

Signal Booster Topics for Next Updates of KDB 935210 D01 & D02

Office of Engineering and Technology
Laboratory Division



Overview

- Except for testing consumer boosters,* present versions of signal booster review and approval guidance are:
 - KDB Pub. 935210 D01 v02, Signal Boosters – Basic Definitions And Concepts For Equipment Authorization Purposes (April 2, 2014)
 - KDB Pub. 935210 D02 v02r01, Signal Boosters Certification Requirements (July 24, 2014)
- Considerations for next updates of 935210 D01 & D02
 - Class II permissive changes for legacy non-consumer boosters
 - Device/system and test setup descriptions in filings
 - Part 90 PLMRS/PSRS filing items
 - In-building DAS device composite-Form-731 filings
 - Noise figure testing
 - Industrial boosters with MIMO capabilities

* Consumer Booster test procedures are in KDB Pub. 935210 D03 & D04



Permissive Changes for Legacy Non-consumer Boosters (1)

- Booster devices granted before February 20, 2013 and previously marketed/operated like what is now Industrial Booster under FCC 13-21 new framework
 - Typically equipment class AMP or TNB or PCB
- CMRS Industrial Boosters
 - Parts 22, 24, 27, 90 bands listed 935210 D02 v02r01 Table B.1
 - Equipment authorization permissive change to update labelling and instructions per § 20.21(f) is allowed but is not required
 - Permissive change filings retain the existing / legacy equipment class (i.e., AMP or TNB or PCB), without change to B2I
 - Use grant remark to indicate § 20.21 compliance
 - Since March 1, 2014 all industrial boosters sold and marketed in US required to comply with § 20.21(f) advisory label and install/operate instructions, regardless whether a permissive change is filed or not
 - Booster device/system subsequent operations must comply with §§ 20.21(c), 20.21(d) [FCC 13 21 ¶¶ 6, 110-116]



Permissive Changes for Legacy Non-consumer Boosters (2)

- PLMRS/PSRS Industrial Boosters
 - Part 90 bands listed 935210 D02 v02r01 Table B.2 (except below 150 MHz not applicable)
 - Since March 1, 2014 all industrial boosters sold and marketed in US required to comply with § 90.219(e) Device Specifications
 - Associated compliance information, test data, and install/operate instructions must be on file under an FCC ID
 - Booster advisory label on file
 - Stating device is either Class A or Class B booster [§ 90.219(e)(5) first paragraph, § 90.219(a)]
 - Stating § 90.219(e)(5)(4) advisory text
 - Depending on operating frequencies and device configurations of existing grants, due to § 90.219(e) new tech. requirements a new FCC ID not permissive change might be considered
 - Please submit pre-testing KDB inquiry requesting guidance
 - Booster device/system subsequent operations must comply with §§ 90.219(a) to 90.219(d) [FCC 13-21 ¶¶ 187, 194-195, etc.]



Misc. Review/Approval Items

- DAS host/remote booster filings should clearly describe and show test configurations
 - Testing end-to-end is preferred (input to host through to output from remote, and vice-versa)
 - When only partial paths are tested, describe how results demonstrate compliance for end-use booster system full transmit paths
 - See also related system and test description requirements at 935210 D01 A.2.3, B.1
- For in-building DAS Class B boosters with passband encompassing both CMRS and PLMRS/PSRS [i.e., B9B + B2I composite Form-731; § 90.219(d)(7)], both §§ 90.219(e)(5)(4) and 20.21(f)(1)(4)(ii) labels are required on the device
- Although not presently itemized in D.3 of 935210 D02 v02r01, PLMRS/PSRS device filings must submit noise figure test data [§§ 90.219(e)(2), 2.911(b)]

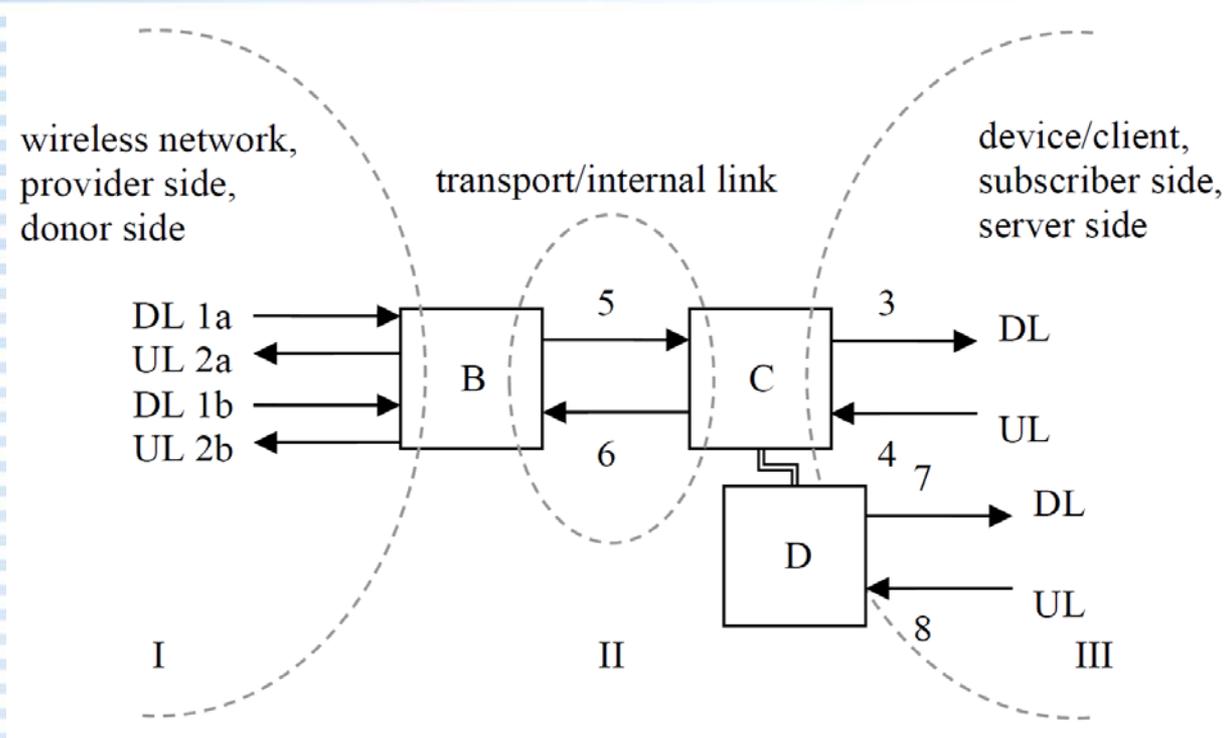


Booster System Devices Supporting MIMO

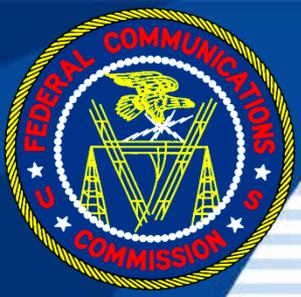
- Some DAS remote unit devices optionally also support MIMO transmissions, when configured in a system with same-band / same-frequency integral or connectable (add-on or expansion) remote unit(s), and host unit(s) and transport links that support multiple streams
 - KDB Pub. 662911 multi-port testing is applicable
 - Technical information describing end-to-end booster system configurations and associated devices is needed
- When compliance for supported optional MIMO operations is not addressed in a filing:
 - Grant condition: This filing has compliance demonstration information and test data only for SISO (single-input single-output) booster system configurations; additional equipment authorization is required to allow this device to be used in MIMO (multiple-input multiple-output) industrial booster systems.
 - Technical information and test data for optional MIMO operation can be submitted in subsequent permissive change filing



DAS Booster System MIMO Concept



- D: RF expansion unit or additional remote unit; may be installed internal or connected external to remote unit C.
- For MIMO (multiple-input multiple-output) operations, signal paths 1b,2b,7,8 are same frequencies as 1a,2a,3,4.
- Signal paths 5,6 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. However, some designs may use multiple separate transport paths for the MIMO streams.



Wrap-up

Following pages are backup material,
other background, and/or for reference



FCC-14-138 Recon. Order & FNPRM

- Docket No. 10-4, Released: September 23, 2014
- Effective date TBD, pending Fed. Reg. posting
- *Order on Reconsideration*
 - Clarifies the § 1.1307 item from *Report and Order* FCC-13-21 [see also KDB 935210 D02 sec. II(I)]
 - Technical and numbering adjustments in § 20.21(e)(8) wideband and § 20.21(e)(9) provider-specific NPS
 - Renumber in § 20.21(f) and add a line for fixed Consumer Booster advisory [new § 20.21(f)(1)(iv)(A)(2)]
- *Further Notice of Proposed Rulemaking*
 - For provider-specific consumer booster only, remove personal-use requirement of §§ 20.21(a) and (g)