

Part 20 and Part 90 Signal Boosters – Miscellaneous Updates

Office of Engineering and Technology
Laboratory Division
May 2017



Overview

- Equipment authorization review and approval policies and procedures and rules summaries for consumer and industrial wireless signal boosters are given in attachments to KDB Publication 935210
- Several minor updates for attachments in *935210* are planned for publishing in the near future
- Various differences between *935210* and ANSI C63.26-2015 are noted for reference



935210 Planned Updates

- Several minor updates for attachments in 935210 are planned for publishing in the near future
- Existing versions, dates and planned updates:
 - D02 v03r02 (04/08/2016): III) b) label; V) f) label; V) j) 4) 929-930 MHz part 90; Table D.1 footnote; Table D.3
 - D03 v04 (02/12/2016): 7.4 intermod; 7.7.1 noise limits; 7.8 uplink inactivity
 - D04 v02 (02/12/2016): test-mode EUT allowed 7.11.3, 7.12; 300 s timing 7.11.3
 - D05 v01r01 (02/12/2016): none

NOTE—The previous attachment 935210 D01 was expired and its relevant content assimilated into 935210 D02.



935210 D02 Basic Guidance (1)

- III) b) label variation allowed, combining FCC information with requirements of ISED Canada RSS-131

NOTE—This example shows Track-Changes for convenience only; actual final labels should omit underlines and font color difference

This is a **CONSUMER** device.

BEFORE USE, you **MUST REGISTER THIS DEVICE** with your wireless provider and have your provider's consent. Most wireless providers consent to the use of signal boosters. Some providers may not consent to the use of this device on their network. If you are unsure, contact your provider.

In Canada, **BEFORE USE** you must meet all requirements set out in ISED CPC-2-1-05.

You **MUST** operate this device with approved antennas and cables as specified by the manufacturer. Antennas **MUST** be installed at least 20 cm (8 inches) from (i.e., **MUST NOT be installed within 20 cm of**) any person.

You **MUST** cease operating this device immediately if requested by the FCC (or ISED in Canada) or a licensed wireless service provider.

WARNING. E911 location information may not be provided or may be inaccurate for calls served by using this device.

This device may be operated **ONLY** in a fixed location (i.e., **may operate in a fixed location only**) for in-building use.



935210 D02 Basic Guidance (2)

- V) f) label variation allowed, combining § 20.21(f)(1)(iv)(B) and § 90.219(e)(5)(4) information

NOTE—This example shows Track-Changes for convenience only; actual final labels should omit underlines and font color difference

Part 90 and Part 20 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 Part 90 Class B signal boosters (as defined in 47 CFR 90.219) online at 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 Basic Guidance (3)

- For 900 MHz band part 90, V) j) 4) of 935210 D02 v03r02 presently has guidance for the 896-901 MHz and 935-940 MHz paired bands
- Added guidance for 929-930 MHz is as follows
 - For 929-930 MHz, both §§ 20.21 [cf. cross-reference in § 90.219 ¶ 1] and 90.219 apply because that band includes interleaved commercial and private services
 - § 90.493(a) channels are subject to part 22 licensing and operation rules [§§ 90.493(b), 90.493(c)]
 - § 20.21 (B2I) applies for part 22 {pending final confirmation from FCC WTB}
 - § 90.494(b) channels are subject to part 90 and § 90.219 (B9B/B9A)
 - Other info given in Table D.3 updates (see below)



935210 D02 Basic Guidance (4)

- Footnote b of Table D.1 moved to Table D.3
 - Table D.1 is for consumer boosters, but footnote b concerns interleaved CMRS and private in SMR band
- Table D.3 has modifications for clarification
 - Shown next page, associated footnotes below

¹³ Table D.1¹⁴ For devices that cover 813.5-817/858.5-862 MHz bands, applicants must specify whether the device is for CMRS or private use so that the appropriate rules can be applied.

¹⁴ Regardless that the 2.106 table lists 22 and 90 for 928-929 MHz, and 22 for 932-935 MHz, the latter band is not provided in part 90, and 22.621 indicates that part 101 subpart O governs for technical operations of any part 22 incumbent licensees.

¹⁵ For the purposes of this document, the listings in Table D.3 for 928-935 MHz are based primarily on the FCC Spectrum Dashboard. Because the Spectrum Dashboard is based on ULS records, the associated rule part scheme is used in Table D.3, regardless that the Spectrum Dashboard is no longer being updated by FCC. Equipment authorization applications requesting differing rule parts for 928-935 MHz should include information on the intended pending or active station authorization(s).

¹⁶ FCC Spectrum Dashboard, Browse Spectrum Bands (225 MHz – 3700 MHz) (<http://reboot.fcc.gov/spectrumdashboard/searchSpectrum Seam>); 928-929 MHz, 101; 929-930 MHz, 22 [see also (http://wireless.fcc.gov/services/index.htm?job=service_home&id=private_land_paging); (http://wireless.fcc.gov/services/index.htm?job=service_bandplan&id=paging)].

¹⁷ Per § 90.493(c) part 22 eqpt. auth. in lieu of part 90 (with § 90.219) allowed for § 90.493(a) channels {pending FCC WTB confirmation};

[Per §§ 90.493(b) and 90.493(c), the technical requirements for the 931-932 MHz part 22 channels apply for the 929-930 MHz § 90.493(a) channels.];

§ 90.493(a) Exclusive channels. The center frequencies of the channels in the 929-930 MHz band that may be assigned on an exclusive basis are as follows: 929.0125, 929.1125, 929.1375, 929.1875, 929.2125, 929.2375, 929.2875, 929.3125, 929.3375, 929.3625, 929.3875, 929.4125, 929.4375, 929.4625, 929.4875, 929.5125, 929.5375, 929.5625, 929.5875, 929.6125, 929.6375, 929.6625, 929.6875, 929.7125, 929.7375, 929.7625, 929.7875, 929.8125, 929.8375, 929.8625, 929.8875, 929.9125, 929.9375, 929.9625, and 929.9875 MHz.

¹⁸ Part 90 eqpt. auth. required for § 90.494(b) channels (§ 90.219 applies): § 90.494(b) The following frequencies are available to all eligible part 90 users for one-way paging systems on a shared basis only and will not be assigned for the exclusive use of any licensee. 929.0375 929.0625 929.0875 929.1625 929.2625



935210 D02 Table D.3 (5)

Table D.3 – Various Part 90 PLMRS band allocations, rule parts/sections, and service types for 90.219 purposes ...

FL (MHz)	–	FL (MHz)	Rule(s)	Misc. Notes

806	–	809	90 NPSPAC (PS) [§ 90.617(a)(1)]	B9B/B9A
809	–	815	90 Interleaved PS; B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 1-470] ¹³	B9B/B9A
815	–	816	90 Expansion B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 470-550] ¹³	B9B/B9A
816	–	817	90 Guardband	B9B/B9A
817	–	824	CMRS 90 ESMR [§ 90.614(b); § 90.613 ch. nos. 551-830]	B2I 90-S
824	–	849	22 H; 90 not available	<u>B2I</u>
849	–	851	22 G; 90 not available	<u>BOS</u>
851	–	854	90 NPSPAC (PS) [§ 90.617(a)(1)]	B9B/B9A
854	–	860	90 Interleaved PS; B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 1-470] ¹³	B9B/B9A
860	–	861	90 Expansion B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 470-550] ¹³	B9B/B9A
861	–	862	90 Guardband	B9B/B9A
862	–	869	CMRS 90 ESMR [§ 90.614(b); § 90.613 ch. nos. 551-830]	B2I 90-S
869	–	894	22-H; 90 not available	<u>B2I</u>
894	–	896	22-G; 90 not available	<u>BOS</u>
896	–	901	90 Interleaved B/ILT [§ 90.617(c)] and SMR [§ 90.617(f)]; UL (donor)	B2I 90-S & B9B/B9A 90-S
901	–	902	24-D; 90 not available	<u>B2I</u>
928	–	929	101; 90 not available ^{14,15}	<u>BOS</u>
929	–	930	22-E; § 90.493(c) allows part 90 for eqpt. auth., in lieu of part 22¹⁶ <u>90^{17,18}</u>	B9B/B9A
930	–	931	24-D; 90 not available	<u>B2I</u>
931	–	932	22-E; 90 not available	<u>B2I {pending FCC WTB; MAYBE BOS}</u>
932	–	935	101; 90 not available	<u>BOS</u>
935	–	940	90 Interleaved B/ILT [§ 90.617(c)] and SMR [§ 90.617(f)]; DL (server)	B2I 90-S & B9B/B9A 90-S
940	–	941	24-D; 90 not available	B2I



935210 D03 Wideband Consumer

- 7.4 Intermodulation-product test procedure; Add:
 - g) ... If the maximum output power is not at the operational-band (booster pass band) center frequency, configure the test signal pair around the frequency with maximum output power as determined per 7.2.
- 7.7.1 Maximum transmitter noise power level; Add:
 - n) ... NOTE-Some signal boosters have a maximum transmitter noise power level that is less than the Transmit Power Off Mode of -70 dBm. For these boosters it is still necessary to confirm that the uplink noise power limits are met in the presence of a downlink signal. Test reports should show measurement data demonstrating compliance. Alternatively the applicant may provide attestation with detailed design information and explanation justifying the omission of the variable uplink testing.
- 7.8 Uplink inactivity test procedure; Add:
 - l) ... NOTE-Some signal boosters have a maximum transmitter noise power level that is less than the uplink inactivity limit. For these boosters it is still necessary to confirm the uplink activity timing requirement. Test reports should show measurement data demonstrating compliance. Alternatively the applicant may provide attestation with detailed design information and explanation justifying the omission of the uplink inactivity test procedure.



935210 D04 Provider-Specific

- 7.11.3 Test procedure for measuring oscillation mitigation or shutdown; Add:
 - a) ... Alternatively, the test mode EUT as described in 6.3.3 may be used.
 - g) 6) The procedure of 7.11.3g1) to 7.11.3.g5) allows the spectrum analyzer trace to stabilize, and verification of shutdown or oscillation level measurement shall occur within 300 seconds.
- 7.12 Mobile booster automatic feedback cancellation test procedure; Add:
 - a) ... Alternatively, the test mode EUT as described in 6.3.3 may be used.



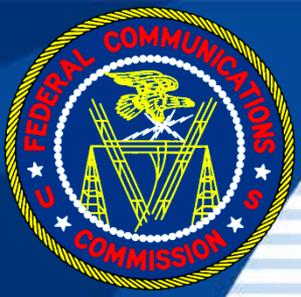
935210 vis-à-vis ANSI C63.26

- For industrial boosters 935210 D02 has general provisions about testing for MIMO-capable devices (not mentioned in 7.2 of ANSI C63.26-2015)
- 7.2 of ANSI C63.26-2015 uses 26 dB EBW, but 935210 D05 allows 99% OBW
- 7.2.2.3, 7.2.3.3, and 7.2.3.4 of ANSI C63.26-2015 are missing steps relative to 935210 D05
- Fig. 18 and Fig. 19 in 7.3.9.1, and Figs. 29 to 31 in 7.4.9.1 of ANSI C63.26-2015 are specific to 50 Ω load; however some devices need testing with for example 75 Ω load
- Numerous NOTES (informative) in ANSI C63.26-2015 should be body text (normative)



New / Unique Booster Designs

- § 20.21 consumer signal booster rules AND associated test procedures were developed based on device designs and operating configurations typical at the time
- Applicants and labs and TCBs should confirm testing and review/approval approaches via KDB inquiry for new or unique booster designs, for example those differing from configurations shown in:
 - Appendix A of KDB Pub. 935210
 - Test set-ups in the figures of KDB Pubs. 935210 D03 (wideband) and D04 (provider-specific)



QUESTIONS ?

**Labs and applicants and TCBs please
let us know in case of any other
935210 change requests**