

## § 73.757

3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with lower frequencies attenuated at a slope of 6 dB per octave.

(3) *Modulation processing.* If audio-frequency signal processing is used, the dynamic range of the modulating signal shall be not less than 20 dB.

(4) *Necessary bandwidth.* The necessary bandwidth shall not exceed 9 kHz.

[70 FR 46677, Aug. 10, 2005]

## § 73.757 System specifications for single-sideband (SSB) modulated emissions in the HF broadcasting service.

(a) *System parameters*—(1) *Channel spacing.* In a mixed DSB, SSB and digital environment (see Resolution 517 (Rev.WRC-03)), the channel spacing shall be 10 kHz. In the interest of spectrum conservation, it is also permissible to interleave SSB emissions midway between two adjacent DSB channels, *i.e.*, with 5 kHz separation between carrier frequencies, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved. In an all inclusive SSB environment, the channel spacing and carrier frequency separation shall be 5 kHz.

(2) *Equivalent sideband power.* When the carrier reduction relative to peak envelope power is 6 dB, an equivalent SSB emission is one giving the same audio-frequency signal-to-noise ratio at the receiver output as the corresponding DSB emission, when it is received by a DSB receiver with envelope detection. This is achieved when the sideband power of the SSB emission is 3 dB larger than the total sideband power of the DSB emission. (The peak envelope power of the equivalent SSB emission and the carrier power are the same as that of the DSB emission.)

(b) *Emission characteristics*—(1) *Nominal carrier frequencies.* Nominal carrier frequencies shall be integral multiples of 5 kHz.

(2) *Frequency tolerance.* The frequency tolerance shall be 10 Hz.

NOTE 1 TO PARAGRAPH (b)(2): The ITU suggests that administrations avoid carrier frequency differences of a few hertz, which cause degradations similar to periodic fading.

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ing. This could be avoided if the frequency tolerance were 0.1 Hz, a tolerance which would be suitable for SSB emissions.

NOTE 2 TO PARAGRAPH (b)(2): The SSB system adopted for the bands allocated exclusively to HF broadcasting does not require a frequency tolerance less than 10 Hz. The degradation mentioned in Note 1 occurs when the ratio of wanted-to-interfering signal is well below the required protection ratio. This remark is equally valid for both DSB and SSB emissions.

(3) *Audio-frequency band.* The upper limit of the audio-frequency band (at—3 dB) of the transmitter shall not exceed 4.5 kHz with a further slope of attenuation of 35 dB/kHz and the lower limit shall be 150 Hz with lower frequencies attenuated at a slope of 6 dB per octave.

(4) *Modulation processing.* If audio-frequency signal processing is used, the dynamic range of the modulating signal shall be not less than 20 dB.

(5) *Necessary bandwidth.* The necessary bandwidth shall not exceed 4.5 kHz.

(6) *Carrier reduction (relative to peak envelope power).* In a mixed DSB, SSB and digital environment, the carrier reduction shall be 6 dB to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

(7) *Sideband to be emitted.* Only the upper sideband shall be used.

(8) *Attenuation of the unwanted sideband.* The attenuation of the unwanted sideband (lower sideband) and of intermodulation products in that part of the emission spectrum shall be at least 35 dB relative to the wanted sideband signal level. However, since there is in practice a large difference between signal amplitudes in adjacent channels, a greater attenuation is recommended.

[70 FR 46677, Aug. 10, 2005]

## § 73.758 System specifications for digitally modulated emissions in the HF broadcasting service.

(a) For digitally modulated emissions, the Digital Radio Mondiale (DRM) standard shall be employed. Both digital audio broadcasting and datacasting are authorized. The RF requirements for the DRM system are specified in paragraphs (b) and (c), of this section.

(b) *System parameters*—(1) *Channel spacing*. The initial spacing for digitally modulated emissions shall be 10 kHz. However, interleaved channels with a separation of 5 kHz may be used in accordance with the appropriate protection criteria appearing in Resolution 543 (WRC-03), provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

(2) *Channel utilization*. Channels using digitally modulated emissions may share the same spectrum or be interleaved with analog emissions in the same high frequency broadcasting (HFBC) band, provided the protection afforded to the analog emissions is at least as great as that which is currently in force for analog-to-analog protection. Accomplishing this may require that the digital spectral power density (and total power) be lower by several dB than is currently used for either DSB or SSB emissions.

(c) *Emission characteristics*—(1) *Bandwidth and center frequency*. A full digitally modulated emission will have a 10 kHz bandwidth with its center frequency at any of the 5 kHz center frequency locations in the channel raster currently in use within the HFBC bands. Among several possible “simulcast” modes are those having a combination of analog and digital emissions of the same program in the same channel, that may use a digital emission of 5 kHz or 10 kHz bandwidth, next to either a 5 kHz or 10 kHz analog emission. In all cases of this type, the 5 kHz interleaved raster used in HFBC shall be adhered to in placing the emission within these bands.

(2) *Frequency tolerance*. The frequency tolerance shall be 10 Hz. See Section 73.757(b)(2), notes 1 and 2.

(3) *Audio-frequency band*. The quality of service, using digital source coding within a 10 kHz bandwidth, taking into account the need to adapt the emission coding for various levels of error avoidance, detection and correction, can range from the equivalent of monophonic FM (approximately 15 kHz) to the low-level performance of a speech codec (of the order of 3 kHz). The choice of audio quality is connected to the needs of the broadcaster and listener, and includes the consider-

ation of such characteristics as the propagation conditions expected. There is no single specification, only the upper and lower bounds noted in this paragraph.

(4) *Modulation*. Quadrature amplitude modulation (QAM) with orthogonal frequency division multiplexing (OFDM) shall be used. 64-QAM is feasible under many propagation conditions; others such as 32-, 16- and 8-QAM are specified for use when needed.

(5) *RF protection ratio values*. The protection ratio values for analogue and digital emissions for co-channel and adjacent channel conditions shall be in accordance with Resolution 543 (WRC-03) as provisional RF protection ratio values subject to revision or confirmation by a future competent conference.

[70 FR 46677, Aug. 10, 2005]

#### § 73.759 Auxiliary transmitters.

Upon showing that a need exists for the use of auxiliary transmitters, a license may be issued provided that:

(a) Auxiliary transmitters may be installed either at the same location as the main transmitters or at another location.

(b) [Reserved]

(c) The auxiliary transmitters shall be maintained so that they may be put into immediate operation at any time for the following purposes:

(1) The transmission of the regular programs upon the failure of the main transmitters.

(2) The transmission of regular programs during maintenance or modification work on the main transmitter, necessitating discontinuance of its operation for a period not to exceed 5 days. (This includes the equipment changes which may be made without authority as set forth elsewhere in the rules and regulations or as authorized by the Commission by letter or by construction permit. Where such operation is required for periods in excess of 5 days, request therefor shall be in accordance with § 73.3542 of this chapter.)

(3) Upon request by a duly authorized representative of the Commission.

(d) The auxiliary transmitters shall be tested at least once each week to determine that they are in proper operating condition and that they are adjusted to the proper frequency except