Spectrum Management and Telecommunications

Radio Standards Specification

Zone Enhancers

May 2017:
Changes to compliance terms – see Preface
Preface


This document will be in force as of its publication on Innovation, Science and Economic Development Canada’s (ISED’s) website. However, a transition period of six (6) months following its publication will be provided, within which compliance with RSS-131 issue 2, or issue 3, will be accepted. After January 1, 2018, all zone enhancers sold, offered for sale, manufactured, imported, distributed or leased on the Canadian market must comply with RSS-131 issue 3. Equipment certified under a previous issue must be evaluated to ensure it is compliant to issue 3. If compliant to issue 3, equipment will not require a permissive change filing.

List of changes:

The following is a list of changes addressed in the current issue of RSS-131:

- the title has been changed
- material common to most RSS has been moved to RSS-Gen, General Requirements for Compliance of Radio Apparatus, and RSS-131 has been updated to reflect the current RSS format
- the requirement that RSS-Gen be used in conjunction with this RSS is stated
- the technical, labelling and user manual requirements for equipment certification have been updated

Issued under the authority of
the Minister of Innovation, Science and Economic Development

_____________________________________
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1. **Scope**

This document sets out certification requirements for zone enhancers, including Distributed Antenna Systems (DASs) and External Radio Frequency Power Amplifiers (ERFPAs) used in conjunction with licensed radio equipment in certain radio services.

Only zone enhancers used to increase the signal strength of radio equipment where this equipment is certified under the following radio standard specifications (RSS) are permitted to be certified under this RSS.

- RSS-119, *Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz*
- RSS-130, *Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz*
- RSS-132, *Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz*
- RSS-133, *2 GHz Personal Communications Services*
- RSS-139, *Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz*
- RSS-195, *Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz*
- RSS-199, *Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz*

ERFPAs are permitted to be certified if the equipment is used with a base station or fixed equipment which is certified under RSS-119. ERFPAs are considered to be Industrial Zone Enhancers and shall comply with requirements specified in section 6 of this RSS.

1.1 **Exclusion**

A radio frequency (RF) power amplifier used solely as an integral component of a particular model of radio equipment is considered to be an internal amplifier. This type of internal amplifier is a component of that model of radio equipment which shall be certified under the applicable Innovation, Science and Economic Development Canada (ISED) standard for that type of radio equipment. Therefore, such internal amplifiers cannot be certified under RSS-131 and are not listed in the *Radio equipment list.*

1.2 **Prohibition**

One-way Wideband Consumer Zone Enhancers (i.e. uplink only, downlink only, uplink impaired and downlink impaired) are prohibited.
Class B zone enhancers (see section 6.1) shall be certified only for use with equipment certified under RSS-119 and for fixed operation. Mobile operation of class B zone enhancers is prohibited.

Except for DASs, the passband of a class B zone enhancer shall not encompass both the land mobile (for commercial and general use) and public safety bands.

2. General information

Equipment covered by RSS-131 is classified as Category I Equipment and a technical acceptance certificate (TAC), issued by ISED’s Certification and Engineering Bureau, or a certificate issued by a recognized certification body (CB), is required.

2.1 Licensing requirements

For information regarding licensing of zone enhancers, refer to ISED’s Client Procedures Circular CPC-2-1-05, Zone Enhancers.

2.2 Related documents

All Spectrum Management and Telecommunications publications are available on its official publications Web page.

The following documents should be consulted:

CPC-2-1-05 Zone Enhancers
RSS-Gen General Requirements for Compliance of Radio Apparatus
RSS-119 Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz
RSS-130 Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz
RSS-132 Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
RSS-133 2 GHz Personal Communications Services
RSS-139 Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
RSS-195 Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz
2.3 Definitions

For the purpose of this standard, the following definitions apply:

Band of Operation: a frequency band that is covered under a specific RSS for specific service (e.g. the MBS band is covered under RSS-130).

Base Station Coupling Loss (BSCL): the minimum coupling loss (in dB) between the zone enhancer’s donor port (input port of the zone enhancer, which receives signals from the base station) and the base station.

Block Edges: the edges at the end of the licensee’s allocated spectrum.

Consumer Zone Enhancer: a bidirectional zone enhancer, which is used by individuals to improve wireless coverage within a limited area. Consumer Zone Enhancers are designed to be installed without third party professional assistance and to be used “out-of-the-box” without fine tuning or other technical adjustments.

Consumer Zone Enhancers can be operated only with approved antennas, cables and/or coupling devices as specified by the manufacturer of the Consumer Zone Enhancer.

Distributed Antenna System (DAS): a network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure. A DAS is considered to be a zone enhancer when the network of internal antennas communicates through the use of an amplifier that is connected to an external antenna that communicates with a base station wirelessly.

Downlink Frequency Band: the transmitted frequency band from the base station to the subscriber.

External Radio Frequency Power Amplifier (ERFPA): a device which, inserted between a radio transmitter (as a signal source) and an antenna, is capable of amplification of that signal and is not an integral part of a radio transmitter. ERFPAs shall have only one transmit antenna port.

Fixed Consumer Zone Enhancer: a Consumer Zone Enhancer designed to be operated in a fixed location in a building.

Industrial Zone Enhancer: all zone enhancers other than Consumer Zone Enhancers. The Industrial Zone Enhancer category includes a wide variety of devices that are designed for installation by licensees.
or installers approved by licensees. These devices are typically designed to serve multiple users simultaneously and to cover larger areas, such as stadiums, airports, office buildings, tunnels and educational campuses. Industrial Zone Enhancers include ERFPAs, repeaters, fibre optic zone enhancers and other similar internal RF distribution methods, such as a single RF internal antenna or a DAS (an array of internal antennas).

**Mobile Consumer Zone Enhancer:** a Consumer Zone Enhancer designed to be operated in a vehicle where both uplink and downlink transmitting antenna are at least 20 cm from the user or any other person.

**Mobile Station Coupling Loss (MSCL):** the minimum coupling loss (in dB) between the wireless device which uses the Consumer Zone Enhancer and the server port (input port of the zone enhancer which receives the signal from the wireless device) of the Consumer Zone Enhancer.

**Provider-Specific Consumer Zone Enhancer:** a Consumer Zone Enhancer, which can be operated only on specific frequency ranges.

**Received Signal Strength Indication (RSSI):** the downlink composite received signal power (in dBm) at the enhancer donor port in the band of operation. RSSI is expressed in negative dBm.

**Uplink Frequency Band:** the transmitted frequency band from the subscriber to the base station.

**Zone Enhancer:** a device or system that automatically receives, amplifies and retransmits the signals received from base, fixed, mobile or portable stations with no change in operating frequency or channel bandwidth.

**Wideband Consumer Zone Enhancer:** a Consumer Zone Enhancer, which can operate on the entire band of one or more of the service bands.

3. **Certification requirements**

3.1 **RSS-Gen compliance**

RSS-131 shall be used in conjunction with RSS-Gen, *General Requirements for the Compliance of Radio Apparatus*, for general requirements and information relevant to the equipment to which this standard applies.

3.2 **Labelling and user manual requirements**

Zone enhancer manufacturers shall ensure that all zone enhancers meet the labelling requirements in this section. Information required for the label shall be displayed in compliance with the labelling format specified in Radio Standards Procedure RSP-100, *Certification of Radio Apparatus*. 
The following advisories shall be included:

(1) in any print or online user manual and installation instructions
(2) on the outer packaging of the device
(3) on a label affixed to the device

(a) For Consumer Zone Enhancers:

i. This is a CONSUMER device

ii. BEFORE USE, you must meet all requirements set out in CPC-2-1-05

iii. You MUST operate this device with approved antennas and cables as specified by the manufacturer. Antennas MUST NOT be installed within 20 cm of any person

iv. You MUST cease operation of this device immediately if requested by ISED or a licensed wireless service provider

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

vi. In addition, Consumer Zone Enhancers certified for fixed operation shall include the following:

- This device may operate in a fixed location only, for in-building use

(b) For Industrial Zone Enhancers:

**WARNING:** This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.

3.3 User manual for Consumer Zone Enhancers

The user manual must include a link to ISED’s CPC-2-1-05.

3.4 Antenna kits for Consumer Zone Enhancers support equipment certified in RSSs listed in section 1 except RSS-119

All Consumer Zone Enhancers certified under RSS-131 shall be sold together with antennas, cables, and/or coupling devices that meet the requirements of this standard, and Consumer Zone Enhancer user manuals shall specify all antennas and cables that meet the requirements in this standard.
Applicants seeking certification are required to submit documentation with the certification application which shows compliance with the requirements in this standard regarding all antennas, cables and/or coupling devices, including any antennas or equipment upgrade options that may be available at the initial purchase or as a subsequent upgrade.

### 3.5 Test report

In addition to the information required in [RSS-Gen](#), the test report shall contain the following information and/or measurements:

- **(a)** the zone enhancer’s gain-versus-frequency response
- **(b)** the zone enhancer’s rated mean output power, $P_{\text{rated}}$, and its output signal coupling attenuation
- **(c)** the calculated or measured MCSL for Wideband Consumer Zone Enhancers for each band of operation
- **(d)** the BSCL for the Provider-Specific Consumer Zone Enhancer, as determined in section 4

In addition, the certification applicant shall submit documents that show compliance of all antennas, cables and/or coupling devices with the requirements in section 4, including any antenna or equipment upgrade options that may be available at initial purchase or as a subsequent upgrade.

### 4. Measurement Methods

Compliance with the requirements in this standard shall be performed according to procedures listed on ISED’s [acceptable knowledge database, other supplementary procedures and notices](#) Web page.

#### 4.1 Output power

Unless indicated otherwise in the applicable standards of the equipment with which the zone enhancer is to be used, the output power and noise limit of the zone enhancer shall be measured in terms of root-mean-square (RMS) average value.

#### 4.2 Base Station Coupling Loss (BSCL) for Provider-Specific Consumer Zone Enhancers

In order of preference, the base station coupling loss (BSCL) is determined using one of the following methods:

- **(1)** determine path loss between the base station and the Provider-Specific Consumer Zone Enhancer by measuring the received forward pilot/control channel power at the zone enhancer and reading the pilot/control transmit power from the base station as defined in the system information messages sent by the base station.
(2) estimate the BSCL by assuming that the base station is transmitting at a level of 25 dBm per channel and by measuring the total received signal power in the channel (RPCH), received at the zone enhancer input port (in dBm). BSCL is then calculated as BSCL = 25 − RPCH

(3) assume that the BSCL is 70 dB without performing any measurement

5. **Equipment standard specifications for zone enhancers working with equipment certified in RSSs listed in section 1 except RSS-119**

Zone enhancers used with equipment certified under RSS-132 (Cellular), RSS-133 (PCS), RSS-139 (AWS), RSS-130 (MBS), RSS-195 (WCS), and RSS-199 (BRS) shall comply with the requirements in this section.

5.1 **Consumer Zone Enhancers**

In addition to the requirements in this section, Consumer Zone Enhancers shall comply with all requirements in the applicable RSS of the equipment with which they are designed to operate.

5.1.1 **Consumer Zone Enhancer network protection standard**

All Consumer Zone Enhancers shall include the features below to prevent harmful interference to wireless networks.

5.1.1.1 **Anti-oscillation**

Consumer Zone Enhancers shall be able to detect and mitigate (i.e. by automatic gain reduction or shut down) any oscillation in uplink and downlink bands. Oscillation detection and mitigation shall occur automatically within 0.3 seconds in the uplink bands and within one second in the downlink bands. In cases where oscillation is detected, the zone enhancer shall continue mitigation for at least one minute before restarting. After five such restarts, the zone enhancer shall not resume operation until manually reset.

5.1.1.2 **Gain control**

Consumer Zone Enhancers shall have automatic limiting control to protect against excessive input signals that would cause output power and emissions in excess of the specified limits in the operating frequency bands of the wireless device with which the zone enhancer is used.

5.1.1.3 **Power down**

Consumer Zone Enhancers shall automatically power down or cease amplification as they approach any affected base station.
5.1.4 Interference avoidance for wireless subsystems

Consumer Zone Enhancers using unlicensed or other frequency bands for wireless transmissions between donor and server subsystems for their internal operations shall employ interference methods to prevent interference into authorized spectrum bands.

5.1.2 Bidirectional capability

All Consumer Zone Enhancers shall be able to provide equivalent uplink and downlink gain and conducted uplink power output that is at least 17 dBm. Spectrum block filtering may be used provided the uplink filter attenuation is not less than the downlink filter attenuation and where the Received Signal Strength Indication (RSSI) is measured after spectrum block filtering is applied referenced to the zone enhancer’s input port for each band of operation.

5.1.3 Wideband Consumer Zone Enhancers

Wideband Consumer Zone Enhancers shall comply with all the requirements for Consumer Zone Enhancers outlined in sections 5.1.1 and 5.1.2, as well as the following limits:

5.1.3.1 Noise limits

Wideband Consumer Zone Enhancers shall comply with the following noise limits:

1. The transmitted noise power (in dBm/MHz) of Wideband Consumer Zone Enhancers at their uplink ports shall not exceed $-103 \text{ dBm} – \text{RSSI}$, where RSSI is the downlink composite received signal power (expressed in negative dBm) at the zone enhancer donor port for all base stations in the band of operation.

2. The transmitted noise power (in dBm/MHz) at the device’s uplink and downlink ports shall not exceed the following limits:
   
   a. $-102.5 \text{ dBm/MHz} + 20 \log_{10}(f)$, where $f$ is the uplink mid-band frequency of the operating frequency bands (in MHz), for fixed Wideband Consumer Zone Enhancers
   
   b. $-59 \text{ dBm/MHz}$ for mobile Wideband Consumer Zone Enhancers

5.1.3.2 Gain limits

Wideband Consumer Zone Enhancers shall comply with the following gain limits:

1. The uplink gain (in dB) of a Wideband Consumer Zone Enhancer referenced to its input and output ports shall not exceed $-34 – \text{RSSI} + \text{MSCL}$
(2) The uplink and downlink gain (in dB) of a fixed Wideband Consumer Zone Enhancer referenced to its input and output ports shall not exceed \(6.5 + 20 \log_{10}(f)\), where \(f\) is the uplink mid-band frequency of the operating frequency bands (in MHz).

(3) The uplink and downlink gain of a mobile Wideband Consumer Zone Enhancer referenced to its input and output ports shall not exceed

(a) 50 dB when using an inside antenna (e.g. inside a vehicle)

(b) 23 dB when using direct contact coupling (e.g. cradle-type zone enhancers)

(c) 15 dB when directly connected (with a physical connection)

5.1.3.3 Power limits

The uplink composite conducted power and e.i.r.p. of the Wideband Consumer Zone Enhancer shall not exceed 1 watt for each band of operation.

The downlink composite conducted power and e.i.r.p. of the Wideband Consumer Zone Enhancer shall not exceed 17 dBm for each band of operation.

5.1.3.4 Out-of-band emission limits

The out-of-band emission of a Wideband Consumer Zone Enhancer shall be at least 6 dB below the mobile unwanted emission limits for the supported mobile wireless device for the bands of operation as specified in the applicable RSS (e.g. RSS-132, RSS-133, etc.).

5.1.3.5 Intermodulation limits

The power of the transmitted intermodulation products of a Wideband Consumer Zone Enhancer at its uplink and downlink ports shall not exceed \(-19\) dBm.

Compliance with intermodulation limits will be carried out with the zone enhancer operating at maximum gain and rated output power, with two continuous wave (CW) input signals spaced 600 kHz apart and centred in the passband of the zone enhancer, and with a 3 kHz measurement bandwidth.

5.1.3.6 Transmit power off mode

When the zone enhancer cannot otherwise meet the noise and gain limits defined herein, it shall operate in “Transmit Power Off Mode.” In this mode, the uplink noise power shall not exceed \(-70\) dBm/MHz and the uplink and downlink gain shall not exceed 23 dB or the MSCL value, whichever is lower.
5.1.3.7 Uplink inactivity

When the zone enhancer is not serving an active device connection, after five minutes, the uplink noise power shall not exceed $-70 \text{ dBm/MHz}$.

5.1.4 Provider-Specific Consumer Zone Enhancers

Provider-Specific Consumer Zone Enhancers shall comply with all the requirements for Consumer Zone Enhancers in sections 5.1.1 and 5.1.2, as well as the following limits:

5.1.4.1 Noise limits

Provider-Specific Consumer Zone Enhancers shall comply with the following noise limits:

(1) The transmitted noise power (in dBm/MHz) of Provider-Specific Consumer Zone Enhancers outside the licensee’s spectrum blocks at their uplink ports shall not exceed $-103 \text{ dBm} – \text{RSSI}$, where the RSSI is the downlink composite received signal power (in dBm) for frequencies in the band of operation, but outside the licensee’s spectrum block as measured after the spectrum block filtering is applied referenced to the zone enhancer’s donor port for each band of operation.

(2) Provider-Specific Consumer Zone Enhancers with an MSCL less than 40 dB shall reduce the noise output power value (in dB) determined in (1 above) by $(40 \text{ dB} – \text{MCSL})$.

(3) The transmitted downlink noise power (in dBm/MHz) at the device’s uplink and downlink ports shall not exceed:

(a) $-102.5 \text{ dBm/MHz} + 20 \log_{10}(f)$, where $f$ is the uplink mid-band frequency of the operating frequency bands (in MHz), for fixed Provider-Specific Consumer Zone Enhancers.

(b) $-59 \text{ dBm/MHz}$ for mobile Provider-Specific Consumer Zone Enhancers.

5.1.4.2 Gain limits

Provider-Specific Consumer Zone Enhancers shall comply with the following gain limits:

(1) The uplink and downlink gain (in dB) of a Provider-Specific Consumer Zone Enhancer referenced to its input and output ports shall not exceed $\text{BSCL} – 28 – (40 – \text{MSCL})$.

(2) The uplink and downlink gain (in dB) of a fixed Provider-Specific Consumer Zone Enhancer referenced to its input and output ports shall not exceed $19.5 + 20 \log_{10}(f)$, or 100 dB for systems having automatic gain adjustment based on isolation measurements between enhancer donor and server antennas, where $f$ is the uplink mid-band frequency of the operating frequency bands (in MHz).
The uplink and downlink gain (in dB) of a mobile Provider-Specific Consumer Zone Enhancer referenced to its input and output ports shall not exceed

(a) 50 dB when using an inside antenna (e.g. inside a vehicle)

(b) 23 dB when using direct contact coupling (e.g. cradle-type zone enhancers)

(c) 15 dB when directly connected (with a physical connection)

For systems using an inside antenna, which have automatic gain adjustment based on isolation measurements between enhancer donor and server antennas and automatic feedback cancellation, the mobile enhancer gain shall not exceed 58 dB and 65 dB for frequencies below and above 1 GHz respectively.

5.1.4.3 Power limits

The uplink composite conducted power and e.i.r.p. of the Provider-Specific Consumer Zone Enhancer shall not exceed 1 watt for each band of operation.

The downlink composite conducted power and e.i.r.p. of the Provider-Specific Consumer Zone Enhancer shall not exceed 0.05 watts (17 dBm) for each band of operation and shall not exceed 10 dBm per channel.

5.1.4.4 Out-of-band gain limits

The Provider-Specific Consumer Zone Enhancer shall have the following minimum attenuation in reference to the zone enhancer’s gain in the centre of the passband of the zone enhancer as follows:

(1) $-20$ dB at the block edges
(2) $-30$ dB at 1 MHz offset from the block edges
(3) $-40$ dB at 5 MHz offset from the block edges

In addition, a Provider-Specific Consumer Zone Enhancer with a maximum gain greater than 80 dB (referenced to the centre of the passband) shall limit the out-of-band gain to 60 dB at 0.2 MHz offset from the block edges, and 45 dB at 1 MHz offset from the block edges, where block edges are the end of the licensee’s allocated spectrum.

5.1.4.5 Out-of-band emission limits

The Provider-Specific Consumer Zone Enhancer’s out-of-band emissions shall meet the mobile emission limit of the supported mobile wireless device for the bands of operation as specified in the applicable RSS of the supported mobile wireless device.
5.1.4.6 Intermodulation limits

The power of the transmitted intermodulation products of a Provider-Specific Consumer Zone Enhancer at its uplink and downlink ports shall not exceed −19 dBm.

Compliance with intermodulation limits will be carried out with the zone enhancer operating at maximum gain and rated output power, with two continuous wave (CW) input signals spaced 600 kHz apart and centred in the passband of the zone enhancer, and with a 3 kHz measurement bandwidth.

5.1.4.7 Transmit power off mode

When the Provider-Specific Consumer Zone Enhancer cannot otherwise meet the noise and gain limits defined herein, it shall operate in “Transmit Power Off Mode.” In this mode, the uplink and downlink noise power shall not exceed −70 dBm/MHz and uplink gain shall not exceed 23 dB or MSCL value, whichever is lower.

5.1.4.8 Uplink inactivity

When the Provider-Specific Consumer Zone Enhancer is not serving an active device connection, after five minutes, the uplink noise power shall not exceed −70 dBm/MHz.

5.2 Industrial zone enhancers

Industrial Zone Enhancers, including DASs, shall employ a gain control feature and shall comply with all the requirements in the RSS which applies to the equipment with which the zone enhancer is to be used. In addition, the equipment shall comply with the requirements specified in this section.

5.2.1 Out-of-band rejection

The gain-versus-frequency response and the 20 dB bandwidth of the zone enhancer shall be reported. The zone enhancer shall reject amplification of other signals outside the passband of the zone enhancer.

5.2.2 Input-versus-output spectrum

The spectral growth of the 26 dB bandwidth of the output signal shall be less than 5% of the input signal spectrum.

5.2.3 Mean output power and zone enhancer gain

The zone enhancer gain shall not exceed the nominal gain by more than 1.0 dB. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.
5.2.4 Frequency stability

Industrial zone enhancers shall comply with the frequency stability given in the RSS that applies to the equipment with which the zone enhancer is to be used. In cases where the frequency stability limit is not given in the applicable RSS, the equipment shall comply with a frequency stability of ± 1.5 ppm.

For zone enhancers with no input signal processing capability, the frequency stability measurement in this section is not required.

6. Equipment standard specifications for zone enhancers working with equipment certified under RSS-119

This section contains requirements for zone enhancers, including ERFPAs and DASs, working with equipment certified under RSS-119.

There is no classification of consumer enhancers for zone enhancers certified under this section. The zone enhancers are considered to be Industrial Zone Enhancers.

6.1 Types of zone enhancers

Two types of zone enhancers can be used with equipment certified under RSS-119:

(1) Class A Zone Enhancer: A zone enhancer designed to retransmit signals on one or more specific channels. A zone enhancer is deemed to be a class A zone enhancer if none of its passbands for one or more specific channels exceed 75 kHz.

(2) Class B Zone Enhancer: A zone enhancer designed to retransmit any signals within a wide frequency band. A zone enhancer is deemed to be a class B zone enhancer if it has a passband that exceeds 75 kHz.

6.2 Output power

The output power of the zone enhancer shall comply with the transmitter output power of the equipment with which it is to be used (as specified in RSS-119) and shall be within ± 1.0 dB of the zone enhancer manufacturer’s rated output power.

6.3 Intermodulation

The effective radiated power (ERP) of intermodulation products should not exceed −30 dBm in a 10 kHz measurement bandwidth.
6.4 Noise

The ERP of noise within the passband should not exceed −43 dBm in a 10 kHz measurement bandwidth.

The ERP of noise in spectrum more than 1 MHz outside of the passband should not exceed −70 dBm in a 10 kHz measurement bandwidth.

The noise figure of a zone enhancer shall not exceed 9 dB in either direction.

6.5 Spurious emissions

The spurious emissions of a zone enhancer shall not exceed −13 dBm in any 100 kHz measurement bandwidth.

6.6 Other requirements

Zone enhancers shall meet the following requirements:

1.minor departures from the exact reference frequencies of the input signals are permitted provided the retransmitted signals meet the frequency stability limit specified in RSS-119 for the equipment with which the zone enhancer is to be used

2. the retransmitted signals shall meet the unwanted emission limits in the RSS that applies to the equipment with which the zone enhancer is to be used.