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

Wireless Bureau Seeks Comment on Petitions	**)**	
Regarding the Use of Signal Boosters and	**)**	**WT Docket No. 10-4**
Other Signal Amplification Techniques Used	**)**	
With Wireless Services	**)**	

REPLY COMMENTS OF CELLYNX, INC.

CelLynx Group, Inc. ("CelLynx") hereby submits these Reply Comments in response to Comments received by the Federal Communications Commission ("FCC" or "Commission") in the above-referenced docket. CelLynx appreciates the opportunity to participate herein, and urges the Commission to initiate a rulemaking proceeding to address the important issues raised by the commenting parties and develop rules for the operation of Commercial Mobile Radio Services ("CMRS") signal boosters and other signal amplification devices.

CelLynx produces and markets breakthrough plug 'n play, portable cell signal amplification technology. The CelLynx 5BARz™ Road Warrior is the industry's first portable, plug 'n play cellular network extender delivering faster Internet and clearer calls to mobile phones being used indoors or in vehicles. Unlike competing technologies, CelLynx's patent-pending 5BARz™ technology does not require any installation, outside antennas, or cables. It capitalizes on widespread customer dissatisfaction with indoor and vehicular cell phone coverage and on the phenomenal worldwide growth of voice, data, and video applications on cellular networks. The 5BARz™ Road Warrior is fully compliant with FCC regulations, and its patent-pending low power emissions make the unit transparent to cellular networks.

I. THE FCC SHOULD INITIATE A RULEMAKING TO DEVELOP RULES FOR THE OPERATION OF CMRS REPEATERS AND BOOSTERS

All commenting parties in this proceeding agree on at least one thing: Signal boosters can enhance network structure, and in doing so, increase coverage areas, fill in dead spots in communication, and reduce the need for additional infrastructure construction in geographic regions that cannot currently justify additional base stations due to economic infeasibility, environmental concerns, or traffic requirements. Consumers throughout the nation are increasingly relying on mobile phones as a primary means of communication, and many consumers depend upon mobile phones as their sole means of telephone communication. Thus, effective and ubiquitous network coverage is critical. Indeed, the requirement for enhanced service quality and coverage is not just a problem currently experienced in rural America. Many consumers who live in urban and suburban neighborhoods might enjoy wireless coverage outside on their streets, but not in their homes, or in just certain parts of their homes. For them, that restriction poses a disadvantage for business, personal freedom, and safety. Signal boosters overcome many of these issues.

CelLynx believes the Commission will be interested in knowing that the public's well-documented need for cell signal amplifiers and the carriers' request for network transparency can both be achieved. New technology developed by CelLynx is available that is built by carrier-trained engineers to be network-grade products. CelLynx 5BARz™ cellular network extenders, which CelLynx introduced in 2010, are transparent to the network, and are significantly different devices than the signal boosters that historically may have caused interference. Several carriers have tested these improved products and have endorsed use thereof on their networks.

CelLynx agrees that signal boosters must be transparent in the carrier networks, thus not causing interference or extraneous signals. CelLynx supports the FCC's adoption of some rules and regulations to ensure network transparency, but urges that any requirements for signal boosters should be limited to ensuring that compliance in not causing interference to the networks. This is already what the FCC rules and regulations attempt to do for all radio equipment. The introduction of a few additional rules and regulations specific to signal boosters, described below can ensure compliance. Specifically, the FCC should adopt the following new certification requirements for self protection of the network (without more):

1) Reasonable methods to protect against spurious signals / oscillation, even with improper installation; and

2) Reasonable methods to control output power within FCC specified limits; or

3) A safeguard that, if a signal booster is unable to maintain the controls described in (1) and (2) above, the unit must self protect the network with an auto shutdown feature.

These additional certification requirements should be limited to network protection. Cellynx maintains that the Commission, with the support of equipment manufacturers, should establish the new certification requirements. In the interest of consumers, the environment, and public safety, the rules should not limit scope of operation to one particular carrier at a time.

With properly designed and tested equipment, the installation can be performed by the typical consumer, much the same way that consumers install television sets, activate mobile phones, install home WiFi routers, and use FRS radios and low power FM transmitters. These products can then provide a consumer and carrier benefit without adversely affecting the networks. In contrast, requiring professional installation and prior authorization from all relevant

carriers, as proposed by some commenting parties in this proceeding, would limit the use of signal boosters, which is certainly not the end goal of carriers, manufacturers, consumers, or the FCC.

Cellynx supports the Commission's adoption of a limited set of rules and regulations to ensure network transparency. This will provide carriers, installers, and manufacturers the broadest flexibility to continue to create and provide products that meet the typical consumer's needs. It will do so without stifling design creativity or severely restricting access by imposing the burdens of individual carrier authorization and/or registration.

II. NOT ALL SIGNAL BOOSTERS CAUSE INTERFERENCE TO THE NETWORK

CelLynx believes that objections raised by AT&T and Verizon Wireless to prohibit all cell signal boosters without a license or carrier authorization are unfounded, especially as they relate to CelLynx's 5BARz™ technology, which has been demonstrated to cause no interference to the network.[1] In the past, the main detected interference posed by cell signal boosters was caused by oscillations on a variety of boosters, including consumer grade and commercial boosters alike.[2] The carriers also cite broadband noise and adjacent channel power as likely potential interference

[1] CelLynx is hesitant to share in the public docket proprietary information regarding its new 5BARz™ technology, including how the equipment affords transparency to the carrier's network and how the technology is different from that offered by other companies. However, if the Commission commences a rulemaking proceeding, CelLynx is willing to provide for the Commission's in camera review all needed proof in testing results, methodologies, or demonstrations.

[2] Comments of AT&T Inc., WT Docket No. 10-4, at 26-27 (filed Feb. 5, 2010); Comments of Verizon Wireless, WT Docket No. 10-4, at 14-18 (filed Feb. 4, 2010).

sources.[3] Often, carriers attack consumer grade 'broadband' boosters, presumably since the carriers have no direct control over them. But no carrier has accurately shown how a properly operating 'broadband' signal booster can harm the network.

CelLynx believes that all parties commenting on the referenced docket would agree that an oscillating booster can cause network interference. This is the case for any signal booster, whether deployed by the carrier, a DAS Forum member, or a consumer. It is imperative that every design incorporate detection and suppression components, and that the FCC rules be amended to ensure the robustness of these detection and suppression mechanisms.

Adjacent Channel Noise (the near-far problem) can also potentially affect the network, and a signal booster is no different than a consumer hand-held phone. If the phone (or booster) is far from the communicating base station, then the output power will be adjusted higher, likely to the maximum possible. If there is a base station for another carrier close by, any signal power outside the modulated bandwidth can potentially cause network interference. This is precisely the reason for conducted emissions regulations and testing of devices, for <u>every</u> type of transmitter. A phone that is operated too high in power (for its internal devices) will cause this type of problem. Here, signal booster (and phone) manufacturers must ensure that the output power remain in the FCC compliant power range. Granted, the design challenge for high power boosters is more difficult than a handset since the linearity requirements dB for dB are more stringent. If the device maintains its linearity and compliance, there is no more likelihood for adjacent channel interference from a signal booster than from a phone.

[3] *Id.*

Verizon Wireless argues that broadband noise from a 'broadband' booster has the potential to cause network interference.[4] This is simply not true. Verizon Wireless claims the signal output is -69 dBm broadband noise, and a CDMA base station has a -111 dBm noise floor, a 42 dB difference.[5] For the noise figure and gain figures quoted by Verizon Wireless, the noise output power is indeed -69 dBm/MHz. For a simple analysis, CelLynx will assume the -111dBm receiver sensitivity is also measured in 1 MHz bandwidth, which is close enough to the actual 1.23 MHz CDMA channel bandwidth. So as not to affect a receiver noise floor, a 10 dB factor is often used, stating that the noise power at the receiver should be attenuated 10 dB below the receiver sensitivity; in this case, -121 dBm/MHz. This shows that if the air-path loss from the booster to the base station antennas is greater than 52 dB [(-69) dBm - (-121)dBm], then there is no receiver sensitivity issue. At a worst case frequency in Cellular bands (824 MHz), the separation required between booster antenna and base station antenna is only 25 feet. At higher frequencies, the required separation is even less. Clearly, this is not a concern.

Phone handsets and base stations also have broadband noise power transmission. A CDMA handset will use an output duplexer that for transmission, covers the entire cellular or PCS band. The handset amplifier noise power specifications are typically within a few dB of the -69 dBm / MHz power levels with which Verizon Wireless is concerned. If broadband noise is a problem, then handsets would need to be designed for each specific location for every carrier, and those phones would lose most of their roaming capabilities. Many base stations use full band duplexers in order to keep infrastructure costs lower and to minimize site specific set-up

[4] Comments of Verizon Wireless, WT Docket No. 10-4, at 15-16 (filed Feb. 4, 2010).

[5] *Id*. at 16, note 43.

requirements. The noise power from these devices in the forward path is even higher, since the output amplifier gain is often much higher than the figure used by Verizon Wireless in the analysis.

Verizon Wireless also urges the Commission to make the manufacture and importation of boosters illegal, just as in the case of 700 MHz microphones.[6] However, there are clear differences between those microphones and signal boosters. First, the microphones are using 700 MHz frequencies for a different type of data transmission that is not intended for the band. In contrast, signal boosters are simply augmenting the signals that are already present, and the purpose of the signal is identical to that of the existing signal. Second, Verizon Wireless and other carriers do not envision or desire a full ban on the manufacturing and importation of signal boosters, since they still want and need the ability to install boosters under their direction, and for their financial gain (from lower infrastructure costs).

III. BURDEN OF PROOF RESIDES WITH THE CARRIERS TO PROVE CELL SIGNAL BOOSTERS ARE INCONSISTENT WITH THE PUBLIC INTEREST

It is CelLynx's understanding from Section 7 of the Communications Act of 1934, as amended, 47 U.S.C. § 157(a),[7] that the burden is on the carriers to prove that cell signal boosters are inconsistent with the public interest. Cell signal boosters are used in all areas due to network

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[6] *Id*. at 20-22.

[7] That Section provides:

(a) It shall be the policy of the United States to *encourage the provision of new technologies and services to the public*. Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this Act *shall have the burden to demonstrate that such proposal is inconsistent with the public interest*.

(b) The Commission shall determine whether any new technology or service proposed in a petition or application is in the public interest within one year after such petition or application is filed. If the Commission initiates its own proceeding for a new technology or service, such proceeding shall be completed within 12 months after it is initiated.

47 U.S.C. § 157(a) (emphasis added).

shortcomings; in rural areas to enhance weak signals on the fringe of cells; in suburban areas to cover dead zones created by topography; and in urban locales to penetrate buildings. The carriers have not solved this issue, but properly built and installed cell signal amplifiers can. Carrier-built femtocell solutions work only indoors (not in-vehicle) and require that the user have a broadband Internet connection.

In rural areas, signal boosters improve and extend the existing coverage, and thus in limited form, assist in bringing telephone and broadband access to all people in the United States. That reduces or eliminates the need for expending universal service funds under the Universal Service Fund high-cost program to subsidize the construction and operation of expanded cellular networks in remote geographic regions. For many users, professionally installed carrier grade products are not an option, due to prohibitive costs. These products are generally meant to cover large areas such as hotels, airports, or valleys. However, for many wireless users, coverage of a small 100 foot to 3000 foot area is adequate.

Carrier-grade amplifiers employ limited channel select devices that pose a number of disadvantages: 1) increased cost to consumers; 2) requirement of site-specific setup and settings for the local network; 3) necessity for the consumer to have an Internet connection; 4) uselessness of the device if the service subscriber changes carriers or relocates geographically; and 5) inability of these devices to work in motor vehicles. Channel select repeaters require down and up conversion and often multiple channel filters. The bands can be 5, 10, or 15 MHz wide, and carriers can have non-contiguous band plans. This makes filtering a challenge, and each repeater needs to be appropriately set up for coverage in the specific installation. Either the unit must be pre-configured or a professional installer will need to prepare the product at the site.

In comparison, cell signal boosters can be very affordable; some cell signal boosters are quite easy to install and work with all carrier networks. This provides users the benefit of mobile coverage where they need it and helps ensure that any cell phone user within range can make emergency calls. If a user changes carriers, the product still functions correctly. A product that works and serves the majority of service providers will stay out of the landfill.

IV. CONCLUSION

The growing demand and need for signal amplification technology necessitates a realistic market solution. CelLynx, through its 5BARz™ cellular network extenders, provides the public with an affordable, consumer-friendly enhanced signal amplifier that is proven to cause no interference to the carrier network. CelLynx assumes that the Commission will readily recall when all telephones in homes were owned and certified by the carriers – to make certain they caused no interference to the telephone network. Once that requirement changed, many new businesses brought new and network-transparent phone products to the market and consumers manifested their desire for, and satisfaction with, such devices by purchasing those new products.

Verizon Wireless stated in its comments, "The unauthorized operation of signal boosters threatens the reliability and quality of mobile services that consumers have come to expect and CMRS providers strive to achieve."[8] However, with properly working signal boosters, that concern is simply not valid. In fact, the opposite is true -- the operation of signal boosters underscores the attempt by consumers to achieve the reliability and quality of mobile services that those consumers are paying for but that CMRS providers are not necessarily offering.

[8] Comments of Verizon Wireless, WT Docket No. 10-4, at 5 (filed Feb. 4, 2010).

The cell signal booster industry employs thousands of Americans. In uncertain economic times, CelLynx suggests that setting standards for the cell signal manufacturers to build network-transparent products serves the public interest in two important ways. First, well-built cell signal boosters complete the carriers' networks in regions they cannot economically serve, giving consumers the signal coverage they are paying for. Second, new technologies and innovations in the cell signal booster industry are creating new companies and jobs, another factor that serves the public interest.

Respectfully submitted,

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