Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters	)	**WT Docket No. 10-4**

COMMENTS OF CELLYNX, INC.

CelLynx, Inc. ("CelLynx"), by its attorneys, is pleased to submit these Comments to the Federal Communications Commission ("FCC" or "Commission") in response to the Notice of Proposed Rulemaking ("NPRM") in the above-referenced proceeding.[1] CelLynx supports the Commission's efforts to promote the deployment of signal boosters and takes this opportunity to propose for the FCC's consideration certain technical guidelines for incorporation into future regulation of consumer signal boosters. Particularly, CelLynx proposes a three-tier system for the categorization and regulation of signal boosters, predicated on the output power of the boosters. As CelLynx will explain, strict rules are not needed for low-power boosters due to their minimal potential for creating interference with cellular networks.

INTRODUCTION

Founded in 2005, CelLynx Inc., a fully-owned subsidiary of CelLynx Group, Inc., develops and manufactures plug-and-play mobile signal amplification technology. CelLynx has developed a product designed to enhance cellular signal strength inside a home or office simply by plugging in a single-piece cellular network extender next to a window. Unlike competing

[1] *In the Matter of Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters* (WT Docket No. 10-4), Notice of Proposed Rulemaking, FCC 11-53 (released April 6, 2011).

technologies, CelLynx's patent pending 5BARz™ technology does not require any installation, outside antennas or cables. CelLynx technology is covered by worldwide patent applications and is currently in the early production stage, having produced 2,000 units for testing including those units tested by the FCC under Registration Number FCC ID: XGLM015 and 4,000 units for the general market soon to be shipped. Moreover, another 12,000 units are in the process of manufacture. CelLynx deems its technology a breakthrough in cellular signal amplification as the only technology designed to offer superior performance in an off-the-shelf plug-and-play unit – one designed to be open platform, for many technologies including but not limited to LTE, GSM and CDMA, that will be mass produced and marketed worldwide at competitive prices.

OVERALL FRAMEWORK FOR LICENSING

The Commission's NPRM is correct about many of the issues relating to signal boosters. In particular, CelLynx concurs with the Commission's rationale for a license-by-rule framework. The license-by-rule framework would, as the Commission has suggested, eliminate burdensome and time-consuming individual licensing requirements while expediting the improvement of cellular service in indoor, rural, and hard-to-reach locations.

Notwithstanding the foregoing, as the Commission regulates consumer signal boosters, it should keep in mind not all signal boosters are created the same. While certain signal boosters may pose the potential for interference with other radio networks, others may not. In particular, low-power signal boosters do not evince the necessary output power to have a significant adverse impact on cellular and other networks. Hence, CelLynx submits that the public interest, convenience and necessity would not be served by the Commission's spending significant time and resources over-regulating the sort of signal boosters that will likely not have any harmful effect on existing networks.

With this orientation in mind, CelLynx proposes a three-tier approach to the regulation of consumer signal boosters. Specifically, CelLynx submits that signal boosters be classified under one of three categories based on the unit's output power:

- **Category 1**: Category 1 devices should be classified as those signal boosters emitting under 1.5 watts of power. Signal boosters emitting under 1.5 watts of power have a very low potential for interference with existing networks. In this case, current registration requirements suffice, and no additional approval should be necessary.
- **Category 2**: Category 2 devices should be classified as those signal boosters emitting between 1.5 watts and 3 watts of power. These signal boosters pose some potential for minor interference with existing networks. Therefore, the standards and requirements for Category 2 devices should be established by an industry panel of subject matter experts drawn from wireless network operators and booster manufacturers.
- **Category 3**: Category 3 devices should be classified as those signal boosters emitting over 3 watts of power. These devices present the potential for interference with existing networks. The operation of such devices should be predicated on prior submission to and approval by the wireless network operators potentially affected.

By distinguishing consumer signal boosters in accordance with the above-described three-tier framework, the Commission can strike the proper balance between promoting the efficient deployment of signal boosters and ensuring that existing networks suffer minimal interference. For example, in the NPRM, the Commission proposed a frequency coordination requirement for fixed signal boosters. Under the three-tier system CelLynx has identified, frequency coordination only would be necessary for Category 3 devices, thereby avoiding a significant administrative and time-consuming burden for both manufacturers and carriers. Furthermore,

a three-tier system would solve the power limit issue for mobile Class A and Class B boosters by codifying regulations based on power, rather than mandating that a wide range of products conform to power-independent specifications.

One additional benefit of establishing the aforementioned three-tier framework is its call for the establishment of a subject-matter expert group to refine the Commission's technical specifications. That group could address some of the specific issues on which the FCC sought comment in the NPRM, including technical issues for Part 90 PLMR signal boosters and mobile amplifiers. Those sort of specific issues would best be evaluated and resolved by an expert group of manufacturers, carrier representatives, and engineers to ensure that manufacturers are afforded a clear and precise set of guidelines from which to work.

GENERAL REQUIREMENTS FOR ALL SIGNAL BOOSTERS

Many of the NPRM's proposed requirements for signal boosters hew closely to requirements for existing cellular devices. However, there are significant differences between the engineering of signal boosters and cellular devices that CelLynx believes should guide the Commission's decision making.

The emission limitations for cellular phones would not be appropriate limitations for boosters. First, a booster held to the limits of a cellular phone would, by definition, be unable to solve the reception problems of the cellular phones it was purchased to assist. Second, in order to meet the emission limitations for cellular phones, a booster would have to include the equivalent of the radio frequency module for all of the phone frequency bands it was required to serve. This would render the booster prohibitively expensive and therefore out of reach of the consumer who required it.

For a signal boosting device to be manufactured at a price acceptable to consumers, it must be designed to amplify a broader range of signals than a single mobile phone frequency. This is also necessary if it is to handle multiple frequency bands and multiple types of radio frequency technologies, without having to introduce multiple components (e.g. antennas, circuits, amplifiers) into the design of a single booster unit. Thus, frequency tolerance for signal boosters also must be approached differently from the cellular paradigm.

As to PCS power and antenna limits, more clarification is needed in response to the NPRM's inquiry. Would these limits apply to the mounting height of the antenna or to the length of the antenna? In either case, it would be appropriate for all boosters to comply with consumer use requirements for antennas. CelLynx's 5BARz products, for example, do not require antennas to be mounted as high as current consumer limits.

CelLynx believes that existing broadband PCS equipment limitations should remain in place, with Category 3 devices facing a more stringent set of guidelines in addition to wireless carrier approval. Miscellaneous Wireless Communications Services power and antenna height limits , PLMS power and antenna height limits, PLMS emission masks, PLMS use of signal boosters, and PLMS mobile repeater stations should similarly be held to current regulations.

Shutdown and Restart Issues: Signal boosters, by design, should self-monitor and respond appropriately to developing power and out-of-band emission issues. However, some of the proposals the FCC has included in the NPRM are not feasible due to the nature of signal boosters as passive, rather than active, consumer devices. A signal booster user almost always is located at a position distinguishable from that occupied by the booster – that is one of the reasons such boosters are valuable and desirable. As such, the typical consumer signal booster user, with no cues to indicate that a device is operating improperly, frequently will be totally unaware a

device is malfunctioning. Accordingly, wherever possible, corrective measures must be developed and limited to what a device is capable of internally monitoring and executing.

CelLynx proposes that a device should be capable of shutting down and restarting within 15 seconds or less, not 10 seconds or less. That greater number provides an enhanced margin of leeway for device manufacturers while still ensuring that a booster can be shut down and restarted in a time sufficient to limit potential interference. Further, with respect to other undesirable situations such as oscillation or overheating, CelLynx believes that all signal boosters should be able to shut down momentarily, then restart. If a restart has corrected a problem within the booster, a one minute "cool down" period, as described in the NPRM, is not essential and unnecessarily prolongs the time affected users may be without mobile phone service, which could be critical in an emergency situation. CelLynx proposes that the duration of the shutdown period be long enough to break the cycle of the malfunction condition that triggered the shutdown. This would provide the opportunity for manufacturers to minimize shutdown time through effective heat dissipation, oscillation mitigation technologies, or other protocols.

CelLynx further suggests the FCC amend its proposed rules to eliminate any requirement for manual resets and restarts by a user. As previously explained, malfunction detection by a consumer user is nearly impossible in practice, and the full shutdown of a device could be costly from a customer service perspective, as well as hazardous from a public safety perspective. If booster manufacturers invoke responsible design practices and conform to existing and proposed FCC regulations, the likelihood of an interference-producing malfunction should be minimal. CelLynx does propose, however, that due to the higher potential of Category 3 devices for interference, remote shutdown capabilities should be built into them. CelLynx further

submits that all devices should, when thermal limits are repeatedly exceeded, have protocols in place to keep such devices in a shutdown mode until such point as component temperatures are restored to an acceptable range.

Automatic Gain Control: The Commission proposes that a signal booster operating in a mobile environment be required to power down or shut down as that device approaches the base station with which it is communicating. CelLynx contends, however, that a better approach would be for the FCC-approved process to require, as a prerequisite, that signal boosters be equipped with an automatic gain control. As with certain other requirements, vendors would be allowed to self-declare and show proof thereof in the confidential (restricted access) section of their submission to the FCC (in order to protect the intellectual property of the method used for automatic gain control). Indeed, requirements for automatic gain control should call for a balanced system (transmitter and receiver). Automatic gain control is the best way that a mobile signal booster can prevent noise generation with the base stations with which it is not communicating ("the near-far problem").

OTHER ISSUES

In addition to its proposed three-tier system, CelLynx also wishes to comment on a number of specific issues raised by the Commission in the NPRM:

Labeling and Marketing: CelLynx generally agrees with the FCC's proposals for labeling and marketing as described in the NPRM. The only change CelLynx proposes is that the proposed advisory:

***WARNING**: Operation of this device is on a secondary non-interference basis and must cease immediately if required by the FCC or a licensed wireless service provider.*

should be amended to delete the words "or a licensed wireless service provider." That phrase creates a significant competitive issue, opening the possibility for wireless providers to order the shutdown of boosters competitive with their own or with that of their equipment providers. Obviously, such a scenario would have a chilling impact on effective competition in the marketplace.

The advisory regarding device coordination should also be kept off Category 1 devices due to the same competitive concerns outweighing the negligible possibility of interference. Whether the advisory should remain on Category 2 devices is a question best left to the subject-matter expert group that would be created to establish Category 2 signal booster equipment standards.

Grandfathering: In the NPRM, the Commission sought comment on how presently operated signal boosters, that will not meet the NPRM's proposed requirements, should be treated. In an effort to promote fair treatment of pre-existing signal boosters, CelLynx proposes that all units that have been demonstrated in a public forum on or before February 1, 2010 and have been in development for at least 18 months be grandfathered. The Commission should ask each manufacturer how many models, and how many units of each model, would fall into this category, in order to calculate the effect of existing signal boosters on the spectrum landscape. If a registration requirement is established by the FCC, grandfathered signal boosters should be subject to such a requirement. Additionally, the FCC's proposed 2-step approach to an orderly transition should be amended to indicate that the 30-day and 6-month requirements should be satisfied if a device has been grandfathered.

National Signal Booster Clearinghouse: The additional FCC requirements proposed by the NPRM, in addition to existing regulations, should suffice for the ample protection of existing

networks from signal booster interference. A clearinghouse would provide no additional benefit, while placing an additional economic burden both on the FCC and on taxpayers. Additionally, such a clearinghouse would create significant privacy issues. CelLynx proposes that if any location registration requirement were enacted, the FCC should limit it to Category 3 devices only.

Signal Boosters for Part 90 PLMS Operations: CelLynx generally agrees with current power and emission limits for Class A and Class B devices, with the exception of devices that would be classified as Category 3. Those devices should face more stringent limitation as described above. These Category 3 devices should also be the only devices that must comply with Rules §95.1600 *et seq*. due to their high power emissions.

CelLynx does not believe that the language "or in remote areas" should be removed from Rule §90.219(d). Remote areas are already defined as areas with "little or no risk of interference to other users," so there is no reason to remove that language in order to prevent interference. There are legitimate needs for Part 90 signal boosters in these rural or remote areas, especially for 911 service.

Part 90 Mobile Signal Boosters: CelLynx supports the FCC's proposal to explicitly permit Part 90 licensees to use mobile signal boosters on their assigned frequencies. However, the NPRM does not allow for Class B signal boosters on interleaved Part 90 channels. CelLynx contends that if Class B amplification is properly modulated such that interference is substantially limited, Class B boosters should be allowed. CelLynx believes that all Class B signal boosters conforming to the standards for each category should be allowed for mobile use, both for consumers and for public safety licensees. Due to the necessity for mobility within a

building, requiring tethering or docking stations for these boosters would defeat the purpose of the signal booster and should not be required.

CONCLUSIONS

The proper deployment and implementation of consumer signal boosters is vital to the expansion of broadband nationwide. With careful regulation, the Commission can ensure that signal boosters can flourish without undue limitation on either signal boosters or wireless networks.

Respectfully submitted,

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