

(c) The necessary bandwidth for a given class of emission is the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

§ 87.137 Types of emission.

(a) The assignable emissions, corresponding emission designators and authorized bandwidths are as follows:

Class of emission	Emission designator	Authorized bandwidth (kilohertz)		
		Below 50 MHz	Above 50 MHz	Frequency deviation
A1A ¹	100HA1A	0.25		
A1N	300HA1N		0.75	
A2A	2K04A2A	2.74	50	
A2D	6K0A2D		50	
A2D ⁵	13K0A2D		50	
A3E ²	6K00A3E		50 ³	
A3E	5K6A3E		8.33	
kHz ¹⁷				
A3X ⁴	3K20A3X		25	
A9W ⁵	13K0A9W		25	
F1B ¹	1K70F1B	1.7		
F1B ¹	2K40F1B	2.5		
F1D ¹⁸	1M30F1D		1300 kHz	312.5 kHz
F2D	5M0F2D		(⁹)	
F3E ⁶	16K0F3E		20	5
F3E ⁷	36K0F3E		40	15
F7D ⁸	5M0F7D		(⁹)	
F9D	5M0F9D		(⁹)	
G1D	16K0G1D		20 kHz	
G1D ¹⁶	21K0G1D		25	
G1D	14K0G1D		25	
F9D	5M0F9D		(⁹)	
G1D	16K0G1D		20 kHz	5
G3E ⁶	16K0G3E		20	
G7D	14K0G7D		25	
H2B ^{10,11}	2K80H2B	3.0		
H3E ^{11,12}	2K80H3E	3.0		
J2A ¹	100HJ2A	0.25		
J2B ¹	1K70J2B	1.7		
	2K40J2B	2.5		
J3E ^{11,12}	2K80J3E	3.0		
J7B ¹¹	2K80J7B	3.0		
J7D	5M0J7D		(⁹)	
J9W ¹¹	2K80J9W	3.0		
M1A	620HM1A			
NON	NON		None ¹⁵	
PON ¹³	(⁹)		(⁹)	
R3E ^{11,12}	2K80R3E	3.0		
XXA ¹⁴	1K12XXA	2.74		

NOTES:
¹ A1A, F1B, J2A and J2B are permitted provided they do not cause harmful interference to H2B, J3E, J7B and J9W.
² For use with an authorized bandwidth of 8.0 kilohertz at radiobeacon stations. A3E will not be authorized:
 (i) At existing radiobeacon stations that are not authorized to use A3 and at new radiobeacon stations unless specifically recommended by the FAA for safety purposes.
 (ii) At existing radiobeacon stations currently authorized to use A3, subsequent to January 1, 1990, unless specifically recommended by the FAA for safety purposes.
³ In the band 117.975–136 MHz, the authorized bandwidth is 25 kHz for transmitters approved after January 1, 1974.

⁴ Applicable only to Survival Craft Stations and to the emergency locator transmitters and emergency locator transmitter test stations employing modulation in accordance with that specified in § 87.141 of the Rules. The specified bandwidth and modulation requirements shall apply to emergency locator transmitters for which approval is granted after October 21, 1973.

⁵ This emission may be authorized for audio frequency shift keying and phase shift keying for digital data links on any frequency listed in § 87.263(a)(1), § 87.263(a)(3) or § 87.263(a)(5). 13K0A2D emission may be authorized on frequencies not used for voice communications. If the channel is used for voice communications, 13K0A9W emission may be authorized, provided the data is multiplexed on the voice carrier without derogating voice communications.

⁶ Applicable to operational fixed stations in the bands 72.0–73.0 MHz and 75.4–76.0 MHz and to CAP stations using F3 on 143.900 MHz and 148.150 MHz.

⁷ Applicable to operational fixed stations presently authorized in the band 73.0–74.6 MHz.

⁸ The authorized bandwidth is equal to the necessary bandwidth for frequency or digitally modulated transmitters used in aeronautical telemetering and associated aeronautical telemetry or telecommand stations operating in the 1435–1535 MHz and 2310–2390 MHz bands. The necessary bandwidth must be computed in accordance with part 2 of this chapter.

⁹ To be specified on license.

¹⁰ H2B must be used by stations employing digital selective calling.

¹¹ For A1A, F1B and single sideband emissions, except H2B, the assigned frequency must be 1400 Hz above the carrier frequency.

¹² R3E, H3E, and J3E will be authorized only below 25000 kHz. Only H2B, J3E, J7B, and J9W are authorized, except that A3E and H3E may be used only on 3023 kHz and 5680 kHz for search and rescue operations.

¹³ The letters "K, L, M, Q, V, W, and X" may also be used in place of the letter "P" for pulsed radars.

¹⁴ Authorized for use at radiobeacon stations.

¹⁵ Applicable only to transmitters of survival craft stations, emergency locator transmitter stations and emergency locator transmitter test stations approved after October 21, 1973.

¹⁶ Authorized for use by aircraft earth stations. Lower values of necessary and authorized bandwidth are permitted.

¹⁷ In the band 117.975–137 MHz, the Commission will not authorize any 8.33 kHz channel spaced transmissions or the use of their associated emission designator within the U.S. National Airspace System, except by avionics equipment manufacturers, and Flight Test Stations, which are required to perform installation and checkout of such radio systems prior to delivery to their customers for use outside U.S. controlled airspace. For transmitters certificated to tune to 8.33 kHz channel spacing as well as 25 kHz channel spacing, the authorized bandwidth is 8.33 kHz when tuned to an 8.33 kHz channel.

¹⁸ Authorized only for Universal Access Transceiver use at 978 MHz.

(b) For other emissions, an applicant must determine the emission designator by using part 2 of this chapter.

(c) A license to use radiotelephony includes the use of tone signals or signaling devices whose sole function is to establish or maintain voice communications.

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