2     26,975       3     26,985       4     27,005       5     27,015       6     27,025       7     27,035       8     27,055       9     27,075       10     27,077       11     27,086       12     27,108       13     27,115       14     27,125       15     27,138       16     27,155       17     27,166       18     27,177       19     27,185       20     27,205       21     27,215       22     27,225       24     27,235       24     27,235       24     27,236       25     27,246       26     27,266       27     27,275       28     27,286       29     27,296       30     27,306       21     27,218       22     27,286       29	CBRS channel No.	Center frequency (MHz)
3 26,98   4 27,00   5 27,01   6 27,02   7 27,05   8 27,05   9 27,06   10 27,07   11 27,08   12 27,10   13 27,11   14 27,12   15 27,13   16 27,15   17 27,16   18 27,17   19 27,18   20 27,20   21 27,21   22 27,225   24 27,23   25 27,25   24 27,23   25 27,24   26 27,26   27 22   28 27,28   29 27,28   30 27,30   31 27,31   32 27,32   33 27,34   34 27,34   35 27,35   36 27,36   37 27,37   38 27,38   39 27,39	1	26.965
4 27,005   5 27,015   6 27,025   7 27,038   8 27,055   9 27,065   9 27,065   10 27,077   11 27,072   12 27,100   13 27,115   14 27,125   15 27,135   16 27,155   17 27,165   18 27,177   19 27,18   20 27,205   21 27,215   22 27,225   23 27,255   24 27,236   25 27,244   26 27,245   27 27,272   28 27,286   27 27,272   28 27,286   29 27,298   30 27,300   31 27,315   32 27,323   33 27,333   34 27,345   35 27,345   36 27,365   37 27,375   38 27,385   39 27,395	2	26.975
5 27.015   6 27.025   7 27.038   8 27.055   9 27.075   10 27.077   11 27.085   12 27.100   13 27.115   14 27.125   15 27.135   16 27.155   17 27.165   18 27.177   19 27.185   20 27.206   21 27.212   22 27.225   24 27.235   25 27.245   26 27.266   27 27.286   29 27.298   30 27.305   31 27.316   32 27.326   33 27.345   34 27.345   35 27.356   37 27.376   38 27.386   39 27.389   27.389 27.389   39 27.389	3	26.985
6   27.025     7   27.035     8   27.055     9   27.065     10   27.076     11   27.086     12   27.105     13   27.115     14   27.125     15   27.135     16   27.156     18   27.176     19   27.186     20   27.206     21   22.21     22   27.226     23   27.256     24   27.236     27   27.246     27   27.246     27   27.246     29   27.296     30   27.306     31   27.316     32   27.326     33   27.336     34   27.346     35   27.356     36   27.366     37   27.376     38   27.386     39   27.392	4	27.005
7	5	27.015
8   27.055     9   27.055     10   27.075     11   27.085     12   27.101     13   27.115     14   27.125     15   27.135     16   27.155     17   27.166     18   27.177     19   27.185     20   27.205     21   27.215     22   27.225     24   27.235     25   27.245     26   27.266     27   27.276     28   27.286     29   27.298     30   27.305     31   27.316     32   27.325     23   27.345     33   27.345     34   27.345     35   27.355     36   27.365     37   27.375     38   27.385     39   27.389	6	27.025
9	7	27.035
10     27.075       11     27.085       12     27.105       13     27.115       14     27.125       15     27.135       16     27.155       17     27.165       18     27.177       19     27.185       20     27.205       21     27.215       22     27.225       23     27.255       24     27.236       25     27.245       26     27.246       27     27.272       28     27.286       27     27.272       28     27.286       27     27.272       28     27.286       27     27.303       31     27.315       32     27.352       33     27.333       34     27.344       35     27.355       36     27.365       37     27.376       38     27.376       38	8	27.055
11 27.08   12 27.10   13 27.11   14 27.12   15 27.13   16 27.15   17 27.16   18 27.17   19 27.20   21 27.20   21 27.21   22 27.22   24 27.23   25 27.24   26 27.26   27 27.27   28 27.28   29 27.29   30 27.30   31 27.31   32 27.32   33 27.35   34 27.38   35 27.36   37 27.36   38 27.38   39 27.39	9	27.065
11 27.08   12 27.10   13 27.11   14 27.12   15 27.13   16 27.15   17 27.16   18 27.17   19 27.20   21 27.20   21 27.21   22 27.22   24 27.23   25 27.24   26 27.26   27 27.27   28 27.28   29 27.29   30 27.30   31 27.31   32 27.32   33 27.35   34 27.38   35 27.36   37 27.36   38 27.38   39 27.39	10	27.075
12 27, 106   13 27, 115   14 27, 125   15 27, 135   16 27, 155   17 27, 166   18 27, 175   19 27, 182   20 27, 202   21 27, 215   22 27, 225   23 27, 225   24 27, 235   25 27, 246   26 27, 246   27 27, 275   28 27, 286   29 27, 296   30 27, 305   31 27, 316   32 27, 325   33 27, 336   34 27, 346   35 27, 356   37 27, 376   38 27, 378   39 27, 398   27, 389 27, 398   27, 389 27, 389   39 27, 398	11	27.085
13 27.11   14 27.12   15 27.13   16 27.15   17 27.16   18 27.17   19 27.18   20 27.20   21 27.21   22 22.22   23 27.25   24 27.25   25 27.24   26 27.26   27 27.27   28 27.28   29 27.28   30 27.30   31 27.31   32 27.32   33 27.33   34 27.34   35 27.35   36 27.36   37 27.37   38 27.38   39 27.39	12	27.105
14 27.125   15 27.135   16 27.155   17 27.166   18 27.177   19 27.185   20 27.205   21 27.215   22 27.225   24 27.235   25 27.245   26 27.265   27 27.275   28 27.285   29 27.296   30 27.305   31 27.315   32 27.325   33 27.345   35 27.345   36 27.365   37 27.375   38 27.375   39 27.385		
15 27.135   16 27.155   17 27.166   18 27.176   18 27.178   20 27.206   21 27.215   22 27.225   23 27.255   24 27.236   25 27.246   27 27.276   27 27.278   29 27.298   30 27.306   31 27.315   32 27.326   33 27.336   34 27.345   35 27.356   36 27.366   37 27.376   38 27.386   39 27.389	14	
16 27.155   17 27.165   18 27.177   19 27.188   20 27.206   21 27.215   22 27.255   24 27.235   25 27.245   26 27.265   27 27.277   28 27.286   29 27.298   30 27.306   31 27.315   32 27.325   33 27.332   34 27.345   35 27.356   37 27.356   37 27.376   38 27.385   39 27.399		
17 27.165   18 27.175   19 27.182   20 27.205   21 27.215   22 27.225   24 27.235   25 27.245   26 27.246   27 27.275   28 27.285   29 27.295   30 27.305   31 27.315   32 27.325   33 27.335   34 27.345   35 27.355   36 27.365   37 27.375   38 27.385   39 27.395	•	
18 27.175   19 27.18   20 27.20   21 27.215   22 27.225   23 27.255   24 27.235   25 27.245   26 27.246   27 27.275   28 27.285   29 27.295   30 27.305   31 27.315   32 27.325   33 27.345   34 27.345   35 27.355   36 27.365   37 27.375   38 27.375   38 27.385   39 27.395		
19 27.18   20 27.20   21 27.21   22 27.25   24 27.25   25 27.26   26 27.26   27 27.27   28 27.28   29 27.28   29 27.30   31 27.31   32 27.32   33 27.33   34 27.35   35 27.35   36 27.36   37 27.37   38 27.38   39 27.39		
20 27 205   21 27.215   22 27.225   23 27.255   24 27.236   25 27.248   26 27.265   27 27.277   28 27.288   29 27.295   30 27.305   31 27.315   32 27.325   33 27.336   34 27.345   35 27.355   36 27.365   37 27.376   38 27.385   39 27.385	-	
21 27.215   22 27.225   23 27.255   24 27.235   25 27.246   26 27.266   27 27.275   28 27.286   29 27.298   30 27.305   31 27.315   32 27.325   33 27.335   34 27.345   35 27.355   36 27.365   37 27.376   38 27.385   39 27.395	•	
22 27.225   23 27.255   24 27.235   25 27.246   26 27.266   27 27.272   28 27.288   29 27.295   30 27.305   31 27.315   32 27.325   33 27.336   34 27.345   35 27.355   36 27.365   37 27.376   38 27.385   39 27.398		
23 27.25   24 27.23   25 27.24   26 27.26   27 27.27   28 27.28   29 27.29   30 27.30   31 27.31   32 27.32   33 27.33   34 27.34   35 27.35   36 27.36   37 27.37   38 27.38   39 27.38		
24 27.23   25 27.24   26 27.26   27 27.27   28 27.28   29 27.29   30 27.30   31 27.31   32 27.32   33 27.33   34 27.34   35 27.35   36 27.36   37 27.37   38 27.38   39 27.39		
25 27.245   26 27.265   27 27.275   28 27.298   29 27.295   30 27.305   31 27.315   32 27.325   33 27.342   34 27.345   35 27.345   36 27.365   37 27.375   38 27.385   39 27.395		
26 27.265   27 27.275   28 27.285   29 27.295   30 27.305   31 27.315   32 27.325   33 27.335   34 27.345   35 27.345   36 27.365   37 27.376   38 27.385   39 27.398		
27     27.275       28     27.298       29     27.298       30     27.305       31     27.315       32     27.325       33     27.335       34     27.345       35     27.355       36     27.365       37     27.376       38     27.385       39     27.395		
28 27.285   29 27.295   30 27.305   31 27.315   32 27.325   33 27.334   34 27.345   35 27.355   36 27.365   37 27.377   38 27.385   39 27.395		
29 27.295   30 27.305   31 27.311   32 27.325   33 27.335   34 27.345   35 27.355   36 27.365   37 27.376   38 27.385   39 27.395		
30     27.305       31     27.315       32     27.325       33     27.335       34     27.345       35     27.355       36     27.365       37     27.375       38     27.385       39     27.395	28	
31 27.315   32 27.325   33 27.334   34 27.345   35 27.365   36 27.365   37 27.375   38 27.386   39 27.395	29	27.295
32 27.325 33 27.335 34 27.345 35 27.355 36 27.365 37 27.375 38 27.385 39 27.395	30	27.305
33 27.33   34 27.34   35 27.35   36 27.36   37 27.37   38 27.38   39 27.39	31	27.315
34 27.348   35 27.355   36 27.365   37 27.375   38 27.386   39 27.395	32	27.325
35 27.358   36 27.366   37 27.378   38 27.388   39 27.398	33	27.335
35 27.355   36 27.365   37 27.375   38 27.386   39 27.395	34	27.345
37 27.375   38 27.385   39 27.395		27.355
37 27.375   38 27.385   39 27.395		27.365
38 27.385   39 27.395		
39		
		27.405

# § 95.965 CBRS transmit frequency accuracy.

Each CBRS transmitter type must be designed such that the transmit carrier frequency (or in the case of SSB transmissions, the reference frequency) remains within 50 parts-per-million of the channel center frequencies specified in §95.963 under all normal operating conditions.

# §95.967 CBRS transmitter power limits.

Each CBRS transmitter type must be designed such that the transmitter power can not exceed the following limits:

- (a) When transmitting amplitude modulated (AM) voice signals, the mean carrier power must not exceed 4 Watts.
- (b) When transmitting single sideband (SSB) voice signals, the peak envelope power must not exceed 12 Watts.

### §95.971 CBRS emission types.

Each CBRS transmitter type must be designed such that its capabilities are in compliance with the emission type rules in this section.

- (a) Permitted emission types. CBRS transmitter types may transmit only AM voice emission type A3E and SSB voice emission types J3E, R3E, or H3E.
- (b) SSB requirements. Each CBRS transmitter type that transmits emission type J3E, R3E, or H3E must be capable of transmitting only the upper sideband with suppressed, reduced or full carrier, respectively, but may additionally be capable of transmitting only the lower sideband, with suppressed, reduced or full carrier, respectively.

#### §95.973 CBRS authorized bandwidth.

Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test.

- (a) AM. The authorized bandwidth for emission type A3E is 8 kHz.
- (b) SSB. The authorized bandwidth for emission types J3E, R3E, and H3E is 4 kHz.

### § 95.975 CBRS modulation limits.

Each CBRS transmitter type must be designed such that the modulation characteristics are in compliance with the rules in this section.

- (a) When emission type A3E is transmitted with voice modulation, the modulation percentage must be at least 85%, but not more than 100%.
- (b) When emission type A3E is transmitted by a CBRS transmitter having a transmitter output power of more than 2.5 W, the transmitter must contain a circuit that automatically prevents the modulation percentage from exceeding 100%.

# §95.977 CBRS tone transmissions.

In addition to the tones permitted under §95.377, CBRS transmitter types may be designed to transmit brief tones to indicate the beginning or end of a transmission.

### § 95.979

# §95.979 CBRS unwanted emissions limits.

Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table:

Emission type	Paragraph
A3E	(1), (3), (5), (6)
H3E, J3E, R3E	(2), (4), (5), (6)

- (1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency;
- (2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency;
- (3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency;
- (4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency;
- (5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth.
- (6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.
- (b) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (a)(5) and (6) of this section is measured with a reference bandwidth of at least 30 kHz.
- (c) Measurement conditions and procedures. Subject to additional measurement standards and procedures established pursuant to part 2, subpart J, the following conditions and procedures must be used.
- (1) The unwanted emissions limits requirements in this section must be met both with and without the connection of permitted attachments, such as external speakers, microphones, power cords and/or antennas.

(2) Either mean power output or peak envelope power output may be used for measurements, as appropriate for the emission type under test, provided that the same type of power measurement is used for both the transmitter output power and the power of the unwanted emissions.

# §§ 95.981-95.985 [Reserved]

#### § 95.987 CBRS additional requirements.

Each CBRS transmitter type must be designed to satisfy all of the additional requirements in this section.

- (a) Transmit frequency capability. Each CBRS transmitter type must be designed to transmit only on one or more of the channels listed in §95.963. No CBRS transmitter type will be certified for use in the CBRS service if it is capable of transmitting on any frequency or channel other than those listed in §95.963, unless such transmitter type is also certified for use in another radio service for which the frequency capability is authorized and for which FCC certification is also required.
- (b) Frequency determining circuitry. All frequency determining circuitry (including crystals) and programming controls in each CBRS transmitter type must be internal to the transmitter and must not be accessible from the operating panel or from the exterior of the transmitter enclosure.
- (c) Final amplifier component ratings. The dissipation rating of all the semiconductors or electron tubes which supply RF power to the antenna terminals of each CB transmitter must not exceed 10 Watts. For semiconductors, the dissipation rating is the greater of the collector or device dissipation value established by the manufacturer of the semiconductor. These values may be temperature de-rated by no more than 50°C. For an electron tube, the dissipation rating is the Intermittent Commercial and Amateur Service plate dissipation value established by the manufacturer of the electron tube.
- (d) External controls. Only the external transmitter controls, connections or devices listed in this paragraph are allowed to be incorporated in a CBRS transmitter type. The FCC, however,