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	)	
	)	

COMMENTS OF ITRON, INC.

Itron, Inc. ("Itron"), by its attorneys, respectfully submits these Comments in response to the Notice of Proposed Rulemaking ("*NPRM*") issued in the above-captioned proceeding.[1]

I. INTRODUCTION

Itron is 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 supplies its RF-based AMR systems to electric, gas, and water utility companies nationwide. Itron's AMR systems enable a utility to monitor business and residential meters from a remote location using a hybrid architecture that employs both licensed and unlicensed frequencies. On the unlicensed side, utility consumption and other critical information is transmitted from meter modules via unlicensed Part 15 devices operating in the 902-928 MHz band. To date, Itron has shipped more than 24 million meter modules to over 850 utility companies providing service in both rural and

[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 comments in this proceeding to January 23, 2004. *See* Order Granting Extension of Time, ET Docket No. 03-201, DA 03-4096 (rel. Dec. 24, 2003).

urban areas. Collectively Itron's utility customers have invested over $1 billion in their AMR networks and tens of millions of AMR devices already are deployed and operating in the unlicensed 902-928 MHz band.

In the *NPRM*, the Commission seeks to update its Part 15 rules to promote more efficient sharing of the spectrum used by unlicensed devices and seeks to remove regulatory barriers that inhibit such sharing. While many of the rules under review apply equally to devices operating in the 902-928 MHz, 2.4 GHz, and 5.7 GHz unlicensed bands, the RF environment in the 902-928 MHz band is very different from RF environments in the 2.4 GHz and 5.7 GHz bands. 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 with short duty cycles. Consequently, Part 15 rules adopted to serve the requirements of devices operating in the 2.4 GHz and 5.7 GHz bands may be inappropriate for operations in the 902-928 MHz band.

As the Commission notes in the *NPRM*, many of the high power advanced technologies contemplated for unlicensed operations in the 2.4 GHz and 5.7 GHz bands could pose a serious risk of harmful interference to other devices operating on the same spectrum.[2] Although the Commission ultimately may conclude in this proceeding that the risk is an acceptable one in the 2.4 GHz and 5.7 GHz bands, based on the fact that the installed base of devices in those bands also operates at relatively high power, the impact of deploying new high power devices in the 902-928 MHz band would be devastating to the low power AMR systems and other unlicensed devices operating in that band.

---

[2] *See, e.g., NPRM* at ¶ 9 (noting that 2.4 GHz advanced antenna systems could "pose an increased risk of interference to other devices" if permitted to operate at point-to-point power limits on the same frequency to communicate with a large number of clients located at various positions around the antenna site); *id*. at ¶ 29 (noting that revising the channel spacing requirements for 2.4 GHz frequency hopping devices "may cause the spectral occupancy and power density to increase, leading to an increased risk of interference").

For these reasons, Itron asks the Commission in these Comments to take into consideration the distinct RF environment of the 902-928 MHz unlicensed band in revising its Part 15 rules. The Commission, by limiting some of its proposed rule changes to the 2.4 GHz and 5.7 GHz bands, may already have taken this factor into account. To avoid creating a cloud over the 902-928 MHz band, however, the Commission should state explicitly that the rules adopted for operations in the 2.4 GHz and 5.7 GHz bands will not be applied to operations in the 902-928 MHz band. Giving formal recognition to the differences in the ISM bands will encourage continued investment in 902-928 MHz band technologies and facilitate the continued success and coexistence of AMR and other low power unlicensed systems operating in the 902-928 MHz band, while promoting innovative, higher-power technologies in the 2.4 GHz and 5.7 GHz bands.

II. DISCUSSION

A. Advanced Antenna Technologies

The Commission proposes to establish rules permitting the use of sectorized and phased array antennas with spread spectrum systems operating in the 2.4 GHz band.[3] Itron generally supports the promotion of spectrum-efficient technologies in the unlicensed bands and commends the Commission for facilitating advanced antenna spread spectrum systems in the 2.4 GHz band. Itron, however, asks the Commission to make clear that it does not intend to authorize the advanced antenna systems described in the *NPRM* in the 902-928 MHz band. Because such systems operate at relatively higher power levels, they would pose a serious risk of harmful interference lower-powered AMR systems operating in the 902-928 MHz band.

---

[3] *See id.* at ¶ 10.

B. Replacement Antennas for Unlicensed Devices

The Commission proposes to permit certification of unlicensed devices with multiple antenna types. Specifically, revised Section 15.203 would require compliance testing of unlicensed devices only with the highest gain antenna of each type of antenna to be certified and with the transmitter operating at its maximum power. Any antenna of a similar type that did not exceed the antenna gain of the tested antennas could be used without retesting.[4]

Itron supports the proposed revision to Section 15.203 as a common sense approach to certification of unlicensed devices. The revised rule will give manufacturers the flexibility to design systems that meet various customers' specifications without the attendant delays of certifying each configuration. The new rule also will decrease demands on Commission resources presently devoted to the equipment authorization process, thereby allowing the Commission to focus its efforts on enforcement of the RF rules applicable to devices operating in unlicensed bands.

C. Measurement Procedures for Digital Modulation Systems

The Commission proposes to harmonize the output power measurement procedure for digital modulation devices authorized under Section 15.247 with the procedures used for digital U-NII devices authorized under Section 15.407. Specifically, testing of Section 15.247 devices would be performed using an average, rather than overall peak, emission measurement, as provided by Section 15.407(a)(4), to determine compliance with the 1-Watt maximum output power. The Commission states that the new measurement procedure would apply to all devices using digital modulation that operate in the 915 MHz, 2.4 GHz, and 5.7 GHz unlicensed bands.[5]

---

[4] *See NPRM* at ¶ 17.
[5] *See id*. at ¶ 23.

Itron takes no position concerning whether the procedures for measuring output power should be harmonized for digital modulation devices operating in the 2.4 GHz and 5.7 GHz bands. Itron, however, opposes applying revised power measurement procedures to digitally-modulated devices operating in the 902-928 MHz band. Changing testing procedures for 902-928 MHz devices at this time could be detrimental to the tens of millions of low power, low duty cycle devices already in operation in the band, because using an average rather than peak power output measurement would in effect result in higher-power devices being permitted to operate in the band. Accordingly, Itron requests that the proposed revisions to Section 15.247(e), if they are adopted, be limited to digitally modulated devices operating in the 2.4 GHz and 5.7 GHz band.[6]

The Commission also seeks comment on whether the spectral occupancy limits for Section 15.247 devices and Section 15.407 (U-NII) devices should be made consistent.[7] Itron believes that a harmonized spectral occupancy limit should be applied to all digital modulation devices operating in the 915 MHz, 2.4 GHz, and 5.7 GHz unlicensed bands, irrespective of whether the devices are authorized under Section 15.247 or 15.407. Specifically, such devices should be required to limit power spectral occupancy to 17 dBm in any 1 MHz band, as currently provided by Section 15.407(a)(3). This harmonized limit will help reduce the potential for harmful interference in unlicensed bands by lowering the spectral occupancy limits across the board for all digitally modulated devices, which may not need the extra power spectral occupancy currently permitted under Section 15.247(d). Accordingly, Itron requests

---

[6] A revised version of Section 15.247(e) along these lines is set forth in Attachment A to these Comments.

[7] *See id*. at ¶ 24. Presently, a Section 15.247 device operating in the 5.7 GHz band is required to limit peak power spectral density to 8 dBm in any 3 kHz band, which is equivalent to 33 dBm in any 1 MHz band, while the same device, if authorized under Section 15.407, would be required to limit its power spectral density to 17 dBm in any 1 MHz band. *See id*.

that Section 15.247(d) be revised to mirror the spectral occupancy limit found in Section 15.407(a)(3).[8/9]

D. Frequency Hopping Channel Spacing Requirements

In response to a request from the Bluetooth Special Interest Group ("Bluetooth"), the Commission proposes to modify the channel separation requirement for frequency hopping spread spectrum systems operating in the 2.4 GHz band to permit such systems to utilize hopping channels separated by either 25 kHz or two-thirds of the 20 dBm bandwidth, whichever is greater.[10] Concurrently, the maximum output power limitation of devices using more narrowly spaced channels would be lowered from 1 Watt to 125 mW.[11]

Itron takes no position concerning the proposed rule changes for frequency hopping devices operating in the 2.4 GHz band. If the proposed rules are adopted, however, Itron asks that the Commission make clear that they do not apply to devices operating in the 902-928 MHz band. As the Commission states in the *NPRM*, although Bluetooth's request "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."[12] Accordingly,

---

[8] Appendix A (Proposed Rule Changes) of the *NPRM* does not explicitly propose revising Section 15.247(d), which presently contains the 8 dBm in any 3 kHz band spectral occupancy limit for digitally modulated systems. Nevertheless, the Commission acknowledges in the text of the *NPRM* that the spectrum occupancy rules for Section 15.247 and U-NII devices may need to be amended to apply the same limits to both types of devices. *See id*. Amending Section 15.247(d) to specify a 17 dBm in any 1 MHz spectral occupancy limit would prevent manufacturers from averaging device output power under Section 15.407(a)(4) provisions while continuing to meet only the 8 dBm in any 3 kHz spectral density limit permitted under present Section 15.247(d). This mixing of rule provisions should not be allowed and is inconsistent with the Commission's goal of harmonizing its standards for digitally modulated devices.
[9] Itron's proposed revision to Section 15.247(d) is set forth in Attachment A to these Comments.
[10] *See NPRM* at ¶ 29.
[11] *See id*. at ¶ 30.
[12] *Id*. at ¶ 25.

the revised channel separation rules should make clear that they apply only to frequency hopping devices operating in the 2.4 GHz band.

E. Part 15 Unlicensed Modular Transmitter Approvals

The Commission proposes to codify and revise its guidelines for approving unlicensed modular transmitters. In particular, the Commission proposes to update its modular approval criteria to accommodate both existing modular devices and emerging partitioned modular architectures, which consist of firmware, radio front end, local oscillator, tuning capacitor, and antenna components.[13]

As an initial matter, Itron notes the Commission's proposed rules for modular transmitter approvals do not provide a clear definition of the term "modular transmitter," which limits Itron's ability to formulate specific comments and could pose the risk of abuse of the modular transmitter approval process. At a minimum, the Commission should make clear that fully integrated systems must be compliant with existing Part 15 rules for unlicensed devices, notwithstanding the formal adoption of procedures for approving unlicensed modular transmitters.

Itron also cautions the Commission against promoting manufacturing flexibility through modular approvals at the expense of integrated Part 15 systems. Allowing too much modularity of various device components could permit end users to build unauthorized configurations more easily and without accountability for a device that could pose a serious threat of interference to compliant devices. Such "mixing and matching" of smaller transmitter components,[14] including local oscillators and tuning capacitors, without the expert advice of the equipment manufacturer contravenes sound engineering practice. Accordingly, Itron requests that the rules adopted for unlicensed modular transmitter approvals take into consideration the potential for

---

[13] *Id*. at ¶ 34.
[14] *Id*. at ¶ 33.

compliance abuse and also incorporate safeguards to protect integrated Part 15 systems such as AMR.

F. Improving Sharing in the Unlicensed Bands

The Commission invites comment on whether it should consider new methods to facilitate efficient spectrum usage by unlicensed devices.[15] In particular, the Commission inquires whether a spectrum sharing "etiquette" should be considered for devices that operate on an unlicensed basis. Such a protocol could require, for example, spectrum monitoring prior to operation, bandwidth limitations, and/or variable output power levels.[16]

Itron believes that the Commission can best promote spectrum sharing and efficiency in the 902-928 MHz band by establishing a limit on the transmit duty cycle of digital modulation devices authorized under Section 15.247.[17] As the Commission frequently has recognized, longer duty cycles, like higher power, translate into greater interference potential.[18] Unlicensed devices in the 902-928 MHz band traditionally have managed to coexist not only because they operate at low power, but also because they transmit for limited periods. Hence, a limitation on duty cycle ensures that the band will not become overcrowded with high power, high duty cycle products to the detriment of the tens of millions of low power, low duty cycle devices already in operation.

---

[15] *Id*. at ¶ 44.
[16] *Id*. at ¶ 45.
[17] Itron is not proposing a similar duty cycle limit for devices operating in the 2.4 GHz and 5.7 GHz bands.
[18] *See, e.g., In re Review of Part 15 and other Parts of the Commission's Rules*, Second Report and Order and Memorandum Opinion and Order, 18 FCC Rcd 14741, ¶ 13 (2003) (declining to permit higher duty cycles for unlicensed devices because the requested change "effectively allows higher signal strength which could result in increased interference potential of devices").

For these reasons, Itron requests that Section 15.247(b)(3), which establishes the maximum peak output power for digitally modulated systems, be revised as set forth in Attachment A hereto to incorporate a duty cycle limit for such devices operating in the 902-928 MHz band. Specifically, only devices that operate up to a 25 percent duty cycle should be permitted to operate at 1 Watt. Devices that exceed the 25 percent duty cycle limit should be required to operate at a lower power level, under 1 Watt, scaled back in proportion to the higher duty cycle. This limit will promote the continued coexistence of the numerous digital devices operating in the 902-928 MHz band and further the Commission's goal of increasing spectrum efficiency in the band.[19]

Finally, Itron is opposed to a spectrum sharing etiquette that would require unlicensed devices to monitor spectrum for activity prior to commencing operation. Such a solution would require the design of complex "smart" transmitters and would be prohibitively expensive for high-volume, cost-cutting technologies such as AMR. Rather, the simplest and most cost-effective solution to the problem of unlicensed spectrum sharing is to establish a duty cycle limit for digital Part 15 devices operating in the heavily used 902-928 MHz band.

III. CONCLUSION

Itron 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 millions of low power, low duty cycle devices already operating in the heavily

[19] Itron's proposed revision to Section 15.247(b)(3) is set forth in Attachment A to these Comments.

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.

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

January 23, 2003

ATTACHMENT A

ITRON'S PROPOSED REVISIONS TO SECTION 15.247

Deletions are indicated by ~~strikethrough~~.
Additions are *italicized* and shaded.

15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

* * * * *

(b) * * *

(3) (i) For systems using digital modulation *and operating at no more than 25% transmit duty cycle* in the 902-928 MHz~~, 2400-2483.5 MHz, and 5725-5850 MHz~~ band~~s~~: 1 Watt.

(ii) *For systems using digital modulation and operating at greater than 25% transmit duty cycle in the 902-928 MHz, band: P=[40 – 10*(transmit duty cycle)/(25%)]dBm.*

(iii) For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz band~~s~~: 1 Watt.

* * * * *

(d) For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than *17 dBm in any 1 MHz* ~~8 dBm in any 3 kHz~~ band during any time interval of continuous transmission.

(e) *For 2.4 GHz and 5.7 GHz devices,* the peak output power ~~and peak power spectral density~~ for digitally modulated system may be determined in accordance with ~~the provisions specified in~~ §§ 15.407(a)(4)~~ and 15.407(a)(5)~~.