

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Progeny LMS, LLC)
) WT Docket No. 11-49
Petition for Waiver of the Rules)
And Request for Expedited Treatment)

**COMMENTS OF ITRON, INC. ON
PROGENY TEST REPORT**

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EXECUTIVE SUMMARY

Progeny seeks to begin operations of its M-LMS system without conducting the requisite, comprehensive field tests to determine how its entire system will co-exist with existing Part 15 technologies. Rather, Progeny chose to perform minimal testing of a very tiny sample of Part 15 devices.

While not all details of Progeny's testing are available, it is clear that the testing fails in a number of significant ways, namely:

- Lack of full cooperation with the Part 15 user community;
- Disregarding a large portion of the Part 15 technologies operating on the band;
- Testing devices individually, at limited locations and modes of operation, against Progeny's location monitoring service only (not its vehicular location service);
and
- Drawing broad conclusions based on very narrow testing that is not statistically significant.

In short, Progeny's test report does not demonstrate that it will not cause unacceptable levels of interference to Part 15, and it is insufficient to support Progeny's request to begin operations.

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Itron, Inc. (“Itron”), by its attorneys, submits these comments in response to the Demonstration of Compliance with Section 90.353(d) of the Commission’s Rules (“Test Report”), filed by Progeny LMS, LLC (“Progeny”) in the above-referenced proceeding.¹

On December, 20, 2011, the Wireless Bureau and Office of Engineering and Technology granted Progeny a waiver of the Multilateration Location and Monitoring Service (“M-LMS”) rules to allow Progeny to construct a system without meeting all of the M-LMS technical construction requirements and without providing primary vehicle location services.² The Waiver Order requires Progeny, prior to commencing operations, to engage in field testing of its system with Part 15 devices and to demonstrate that its system “will not cause unacceptable levels of interference to Part 15 devices that operate in the 902-928 MHz band.”³ For a number of reasons, Progeny

¹ *In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Progeny LMS, LLC, Demonstration of Compliance with Section 90.353(d) of the Commission’s Rules, WT Docket No. 11-49 (filed Jan. 27, 2012) (“*Test Report*”).

² *In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Order, 2011 FCC Lexis 5263, WT Docket No. 11-49 (rel. Dec. 20, 2011) (“*Progeny Waiver*”).

³ *Progeny Waiver* at ¶ 35; see also 47 C.F.R. § 90.353(d).

failed to conduct the field testing in the required manner and should not be allowed to begin operations at this time.

Progeny's testing specifically:

- Did not engage the Part 15 user community, as the Commission intended when it established the M-LMS field testing requirement;⁴
- Did not provide all the information regarding how it conducted the field testing so a determination cannot be made as to whether the testing was valid or sufficient;
- Did not test all deployed Part 15 technologies, or even a representative sample of Part 15 devices, testing only a very limited number of certain types of recently-certified devices;
- Did not employ proper field testing methodology – failing to conduct Line of Sight, collocation, and height testing, among other errors;
- Made incorrect assumptions regarding how and where Part 15 devices operate; and
- Did not rely on findings of statistical significance in making its conclusions.

In fact, an independent engineering report prepared at the request of Itron has determined that substantial interference to various types of Part 15 devices would occur if the Progeny system were allowed to operate.

For these reasons, the Commission should find that Progeny has not met its burden under either the terms of its waiver or the Part 90 M-LMS field testing requirements.

⁴ While Progeny contacted Itron with a proposal to participate in testing, Itron rejected the proposal because it was extremely limited in scope and would not adequately test the potential of the Progeny system to interfere with the operation of Itron's and its utility customers' Part 15-based metering technologies.

BACKGROUND

Itron, the nation's leading manufacturer and supplier of Advanced Metering Infrastructure ("AMI") and Automatic Meter Reading ("AMR") technologies operating several systems using unlicensed devices in the 902-928 MHz band, has participated in this and related M-LMS proceedings for nearly a dozen years. Itron supplies its RF-based AMI and AMR systems to electric, gas, and water utility companies nationwide, enabling smart grid operations by allowing utilities to monitor and control business and residential meters from remote locations. Itron's 902-928 MHz systems consist of more than just house-mounted units, as utility consumption information is transmitted from Part 15 meter modules via a mesh system, or to pole mounted transceivers (known as cell control units and Cell Relays) or to mobile devices (known as Mobile Collectors) that operate in the band. More than 80 million Itron meter modules have been shipped nationwide.

As noted, Progeny has been granted a waiver of the M-LMS rules to permit it to construct a network.⁵ Specifically, Progeny received a waiver of the M-LMS build-out requirement, Section 90.155(e),⁶ so that it may satisfy that requirement using a system that transmits using just one transmission path (forward links/beacon signals), and a waiver of Section 90.353(f)⁷ so that it may provide location monitoring services to non-vehicular mobile devices on an equal basis as vehicular devices. As a condition of the waiver order, prior to commencing operations Progeny must conduct field testing of its system with Part 15 devices and file a report that: 1) details its system design; 2) describes how it conducted field testing; and 3) demonstrates that its system "will not cause unacceptable levels of interference to Part 15 devices that operate in the 902-928 MHz band."⁸

The M-LMS field testing requirement was established when the Commission adopted the 902-928 MHz band plan to allow multiple services – specifically, M-LMS

⁵ *Progeny Waiver*.

⁶ 47 C.F.R. § 90.155(e).

⁷ 47 C.F.R. § 90.353(g).

⁸ *Progeny Waiver* at ¶¶ 29 and 35.

and Part 15 technologies – to mutually coexist on the band.⁹ The purpose of the testing is to provide data to users so that M-LMS licensees may “fine tune” their systems to facilitate this co-existence and minimize interference to existing Part 15 users.¹⁰ As the Commission explained, it sought:

to ensure not only that Part 15 operators refrain from causing harmful interference to LMS systems, but also that LMS systems are not operated in such a manner as to degrade, obstruct or interrupt Part 15 devices to such an extent that Part 15 operations will be negatively affected.¹¹

Notably, the Commission specified its expectation that M-LMS field testing “be accomplished through close cooperation between multilateration systems users and operators of Part 15 systems.”¹² Specifically, in determining what would be appropriate field testing, the Commission explained the following:

the Part 15 industry has an even greater array of technologies that fluctuate in response to the needs of the public. It would be inappropriate to apply uniform testing parameters to those varied technologies, **as no one testing method would adequately address the needs of either LMS or Part 15 operations.** Instead, we believe that the more prudent course of action would be for LMS and Part 15 operators to work closely together to reach consensus on testing guidelines that satisfy their respective requirements.¹³

Progeny’s testing falls far short of the Commission’s requirements for rigorous M-LMS field testing and, therefore, is insufficient to allow Progeny to move forward with its operations.

⁹ *In the Matter of Amendment of Part 90 of the Commission’s Rules to Adopt Regulations for Automatic Vehicular Monitoring Systems*, 10 FCC Rcd 4695 (1995) (“*First M-LMS R&O*”).

¹⁰ *First M-LMS R&O*, 10 FCC Rcd at 4737; see also, *In the Matter of Amendment of Part 90 of the Commission’s Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, Order on Reconsideration, 11 FCC Rcd 16907, 16910 (1996) (“*M-LMS Recon Order*”).

¹¹ *M-LMS Recon Order* at 16911-16912.

¹² *Id.*

¹³ *Id.* (emphasis added).

As detailed in many Commission proceedings,¹⁴ millions of Part 15 devices and systems operate on 902-928 MHz. Today, WISPs, AMI, AMR, ZigBee and RFID devices, WLANs, wireless microphones, SCADA systems used by the oil and gas industry, and many other consumer and commercial devices co-exist on the band. Adequate field testing of these many types of devices requires a great deal of thought, set-up and time to ensure that the inference potential of Progeny's system is properly examined.

In terms of AMR devices, most smart grid manufacturer has devices operating in the band, though these devices vary greatly in design. AMR systems employ a variety of types of devices, from pole-mounted fixed devices that have more than a two-mile radius, to handheld and drive-by mobile devices, to consumer engagement devices operating on a 2 MHz wide band listening to 10 endpoints within a home. AMR systems can be custom-designed for a particular utility and geographic location, differing from area to area. Other AMR systems are designed with fewer variations, but are less robust. AMR systems also vary in terms of what interference solutions are used, with some using "adaptive channel planning" and others simply retransmitting at certain intervals to obtain missed messages, with these intervals dependent on the power level and battery life (if applicable) of the device. Legacy AMR devices can perform frequency hopping, but only over a limited number of channels (in the range of 50), and thus their operations are disproportionately centered in the middle of the 902-928 MHz band, near the center M-LMS channel. Finally, certain Part 15 devices, such as AMR fixed devices or WISP transmitters, out of necessity will be collated with Progeny devices on utility poles or towers. Thus, with such a variety of AMR devices operating at various power levels and with differing levels of sensitivity, cooperation with these many manufacturers and users is necessary to ensure adequate field testing of the Progeny system with all the variations these systems can have.

¹⁴ See *In the Matter of Amendment of Part 15 of the Commission's Rules in the 904-909.75 and 919.75-928 MHz Bands*, Notice of Proposed Rulemaking, 21 FCC Rcd 2809 at 2810-2812 (2006).

DISCUSSION

This is the first time an M-LMS licensee has submitted a field test report to support the co-existence of its operations with Part 15 technologies. Thus, as the first report that has been submitted pursuant to Section 90.353(d), it will set the standard for future M-LMS field testing. Accordingly, it is essential that the Commission ensure that the tests have been conducted properly and that the test results adequately support a conclusion of compatibility between the universe of Part 15 technologies and the proposed M-LMS system.

Progeny's testing falls far short of this requirement. At the very least, further testing is required to provide sufficient information on which to conclude that the operation of the Progeny system would not cause unacceptable levels of interference to Part 15 devices.

Failure to Work in Conjunction with the Part 15 User Community

Notwithstanding the Commission's requirement that the Part 15 community be involved with any M-LMS field testing, Progeny did not do so.¹⁵ Rather, it appears Progeny obtained a small number of off-the-shelf consumer devices to test as it saw fit. Progeny admits that it had difficulty obtaining devices and did not source or test OEM or older consumer devices, among many types of devices that it failed to test.¹⁶

For these reasons, from the start the field testing was not designed to determine whether Progeny would cause unacceptable levels of interference to existing Part 15 technologies in their area. Progeny lacked the knowledge and ability to simulate the use of the varied Part 15 systems and devices operating on the band. The flaws in its testing

¹⁵ See n.4. Itron explained to Progeny that "[g]iven the level of Itron's deployment, however, it would be very complex to test Progeny's planned system with all of our systems," that "your proposal to conduct just a few tests in one location will not provide us with any confidence," and that "one to two days of testing would not be enough." Letter from Jay Holcomb, Itron, Inc. to Gary Parsons, Progeny M-LMS (Nov. 11, 2011). Notwithstanding this, Progeny moved forward with its inadequate testing without the involvement of Itron or other existing Part 15 users.

¹⁶ *Test Report* at 16.

are detailed in a report prepared by RKF Engineering Solutions (“RKF”), which is attached.¹⁷ RKF notes that “examination of the field testing report has identified several significant flaws in the test plan which cast doubt upon the amount of interference, and the effects of this interference, that Progeny proposed system would cause to Part 15 devices operating in the band.”¹⁸ They further found that “test procedures outlined in Progeny LMS’s report are insufficiently documented and unclear,” and conclude “the field tests are insufficient.”¹⁹

Failure to Adequately Describe the Process of its Field Testing

As an initial matter, Progeny has not provided the basic information needed to determine whether it properly tested the devices that it did test. First, it did not provide information regarding how these devices are designed to operate. While Progeny provided the FCC equipment certification ID number for the devices tested, it did not provide full operational description of these devices, which is needed to comment on whether the devices were set-up and operated in a way that sufficient test them for interference.²⁰

Additionally, test procedures were not clearly documented. As RKF concludes, “[t]he test setup for commercial/industrial devices does not provide any details on where these devices were placed for the measurements, making it difficult to evaluate whether these devices were configured in a manner consistent with their typical use.”²¹ For this reason, RKF was unable to determine whether the test results adequately described the potential for Progeny interference to Part 15 commercial devices.

¹⁷ RKF Engineering Solutions, LLC, *Analysis of Progeny Part 15 Test Report* (March 15, 2012) (“RKF Report”).

¹⁸ RKF Report at 1.

¹⁹ *Id.*

²⁰ At least with regard to the one AMR device tested, the equipment authorization application filings associated with the listed FCC ID number do not provide this information.

²¹ RKF Report at 5.

As well, in terms of measurements taken, the report fails to reveal the number of times tests were repeated or the amount of variance in the measurement distances.²² Thus, it is unclear whether the performance of the tested devices was a true representation of what could occur under normal operating conditions. And, the report does not reveal which devices the testers were able to “force” to operate on co-channels with Progeny and which they were not able to force, making it impossible to fully assess the conclusions set forth in the test report regarding co-channel interference as well as how the devices operate under certain conditions.²³

Failure to Conduct Adequate Field Testing

There is much more to conducting adequate field testing than what has been performed by Progeny in this instance. Rather than testing the existing deployment of Part 15 technologies in the area, or even a truly representative sample of Part 15 devices operating today in their normal operating environments, Progeny selectively tested small number of non-representative devices.

Devices Tested

Progeny ignored the tens of millions of Part 15 legacy devices in the field, choosing to test only devices type-approved since January 2005.²⁴ Moreover, Progeny tested only 17 devices out of thousands approved, eight of which were cordless phones or baby monitors and only five of which were commercial devices. This is neither a sufficient nor representative example of Part 15 devices operating today. With regard to commercial Part 15 devices, the number of devices tested represented less than 1% of devices type-approved in recent years.²⁵

Specifically as to AMR devices, Progeny tested just one device, while Itron alone has almost a dozen generations of devices operating in the field in the band, most of

²² *RKF Report* at 8.

²³ *RKF Report* at 8-9.

²⁴ *Test Report* at n.6.

²⁵ *RKF Report* at 4.

which differ in terms of power, modulation, programming and channel use. As discussed above, given the wide range of types of AMR devices operating in the band, and the fact that some AMR systems are uniquely designed for a specific utility, the field testing of Part 15 AMR devices was utterly insufficient.

Itron also notes that, although Progeny claims that devices were chosen based on a random selection, it appears that Progeny ultimately did not test that resulting selection of devices but rather tested a different group of devices,²⁶ and did not provide an explanation for this. A conclusion thus can be drawn that the ultimate selection of devices tested was based on a determination that such devices would produce a more favorable result.

Methodology and Test Locations

As the RKF Report details, there were additional flaws in Progeny's testing methods, including:

- The fact that there is insufficient information on the testing of commercial/industrial devices to determine whether the tested was conducted properly;²⁷
- Testing of commercial/industrial devices was conducted only at two locations, both similar in design, ignoring the true deployment and system operations of the Part 15 devices;²⁸
- Lack of testing of Progeny's vehicular location portion of its proposed service;²⁹
- A failure to conduct line of sight testing, leaving it unclear how Part 15 devices would perform when in line of sight of a Progeny beacon;³⁰
- A failure to conduct height testing, so that the performance of Part 15 devices that operate at higher levels, such as on pole tops or towers, was not measured;³¹

²⁶ Compare Test Report at Appendix A and p. 17.

²⁷ RKF Report at 5.

²⁸ RKF Report at 6.

²⁹ RKF Report at 5.

³⁰ RKF Report at 7.

- Lack of collocation testing, which means there was no determination of the potential interference effect of Progeny on commercial/industrial Part 15 devices collocated on the same tower;³²
- No “break case” tests conducted for commercial/industrial devices, so that it is unclear what measurable interference would occur if a Progeny beacon were located within 50 feet of a commercial Part 15 device;³³ and
- That not all test devices could be “forced” to operate co-channel to Progeny’s beacons, which means these devices were not adequately tested for co-channel interference.³⁴

Further specific to commercial/industrial Part 15 technologies, with such a variety of systems in operation – some custom-designed, some off-the-shelf but less robust – specific testing is required for all these systems to understand the true impact of Progeny. For example, such testing would need to consist of testing in a variety of geographic areas to understand the impact of the Progeny M-LMS system to custom-designed commercial/industrial systems. As well, legacy devices often have a lifespan of twenty years. Progeny’s testing of 2005 and newer devices fails to consider the impact of its system on the tens of millions of legacy devices in the field that are expected to be in use for years to come.

Failure to Demonstrate that Progeny Will Not Cause Unacceptable Levels of Interference

Above all, Progeny has not demonstrated what the Commission requires: That its system will not cause unacceptable levels of interference to the existing deployment of Part 15 technologies. First, the inadequacies of the field testing conducted casts doubt on the interference findings presented, as interference conclusions cannot be drawn based

³¹ RKF Report at 6.

³² *Id.*

³³ RKF Report at 7-8.

³⁴ RKF Report at 8-9.

on a tiny and non-representative sample, or when devices are not tested as they are intended to operate.³⁵

Next, Progeny did not make a statistically significant showing in support of its claims that its system will not cause interference to Part 15.³⁶ While Progeny presented some test methods and results,³⁷ its conclusions drawn from this information are cursory and not supported with calculations demonstrating with confidence that no unacceptable levels of interference will occur.

Moreover, as RKF's analysis has determined, the Progeny system will cause a substantial amount of interference to Part 15 devices under some circumstances. RKF performed a Hata radio propagation model analysis to demonstrate the impact of Progeny on Part 15 devices.³⁸ RKF also solved for overload to a typical Part 15 commercial device and determined that the Progeny system would cause overload to a device located within 0.25 km of a Progeny beacon.³⁹ These results directly contradict Progeny's conclusions about the potential interference of its system.

³⁵ See *RKF Report* at 4 and Section 3.

³⁶ *RKF Report* at 1.

³⁷As RKF notes, the report lacks certain information regarding the testing of commercial devices. *RKF Report* at 5.

³⁸ *RKF Report* at 9-10.

³⁹ *RKF Report* at 11.

