Updates on Signal Boosters and Related Devices – Policy Considerations

Office of Engineering and Technology Laboratory Division
Overview

Numerous editorial, layout, and substantive updates made to the boosters equipment authorization policies KDB publications

– Change Notices list 10 topics for D01 and 26 topics for D02

– Selected update topics will be discussed

Status of TCB PBA requirements

Distinguishing Consumer & Industrial

– KDB 935210 D01 v02, Signal Boosters – Basic Definitions And Concepts For Equipment Authorization Purposes (https://apps.fcc.gov/kdb/GetAttachment.html?id=Av10E8AY%2FnOQEAkTHIPn3w%3D%3D)

– KDB 935210 D02 v02, Signal Boosters Certification Requirements (https://apps.fcc.gov/kdb/GetAttachment.html?id=JPwUbMGz7dHDWndKARuMew%3D%3D)
935210 **D01** Changes

- **D01 v01r01** former Clauses 3 & 4 are moved to D02 *
- **D01 v01r01** former informative Annexes B & C are omitted **
- Fiber-optic connected and other distributed systems consolidated in new Appendix B
  - B.1 Basic Fiber-optic RF Distribution Systems
  - B.2 Distributed Antenna Systems
  - B.3 Distributed Base Station Systems

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* 3 Equipment Authorization System (EAS) Form-731 Equipment Class Designators
  4 Frequency Bands For Signal Boosters Under §§ 20.21 and 90.219
** ANNEX B Signal Boosters Terminology and Concepts (Order, Appendix B)
  ANNEX C Booster, Amplifier, and Repeater Various Terms and Definitions From Other Sources
II(m) requested test reporting and application contents

- Identify specific applicable rule subparagraphs; e.g., cite § 20.21(e)(8)(i)(C)(2)(iii) not § 20.21(e)(8)(i)(C)(2)
- Include brief text with each results set describing how compliance is demonstrated
- Include a letter listing summary of differences for filings covering multiple model variations

D02 v01r01 former 3 (a) NPS (Network Protection Standard) topic listing replaced by rules and requirements summary of new Appendix C
III(f) Fixed Consumer Boosters
- Definition “fixed location in a building” means server antenna must be indoors fixed
- Fixed devices transmitting in 1710-1755 MHz must address § 27.50(d)(4) 10 m height compliance

III(g) contact coupling accessories
- Booster rules and docket no. 10-4 records preclude RF exposure portable device booster
- Third-party attachments to mobile phone can invalidate SAR compliance for the combination
935210 D02 Changes (3)

Example part 90 booster label, per § 90.219(e)(5)(4) along with § 90.219(e)(5) first paragraph
→ indicate Class A or Class B device

<table>
<thead>
<tr>
<th>Part 90 Signal Boosters</th>
<th>THIS IS A 90.219 CLASS A DEVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at <a href="http://www.fcc.gov/signal-boosters/registration">www.fcc.gov/signal-boosters/registration</a>. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.</td>
<td></td>
</tr>
</tbody>
</table>
935210 D02 Changes (4)

- Additional part 90 boosters specific provisions
  - V(j)(1) Devices operating at § 90.219 5 watt ERP and also higher output powers
  - V(j)(2) 800 MHz distinguishing ESMR (§ 20.21 CMRS) and SMR (§ 90.219 PLMRS/PSRS)
  - V(j)(3) 800 MHz NPSPAC (Mask H)
  - V(j)(4) 900 MHz distinguishing § 20.21 SMR § 90.219 SMR, and CMRS part 24 NB-PCS
935210 D02 Changes (5)

- Appendix A equipment classes
  - Relocated from D01 v01r0
  - Add A.2.2 about permissive change; see below
- Appendix B frequencies for §§ 20.21, 90.219
- Appendix C summary of § 20.21 NPS
- Appendix D former D02 v01r01 Annex A basic test and certification procedures
- Appendix E website links and reference info for booster end-use registrations
TCB PBA Considerations

Boosters subject to TCB PBA:

- Boosters for PSRS and/or PLMRS operations subject to § 90.219 (eqpt. classes B9A, B9B)
- Consumer boosters (eqpt. classes B2W, B2P)
- Manufacturers or test labs must obtain prior approval for test procedures used for consumer boosters unless published KDB measurement procedures are applied as available
- FCC may request booster device samples prior to approving a TCB PBA

Filings for CMRS industrial boosters (eqpt. class B2I) conforming to § 20.21 and the latest KDB 935210 do not require PBA
D01 Consumer Boosters
- marketed to and sold for personal use by an individual
- allow an individual to improve coverage in limited areas such as home, car, boat, or RV
- individual use is key, notwithstanding *de minimis* third-party use

D01 Industrial Boosters
- designed to serve multiple users simultaneously
- if a provider allows an individual subscriber to operate a signal booster that does not conform with § 20.21, it must be installed and configured by the provider *

This is the present situation—OET and FCC Wireless Bureau (WTB) discussions are ongoing

* FCC-13-21, ¶18
D02 III(h) single device authorized for marketing and end-use operation both as an Industrial Booster ONLY or a 20.21 Consumer Booster ONLY

– Two different FCC IDs – one for consumer use and the other for industrial use, OR

– Two separately marketed and operated versions/models under a single FCC ID
  • Consumer Booster – personal use
  • Industrial Booster – multi-user, e.g., small office
D02 A.2.2 Class II permissive changes (C2pc) for devices granted before February 20, 2013

- C2pc updating representations and/or test data (install/operate instructions, labeling, etc.) for subsequent marketing and operation as an Industrial Booster ONLY, or

- New FCC ID composite-Form 731 is required for consumer devices with pre-existing FCC ID intended for subsequent marketing and operation as described in D02 III(h) both as Industrial Booster ONLY or 20.21 Consumer Booster ONLY
Misc. Reminders

Besides Consumer Boosters as in D02 III(f)(2), fixed Industrial Booster filings must also provide compliance supporting info for § 27.50(d)(4) 10 m height above ground.

Further to § 20.21(e)(3) and FCC-13-21 ¶36, Consumer Booster devices can be granted only for the frequency bands specified:

- Various CMRS bands recently established by FCC, such as AWS-4 and AWS-3, are not available for Consumer Booster devices.
Conclusion

KDB 935210 D01 & D02 policies and procedures are continuing to evolve for devices subject to the Feb. 2013 §§ 20.21 and 90.219

Where booster rules are unclear and/or guidance in KDB 935210 is not clearly applicable for a specific device, an applicant or agent or test lab should submit a KDB inquiry providing device details to request evaluation procedures

ACKNOWLEDGEMENTS
Thanks to OET Lab staff Axel Rodriguez, Edna Prado, Steve Jones for handling 20+ B2W PBA grants so far in 2014!
Backup
Simplified schematics of:
- a) single-enclosure amplifier device (not a transceiver) – Form-731 equipment class AMP
- b) single-enclosure consumer booster – Form-731 equipment class B2W or B2P, connecting to a device at node N using either contact/proximity coupling or RF-port connection.
Device Types Background (2)

A: Single enclosure booster device, with donor-side and server-side ports.
UL, DL: Uplink (subscriber / mobile station to provider / base station); downlink (provider / base station to subscriber / mobile station).
1…4: Signal paths 1,2,3,4 typically are parts 22, 24, 27, 90 paired-band frequencies; each of donor-side and server-side may or may not connect to over-the-air antenna(s).
I, III: Region I: provider / base-station coverage; Region II: booster internal operations; Region III: subscriber / mobile-station coverage, e.g., indoors, dead spot (§ 22.99).
Device Types Background (3)

B, C: Donor-side and server-side system components. For this basic configuration, components B,C may or may not be electrically identical. B,C typically are tested together as a system, however generally each may be subject to separate / individual equipment authorization (e.g., separate FCC IDs).

UL, DL: Uplink (subscriber / mobile station to provider / base station); downlink (provider / base station to subscriber / mobile station).

Signal paths 1,2,5,6 typically are parts 22, 24, 27, 90 paired-band frequencies; each of donor-side and server-side may or may not connect to over-the-air antenna(s). Signal paths 3,4 are system internal “transport” paths, typically RF-on-fiber-optic or coax cable or over-the-air locally; for the latter two, either on-channel or frequency-shifted.

I, II, III: Region I: provider / base-station coverage; Region II: booster internal operations; Region III: subscriber / mobile-station coverage, e.g., indoors, dead spot (§ 22.99).
B, C: Donor-side and server-side system components. For this basic configuration, components B,C may or may not be electrically identical. B,C typically are tested together as a system, however generally each may be subject to separate / individual equipment authorization (e.g., separate FCC IDs). D: RF expansion unit; may be installed internal or connected external to remote unit C.

UL, DL: Uplink (subscriber / mobile station to provider / base station); downlink (provider / base station to subscriber / mobile station).

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