

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

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

**COMMENTS OF APCO**

The Association of Public-Safety Communications Officials-International, Inc. (“APCO”) hereby submits the following comments in response to the Commission’s *Notice of Proposed Rulemaking*, FCC 11-53, released April 6, 2011 (“*NPRM*”), in the above-captioned proceeding regarding the use of signal boosters to improve coverage of wireless services.

Founded in 1935, APCO is the nation’s oldest and largest public safety communications organization. Most APCO members are state or local government employees who manage and operate communications systems for police, fire, emergency medical, forestry conservation, highway maintenance, disaster relief, and other public safety agencies. APCO is the largest FCC-certified frequency coordinator for Part 90, Public Safety Pool channels, and appears regularly before the Commission on a wide range of public safety communications issues.

Properly authorized, designed, and installed signal boosters can be extremely helpful in extending the reach of both commercial and private radio communications in challenging locations with poor signal coverage. Many public safety agencies depend upon Part 90, private radio signal boosters to provide communications at locations such as inside buildings, parking garages, tunnels, and other isolated geographic areas where signals are blocked by terrain or structures. However, unauthorized boosters, use of incorrect booster types, and improper booster

installation can lead to dangerous interference to critical public safety operations in the same, or adjacent frequency bands.

The focus of these comments will be on proposed Part 90 rules that are necessary to prevent harmful interference in bands used by public safety licensees. However, APCO is also deeply concerned with the unauthorized use of devices intended to boost the signals of commercial services, especially those that operate in the 800 MHz band where there is also substantial public safety land mobile radio operations. There is also a danger that improper use of commercial band signal boosters could interfere with cellular telephone phone calls to 9-1-1.

Thus, APCO opposes suggestions in the *NPRM* that any type of signal booster can be “licensed by rule.” Signal boosters of all types should only be operated by licensees, or those authorized by licensees, to ensure proper use and installation. To the extent that the Commission nevertheless chooses to license commercial band boosters by rule or similar procedures, that approach should not apply under any circumstances to signal boosters used on public safety frequency bands. There must also be some type of enforceable, mandatory registration even for commercial boosters that may be authorized by rule. Otherwise system operators, both commercial and public safety, will be stymied in their efforts to identify and locate boosters that are potential sources of interference.

As a general principle, APCO believes that Part 90 signal boosters should continue to be governed by separate, rigorous rules that limit booster use to licensees or those authorized by licensees. The following comments will focus on proposed modifications to the relevant Part 90 rules.

### *Class A/B Distinctions*

The FCC’s current Part 90 signal booster rules distinguish between Class A (wideband) and Class B (channelized) boosters.<sup>1</sup> APCO supports retention of that distinction, but with important clarifications regarding the use of Class B boosters. As documented in the record, wideband Class B devices pose the greatest danger of interference. Class B boosters can be used to transmit *into* a confined area (*e.g.*, a building, garage, or tunnel) with a high degree of confidence that interference will not occur outside of that confined area. However, using a wideband, Class B device to transmit an “uplink” *out of* a confined area to an open area creates the potential for interference to other radio communications operating within (or adjacent to) the wide band of frequencies being transmitted. In contrast, a *channelized* Class A device could be used in either situation without unintended consequences. Therefore, APCO suggests that the Commission adopt and or clarify its rules to specify the locations in which Class A and Class B devices may be used as follows:

Device Class	Downlink	Uplink	Use with a transmitting Outdoor Antenna	Use with a transmitting confined space Antenna
A	Yes	Yes	Yes	Yes
B	Yes	No	No	Yes

### *Power levels*

APCO recommends that power levels for Class A devices that (a) exceed 5 watts ERP per discrete channel being amplified, or (b) have an AGL of greater than 6.1m above ground be required to complete frequency coordination and be individually licensed, under a new class of fixed station (*e.g.*, “FXSB”). This would not apply where the signal from the Class A device is

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<sup>1</sup> APCO recommends that the FCC correct the confusion caused by the multiple (and conflicting) meanings of the terms “narrowband” and “broadband” in the signal booster rules by conforming the concepts of “Class A” and “Class B” signal boosters to mean ‘channelized’ (Class A) and ‘broadband’ (Class B) boosters, and align the language in § 90.219 (b) to match.

operated by the licensee of the frequency being transmitted and the signal from the device does not expand the licensee's current area of service.

*Clarification of Section 90.219*

The current rule regarding signal boosters refers to “broadband” and “narrowband” boosters. However, in 1996, when § 90.219 was added, ‘broadband’ was not used in the same context as ‘broadband’ is used today. Currently, system design engineers and system licensees/operators implement devices that are channelized to provide gain across many individual narrowband (< 25 kHz bandwidth) licensed channels, and are then combined into a common antenna network to provide the extended coverage for PLMR systems within buildings, subway tunnels, etc. These are known “on the street” as Class A (narrowband) boosters, and operate in the manner described in § 90.219 (b) as a Class B booster – “... boosters are limited to 5 watts ERP for each authorized frequency that the booster is designed to amplify.” Likewise, signal boosters that provide gain over a broad range of frequencies (such as the 851-869 MHz spectrum and/or the 850 MHz cellular spectrum) are known “on the street’ as Class B (broadband) boosters. These Class B devices operate in the manner described in § 90.219(b) as a Class A booster – “Class A narrowband signal boosters must be equipped with automatic gain control circuitry which will limit the total effective radiated power (ERP) of the unit to a maximum of 5 watts under all conditions.” The language of § 90.219(c), discussing out-of-band emissions of Class A boosters for “each narrowband channel” while stating that “Class B broadband signal boosters must meet the emission limits of §90.210 for frequencies outside of the booster's designed passband” is seen as supporting the interpretation outlined here.

Therefore, APCO recommends that the FCC correct the confusion caused by the multiple (and conflicting) meanings of the terms “narrowband” and “broadband” by conforming the concepts of “Class A” and “Class B” signal boosters to mean ‘channelized’ (Class A) and ‘broadband’ (Class B) boosters, and align the language in § 90.219 (b) to match as follows:

*(b) Class A narrowband signal boosters are limited to 5 watts ERP for each authorized frequency that the booster is designed to amplify. Class B broadband signal boosters must be equipped with automatic gain control circuitry which will limit the total effective radiated power (ERP) of the unit to a maximum of 5 watts under all conditions.*

#### *Limiting Class B devices to confined areas*

APCO agrees with the Commission that Class B devices should be restricted to confined areas. Thus, Section 90.219(d) should be modified to eliminate the term “or in remote areas” in defining where Class B devices may operate. Existing Class B devices in non-confined areas that may have relied upon the “or in remote areas” language should be allowed a reasonable period of time frame for the gradual replacement or upgrade of such devices. APCO recommends a period of ten (10) years, with the understanding that any Class B devices causing interference in the interim must be shut-down immediately.

#### *Mobile operation by consumers*

Mobile use of signal boosters by consumers poses a particular problem, especially if used to boost communications in portions of the 800 MHz band that continue to include an interleaving of public safety and ESMR channels. Therefore, consumer use of mobile boosters should not be allowed below 824/869 MHz until such time as the 800 MHz rebanding process has been completed throughout all regions of the nation, at which point public safety and ESMR operations will be in separate portions of the band.

### *Mobile Class A Devices*

Part 90 licensees should be permitted to operate Class A mobile boosters, but only on their licensed frequencies and within their licensed area of operation. There could be an exception, however, for mobile boosters in the new 700 MHz public safety broadband spectrum, which should be treated in the same manner as commercial, subscriber-based operations in the 700 MHz band. We note that large contiguous spectrum blocks are far more suited for Class B type devices than narrowband channels now used for public safety land mobile communication.

### *Mobile Amplifiers*

APCO also believes that mobile power amplifiers used with a transmitter (commercial or PLMR subscriber device) should not be treated as mobile signal boosters. Such RF amplifiers should continue to subject to rules for the relevant licensed service (commercial or PLMR) being amplified.

### *Emissions Limits*

For Class A devices, APCO supports allowing wider passbands than currently allowed. This would address the group delay issues noted in the *NPRM*, which is particularly important for Part 90 simulcast PLMR systems. Passbands should be the minimum necessary for the efficient operation of the license. The actual passband specification, especially for digital signals, needs to be determined in the field at the time of implementation. As a benchmark, if device cannot meet a 60 kHz (at- 3 dB) parameter for each individually licensed channel that is being amplified, then the device should be individually licensed (regardless of power level) as a fixed station with operational parameters are on record.

### *Equipment Authorization*

APCO believes that 5 watts ERP is a reasonable operational benchmark for PLMR signal boosters. The FCC should require documentation describing how the device is to be used under the rules, and require labeling on signal amplification devices stating that registration with a national clearinghouse is required prior to operation. Class B amplifiers should be tested with multiple signals on the input to ensure that the output signal remains constant when multiple signals are presented.

### *Signal Booster Registration*

As noted above, APCO supports the concept that boosters that are not individually licensed should be required to be registered with a national clearinghouse. This would allow both commercial operators and Part 90 PLMR licensees that are experiencing interference to contact a single clearinghouse to obtain information on potential sources of the interference.

### *800 MHz Rebanding*

The FCC should establish a sunset date for existing Part 90 Class B signal boosters operating in the 800 MHz band above 862 MHz. This date should be no more than 24 months after adoption of any revised rules. The FCC should implement an outreach program similar to the effort the Commission used regarding to 700 MHz wireless microphones, encouraging manufacturers and commercial system operators to provide incentives to retire non-complying devices. Future Class B equipment certifications should provide significant protection to PLMR operations below 862 MHz as a condition of certification and use.

### *Local Ordinances*

APCO encourages local communities to adopt ordinances that require signal boosters to be installed in certain buildings to ensure that first responders will be able communicate.

However, we concur with the Commission's view in the *NPRM* that signal boosters installed pursuant to such ordinances must still comply with relevant FCC regulations (*e.g.*, restrictions on the use of Class B devices).

## CONCLUSION

Therefore, consistent with the comments set forth above, the Commission should adopt and/or clarify its rules to promote the use and installation of signal boosters in a manner that will not cause interference to critical public safety communications.

Respectfully submitted,

/s/

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