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.
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.
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.
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

<table>
<thead>
<tr>
<th>Part 90 and Part 20 Signal Boosters</th>
<th>THIS IS A 90.219 CLASS A DEVICE</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>FL (MHz) – FL (MHz)</th>
<th>Rule(s)</th>
<th>Misc. Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>806 – 809</td>
<td>90 NPSPAC (PS) [§ 90.617(a)(1)]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>809 – 815</td>
<td>90 Interleaved PS; B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 1-470]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>815 – 816</td>
<td>90 Expansion B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 470-550]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>816 – 817</td>
<td>90 Guardband</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>817 – 824</td>
<td>CMRS 90 ESMR [§ 90.614(b); § 90.613 ch. nos. 551-830]</td>
<td>B2I 90-S</td>
</tr>
<tr>
<td>824 – 849</td>
<td>22 H; 90 not available</td>
<td>B2I</td>
</tr>
<tr>
<td>849 – 851</td>
<td>22 G; 90 not available</td>
<td>BOS</td>
</tr>
<tr>
<td>851 – 854</td>
<td>90 NPSPAC (PS) [§ 90.617(a)(1)]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>854 – 860</td>
<td>90 Interleaved PS; B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 1-470]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>860 – 861</td>
<td>90 Expansion B/ILT; SMR [§ 90.614(a); § 90.613 ch. nos. 470-550]</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>861 – 862</td>
<td>90 Guardband</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>862 – 869</td>
<td>CMRS 90 ESMR [§ 90.614(b); § 90.613 ch. nos. 551-830]</td>
<td>B2I 90-S</td>
</tr>
<tr>
<td>869 – 894</td>
<td>22-H; 90 not available</td>
<td>B2I</td>
</tr>
<tr>
<td>894 – 896</td>
<td>22-G; 90 not available</td>
<td>BOS</td>
</tr>
<tr>
<td>896 – 901</td>
<td>90 Interleaved B/ILT [§ 90.617(c)] and SMR [§ 90.617(f)]; UL (donor)</td>
<td>B2I 90-S &amp; B9B/B9A 90-S</td>
</tr>
<tr>
<td>901 – 902</td>
<td>24-D; 90 not available</td>
<td>B2I</td>
</tr>
<tr>
<td>928 – 929</td>
<td>101; 90 not available14,15</td>
<td>BOS</td>
</tr>
<tr>
<td>929 – 930</td>
<td>22-E; § 90.493(c) allows part 22 for eqpt. auth.; in lieu of part 2216, 2017, 2018</td>
<td>B9B/B9A</td>
</tr>
<tr>
<td>930 – 931</td>
<td>24-D; 90 not available</td>
<td>B2I</td>
</tr>
<tr>
<td>931 – 932</td>
<td>22-E; 90 not available</td>
<td>B2I (pending FCC WTB; MAYBE BOS)</td>
</tr>
<tr>
<td>932 – 935</td>
<td>101; 90 not available</td>
<td>BOS</td>
</tr>
<tr>
<td>935 – 940</td>
<td>90 Interleaved B/ILT [§ 90.617(c)] and SMR [§ 90.617(f)]; DL (server)</td>
<td>B2I 90-S &amp; B9B/B9A 90-S</td>
</tr>
<tr>
<td>940 – 941</td>
<td>24-D; 90 not available</td>
<td>B2I</td>
</tr>
</tbody>
</table>
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.
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