exceeds 6 dBi. Preserving this rule will reduce the potential for harmful interference in the band by keeping the final EIRP of devices with higher gain antennas at a lower maximum level.

II. THE REVISED CHANNEL SPACING REQUIREMENTS SHOULD NOT BE APPLIED TO FREQUENCY HOPPING SYSTEMS OPERATING IN THE 902-928 MHz BAND.

The Commission also proposed in the *NPRM* to allow frequency hopping spread spectrum systems to utilize hopping channels separated by either 25 kHz or two-thirds of the 20 dBm bandwidth, whichever is greater, but to limit these rule changes to devices operating in the 2.4 GHz band.⁹ Pegasus Technologies, Inc. (“Pegasus”), a manufacturer of 915 MHz band frequency hopping modules, urges the Commission to adopt the same

⁶ See *id.* at § 15.247(b)(4)(i).

⁷ See *id.* at § 15.247(b)(4)(ii).

⁸ *In re Amendment of Parts 2 and 15 of the Commission’s Rules Regarding Spread Spectrum Transmitters*, Report and Order, 12 FCC Rcd 7488, ¶ 12 (1997).

⁹ See *NPRM* at ¶ 29. As the Commission states in the *NPRM*, although Bluetooth SIG’s request to revise the channel spacing requirements “did not specify the operating band to which the changes should apply, we interpret the request as being applicable to devices operating in the 2.4 GHz band because the Bluetooth product line operates in the 2.4 GHz band.” *Id.*

channel separation rules for frequency hopping systems operating in the 902-928 MHz band because “there is no technical reason why the 915 MHz band should be treated any differently than the 2.4 GHz band.”¹⁰ Pegasus was the only commenter to make this proposal.

Pegasus overlooks the fact that, because of the prevalence of low power devices in the 902-928 MHz band, reducing channel spacing poses a greater interference problem in that band than in the 2.4 GHz band. The interference impact of reduced spacing in the 902-928 MHz band would be substantial, and would be accompanied by a reduction in the benefits realized from frequency hopping. As Figure 1 demonstrates below, under the current rules a frequency hopper with a 20 dB bandwidth of 250 kHz is permitted to transmit on any hopping channel for up to 400ms in any 10 seconds.¹¹ In these circumstances, a nearby receiver with a 4 MHz bandwidth will receive interference 64% of the time, as shown below:

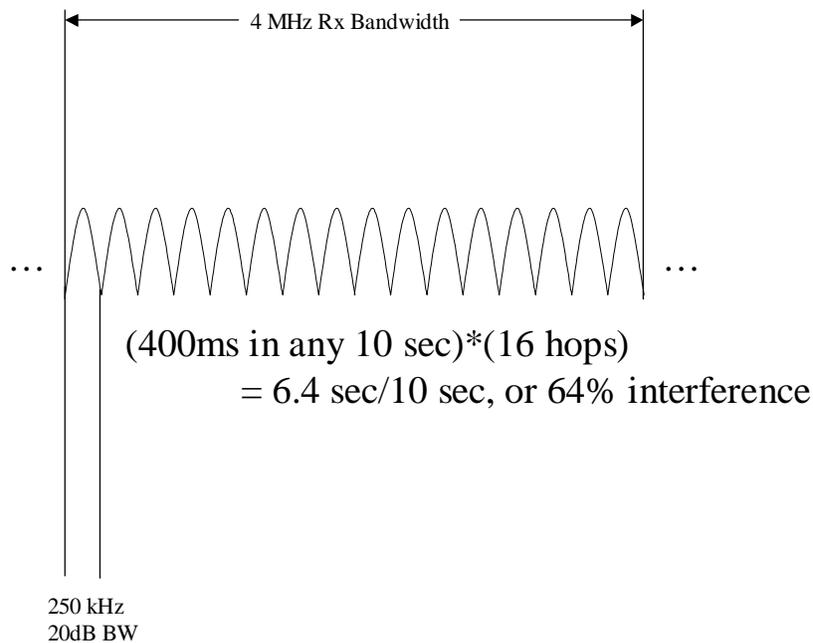


Figure 1: Current Channel Spacing for Frequency Hoppers in 902-928 MHz Band

¹⁰ Comments of Pegasus Technologies, Inc., ET Docket No. 03-201 (filed Jan. 21, 2004) at 2.

¹¹ See 47 C.F.R. § 15.247(a)(1)(i).

However, if the two-thirds bandwidth channel spacing rule is applied in the band, then the same receiver will receive interference 96% of the time, and 24 of the 25 hopping channels would be allowed to sit in the same 4 MHz, thereby significantly reducing the benefit of using a frequency hopping transmitter, as shown below:

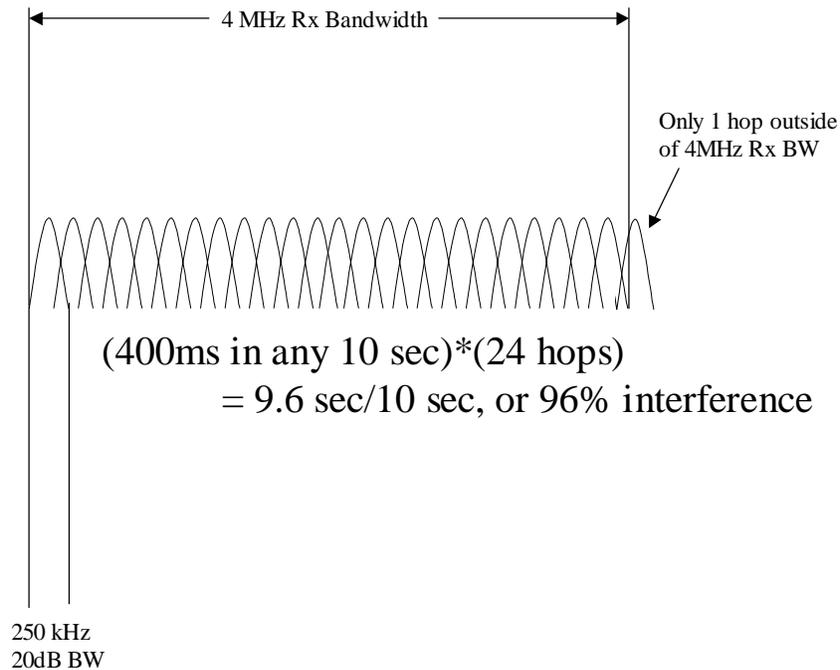


Figure 2: Revised Channel Spacing for Frequency Hoppers in 902-928 MHz Band

In addition, the lower path loss in the 902-928 MHz band increases the potential for interference from devices using more closely spaced hopping channels at longer distances. Thus, reducing channel spacing could result in more instances of harmful interference from a single frequency hopper and increase the number of potential interference sources in the band.

For these reasons, Itron asks the Commission to reject Pegasus' proposal and to make clear that the revised channel spacing requirements do not apply to frequency hoppers operating in the 902-928 MHz band.

III. INDUSTRY-LED INITIATIVES AND COOPERATION CAN RESOLVE SPECTRUM ETIQUETTE CONCERNS.

In the *NPRM*, the Commission invited comment on whether new methods to facilitate efficient spectrum usage by unlicensed devices should be formally adopted.¹² Several commenters oppose the adoption of a mandatory spectrum sharing etiquette in favor of industry-led initiatives to solve the problem of spectrum overcrowding in the unlicensed bands.¹³

Itron agrees with these commenters that industry standards and cooperation often do resolve interference and spectrum occupancy concerns. Itron has worked with other users of the 902-928 MHz band, for example, WaveRider Communications, Inc., a wireless broadband equipment manufacturer, to ensure that Itron's AMR systems and its systems could coexist in the 902-928 MHz band.

In its comments, Itron suggested the Commission might adopt a power output and duty cycle relationship to be applied to devices operating in the heavily used 902-928 MHz band.¹⁴ Itron hereby clarifies that its proposal only was intended as an example of how the Commission could create incentives for efficient spectrum usage. The ultimate goal is to promote co-existence by everyone with sharing the band in a non-interference manner.

IV. CONCLUSION

Itron again commends the Commission for updating its Part 15 rules to accommodate spectrally efficient and innovative technologies in the unlicensed bands. The Commission should take care, however, to limit the scope of new rules that are intended to promote the development of high power, high duty cycle technologies. Any such new rules should be limited to devices operating in the 2.4 GHz and 5.7 GHz band. Extending these rules to the 902-928 MHz band could pose a serious threat to the tens of

¹² See *NPRM* at ¶ 44.

¹³ See, e.g., CEA Comments at 10-13; Comments of Motorola, Inc. at 5; Comments of the Information Technology Council at 8.

¹⁴ See Itron Comments at 8-9.

millions of low power (*i.e.*, operating at less than 1 mW and compliant with the field strength limits in Section 15.249), low duty cycle devices already operating in the heavily used band. Thus, the Commission's new Part 15 rules should take into consideration the distinct RF environments in the 902-928 MHz band and the 2.4/5.7 GHz bands.

Respectfully submitted,

ITRON, INC.

A handwritten signature in black ink that reads "Henry Goldberg". The signature is written in a cursive style with a large, prominent "H" and "G".

By: _____

Henry Goldberg
Joseph A. Godles
Christopher G. Tygh

Goldberg, Godles, Wiener & Wright
1229 Nineteenth Street, N.W.
Washington, DC 20036
(202) 429-4900

Its Attorneys

February 9, 2004