



# **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

\* 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



# 935210 D02 Changes (1)

- 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



# 935210 D02 Changes (2)

- 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

**Part 90 Signal Boosters**      **THIS IS A 90.219 CLASS A DEVICE**

**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 **[www.fcc.gov/signal-boosters/registration](http://www.fcc.gov/signal-boosters/registration)**. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.



## 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



# 935210 Consumer, Industrial (1)

- 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



## 935210 Consumer, Industrial (2)

- 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



## 935210 Consumer, Industrial (3)

- 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

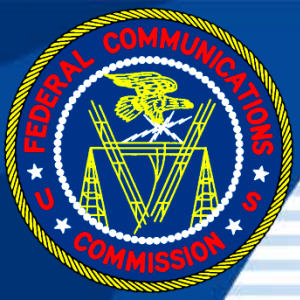


# Conclusion

- 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

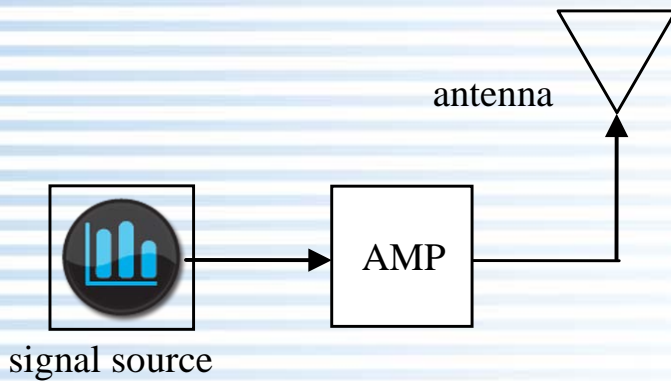
*Thanks to OET Lab staff Axel Rodriguez, Edna Prado, Steve Jones for handling 20+ B2W PBA grants so far in 2014!*



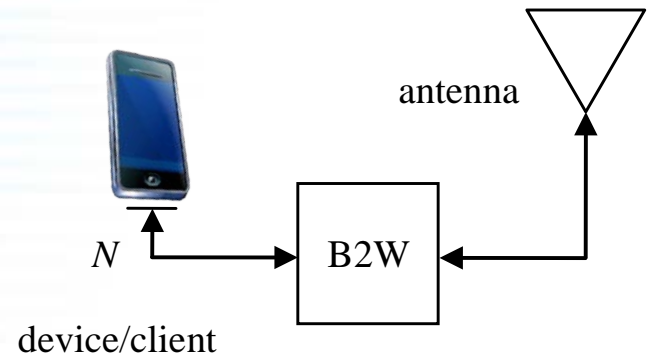
# Backup



# Device Types Background (1)



a)



b)

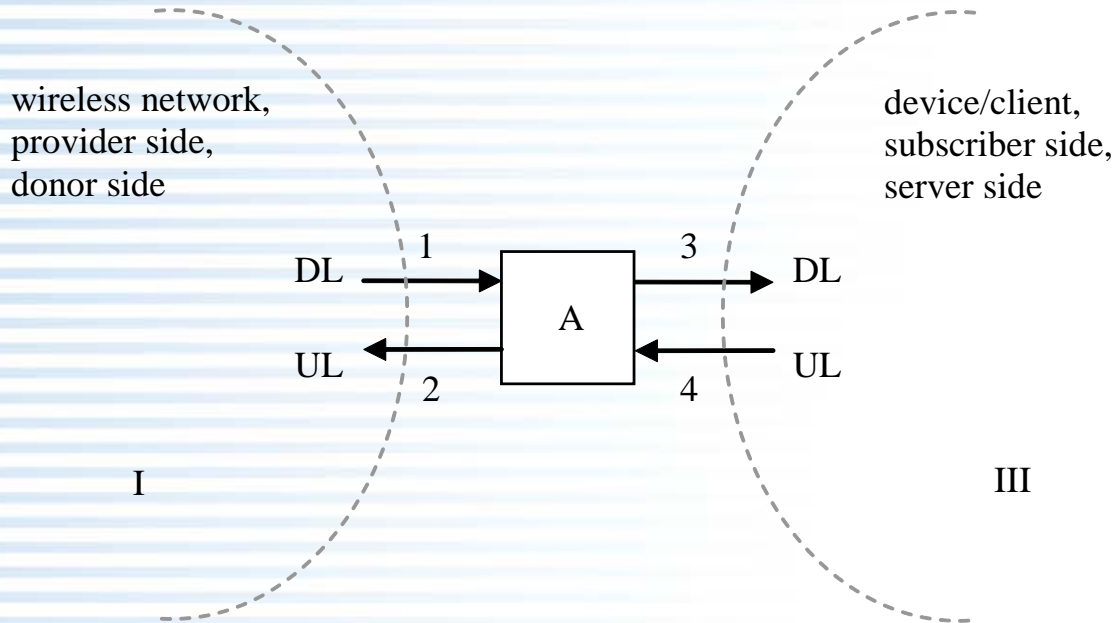
## ● Simplified schematics of:

- 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.





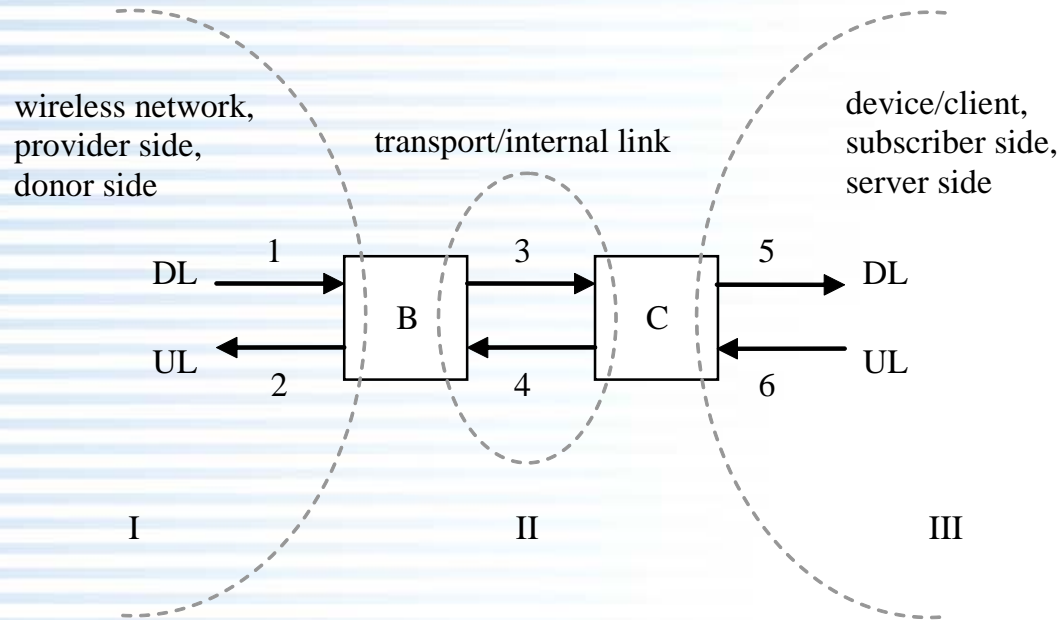
# Device Types Background (2)



- 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).



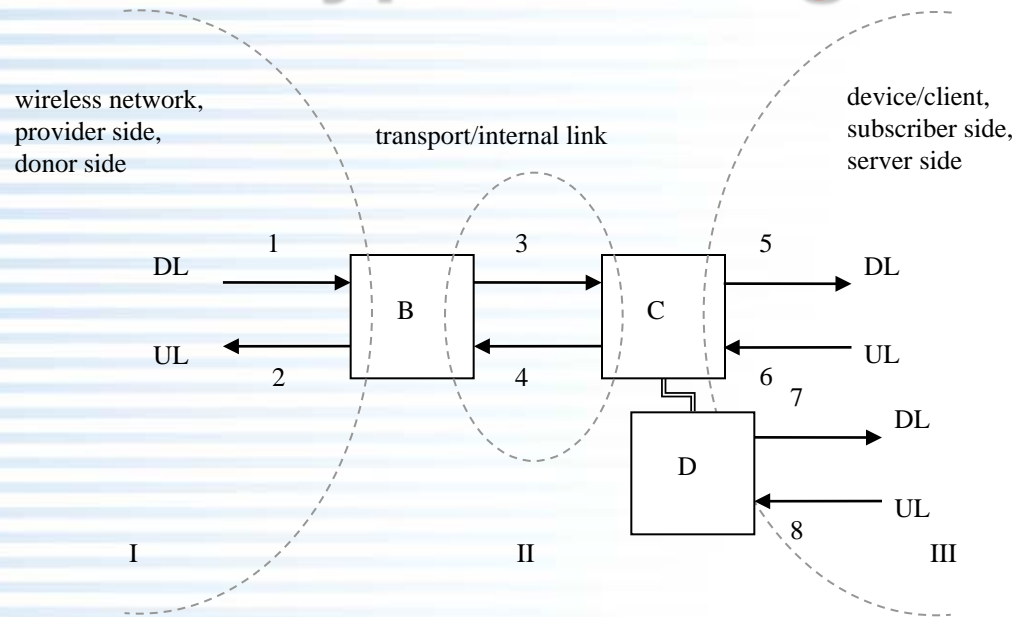
# Device Types Background (3)



- 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).



# Device Types Background (4)



- 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).
- 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).