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Description of emission	Necessary bandwidth		Designation of emission
	Formula	Sample calculation	
Composite transmission digital modulation using DSB-AM (Micro-wave radio relay system).	$B_n = 2RK/\log_2 S$	Digital modulation used to send 5 megabits per second by use of amplitude modulation of the main carrier with 4 signaling states $R = 5 \times 10^6$ bits per second; $K = 1$ ; $S = 4$ ; $B_n = 5$ MHz	5M00K7
Binary Frequency Shift Keying.	$(0.03 < 2D/R < 1.0)$ ; $B_n = 3.86D + 0.27R$ $(1.0 < 2D/R < 2)$ $B_n = 2.4D + 1.0R$	Digital modulation used to send 1 megabit per second by frequency shift keying with 2 signaling states and 0.75 MHz peak deviation of the carrier $R = 1 \times 10^6$ bps; $D = 0.75 \times 10^6$ Hz; $B_n = 2.8$ MHz	2M80F1D
Multilevel Frequency Shift Keying.	$B_n = (R/\log_2 S) + 2DK$	Digital modulation to send 10 megabits per second by use of frequency shift keying with four signaling states and 2 MHz peak deviation of the main carrier $R = 10 \times 10^6$ bps; $D = 2$ MHz; $K = 1$ ; $S = 4$ ; $B_n = 9$ MHz	9M00F7D
Phase Shift Keying .....	$B_n = 2RK/\log_2 S$	Digital modulation used to send 10 megabits per second by use of phase shift keying with 4 signaling states $R = 10 \times 10^6$ bps; $K = 1$ ; $S = 4$ ; $B_n = 10$ MHz	10M0G7D
Quadrature Amplitude Modulation (QAM).	$B_n = 2R/\log_2 S$	64 QAM used to send 135 Mbps has the same necessary bandwidth as 64-PSK used to send 135 Mbps; $R = 135 \times 10^6$ bps; $S = 64$ ; $B_n = 45$ MHz	45M0W
Minimum Shift Keying ...	2-ary: $B_n = R(1.18)$ 4-ary: $B_n = R(2.34)$	Digital modulation used to send 2 megabits per second using 2-ary minimum shift keying $R = 2.36 \times 10^6$ bps; $B_n = 2.36$ MHz	2M36G1D

[28 FR 12465, Nov. 22, 1963, as amended at 37 FR 8883, May 2, 1972; 37 FR 9996, May 18, 1972; 48 FR 16492, Apr. 18, 1983; 49 FR 48698, Dec. 14, 1984; 68 FR 68543, Dec. 9, 2003]

**Subpart D—Call Signs and Other Forms of Identifying Radio Transmissions**

**AUTHORITY:** Secs. 4, 5, 303, 48 Stat., as amended, 1066, 1068, 1082; 47 U.S.C. 154, 155, 303.

**§ 2.301 Station identification requirement.**

Each station using radio frequencies shall identify its transmissions according to the procedures prescribed by the rules governing the class of station to which it belongs with a view to the elimination of harmful interference and the general enforcement of applicable radio treaties, conventions, regulations, arrangements, and agreements in force, and the enforcement of the Communications Act of 1934, as amended, and the Commission's rules.

[34 FR 5104, Mar. 12, 1969]

**§ 2.302 Call signs.**

The table which follows indicates the composition and blocks of international call signs available for assignment when such call signs are required by the rules pertaining to particular classes of stations. When stations operating in two or more classes are authorized to the same licensee for the same location, the Commission may elect to assign a separate call sign to each station in a different class. (In addition to the U.S. call sign allocations listed below, call sign blocks AAA through AEZ and ALA through ALZ have been assigned to the Department of the Army; call sign block AFA through AKZ has been assigned to the Department of the Air Force; and call sign block NAA through NZZ has been assigned jointly to the Department of the Navy and the U.S. Coast. Guard.

Class of station	Composition of call sign	Call sign blocks
Coast (Class I) except for coast telephone in Alaska.	3 letters .....	KAA through KZZ. WAA through WZZ.

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Class of station	Composition of call sign	Call sign blocks
Coast (Classes II and III) and maritime radio-determination.	3 letters, 3 digits .....	KAA200 through KZZ999. WAA200 through WZZ999.
Coast telephone in Alaska .....	3 letters, 2 digits. 3 letters, 3 digits (for stations assigned frequencies above 30 MHz).	KAA20 through KZZ99. WAA20 through WZZ99. WZZ200 through WZZ999.
Fixed .....	3 letters, 2 digits .....	KAA20 through KZZ99.
Marine receiver test .....	3 letters, 3 digits (for stations assigned frequencies above 30 MHz).	WAA20 through WZZ99. WAA200 through WZZ999.
Ship telegraph .....	3 letters, 3 digits (plus general geographic location when required).	KAA200 through KZZ999. WAA200 through WZZ999.
Ship telephone .....	4 letters <sup>1</sup> .....	KAAA through KZZZ. WAAA through WZZZ.
Ship telegraph plus telephone .....	2 letters, 4 digits, or 3 letters, 4 digits <sup>1</sup> .....	WA2000 through WZ9999, through WZZ9999.
Ship radar .....	4 letters .....	KAAA through KZZZ. WAAA through WZZZ.
Ship survival craft .....	Same as ship telephone and/or telegraph call sign, or, if ship has no telephone or telegraph: 2 letters, 4 digits, or 3 letters, 4 digits.	WA2000 through WZ9999, through WZZ9999.
Cable-repair ship marker buoy .....	Call sign of the parent ship followed by 2 digits.	KAAA20 through KZZZ99. WAAA20 through WZZZ99.
Marine utility .....	Call sign of the parent ship followed by the letters "BT" and the identifying number of the buoy.	
Shipyards mobile .....	2 letters, 4 digits .....	KA2000 through KZ9999. KA2000 through KZ9999.
Aircraft telegraph .....	2 letters, 4 digits .....	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft telegraph and telephone .....	5 letters .....	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft telephone .....	5 letters <sup>2</sup> .....	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aircraft survival craft .....	5 letters <sup>2</sup> (whenever a call sign is assigned).	KAAAA through KZZZZ. WAAAA through WZZZZ.
Aeronautical .....	Whenever a call sign <sup>2</sup> is assigned, call sign of the parent aircraft followed by a single digit other than 0 or 1.	
Land mobile (base) .....	3 letters, 1 digit <sup>2</sup> .....	KAA2 through KZZ9. WAA2 through WZZ9.
Land mobile (mobile telegraph) .....	3 letters, 3 digits .....	KAA200 through KZZ999. WAA200 through WZZ999.
Land mobile (mobile telephone) .....	4 letters, 1 digit .....	KAAA2 through KZZZ9. WAAA2 through WZZZ9.
Broadcasting (standard) .....	2 letters, 4 digits .....	KA2000 through KZ9999. WA2000 through WZ9999.
Broadcasting (FM) .....	4 letters <sup>3</sup> (plus location of station) .....	KAAA through KZZZ. WAAA through WZZZ.
Broadcasting with suffix "FM" .....	4 letters (plus location of station) .....	KAAA through KZZZ. WAAA through WZZZ.
Broadcasting (television) .....	6 letters <sup>3</sup> (plus location of station) .....	KAAA-FM through KZZZ-FM. WAAA-FM through WZZZ-FM.
Broadcasting with suffix "TV" .....	4 letters (plus location of station) .....	KAAA through KZZZ. WAAA through WZZZ.
Television broadcast translator .....	6 letters <sup>3</sup> (plus location of station) .....	KAAA-TV through KZZZ-TV. WAAA-TV through WZZZ-TV.
Disaster station, except U.S. Government .....	1 letter—output channel number—2 letters.	K02AA through K83ZZ. W02AA through W83ZZ.
Experimental (letter "X" follows the digit) .....	4 letters, 1 digit .....	KAAA2 through KZZZ9. WAAA2 through WZZZ9.
Amateur (letter "X" may not follow digit) .....	2 letters, 1 digit, 3 letters .....	KA2XAA through KZ9XZZ. WA2XAA through WZ9XZZ.
Amateur .....	1 letter, 1 digit, 1 letter <sup>4</sup> .....	K1A through K0Z. N1A through N0Z. W1A through W0Z.
Do .....	1 letter, 1 digit, 2 letters <sup>4</sup> .....	K1AA through K0ZZ. N1AA through N0ZZ. W1AA through W0ZZ.
Do .....	1 letter, 1 digit, 3 letters <sup>4</sup> .....	K1AAA through K0ZZZ. N1AAA through N0ZZZ. W1AAA through W0ZZZ.
Do .....	2 letters, 1 digit, 1 letter <sup>4</sup> .....	AA1A through AI0Z. KA1A through KZ0Z. NA1A through NZ0Z. WA1A through WZ0Z.

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Class of station	Composition of call sign	Call sign blocks
Do .....	2 letters, 1 digit, 2 letters <sup>4</sup> .....	AA1AA through AL0ZZ. KA1AA through KZ0ZZ. NA1AA through NZ0ZZ. WA1AA through WZ0ZZ.
Amateur (letter "X" may not follow digit) .....	2 letters, 1 digit, 3 letters <sup>4</sup> .....	AA1AAA through AL0ZZZ. KA1AAA through KZ0ZZZ. NA1AAA through NZ0ZZZ. WA1AAA through WZ0ZZZ.
Standard frequency .....	.....	WWV, WWVB through WWVI, WWVL, WWVS.
Personal radio .....	3 letters, 4 digits, or 4 letters, 4 digits.	KAA0001 through KZZ9999, WAA0001 through WPZ9999, KAA0001 through KZZ9999.
Personal radio, temporary permit .....	3 letters, 5 digits .....	KAA0000 through KZZ9999.
Personal radio in trust territories. ....	1 letter, 4 digits .....	K0001 through K9999.
Business radio temporary permit .....	2 letters, 7 digits .....	WT plus local telephone number.
Part 90 temporary permit .....	2 letters, 7 digits .....	WT plus local telephone number.
Part 90 conditional permit .....	2 letters, 7 digits .....	WT plus local telephone number.
General Mobile Radio Service, temporary permit.	2 letters, 7 digits .....	WT plus business or residence telephone number.

NOTE: The symbol 0 indicates the digit zero.

<sup>1</sup> Ships with transmitter-equipped survival craft shall be assigned four letter call signs.

<sup>2</sup> See § 2.303.

<sup>3</sup> A 3 letter call sign now authorized for and in continuous use by a licensee of a standard broadcasting station may continue to be used by that station. The same exception applies also to frequency modulation and television broadcasting stations using 5 letter call signs consisting of 3 letters with the suffix "FM" or "TV".

<sup>4</sup> Plus other identifying data as may be specified.

[34 FR 5104, Mar. 12, 1969; as amended at 54 50239, Dec. 5, 1989]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 2.302, see the List of CFR Sections Affected in the Finding Aids section of this volume.

§ 2.303 Other forms of identification of stations.

(a) The following table indicates forms of identification which may be used in lieu of call signs by the specified classes of stations. Such recognized means of identification may be one or more of the following: name of station, location of station, operating agency, official registration mark,

flight identification number, selective call number or signal, selective call identification number or signal, characteristic signal, characteristic of emission or other clearly distinguishing form of identification readily recognized internationally. Reference should be made to the appropriate part of the rules for complete information on identification procedures for each service.

Class of station	Identification, other than assigned call sign
Aircraft (U.S. registry) telephone .....	Registration number preceded by the type of the aircraft, or the radiotelephony designator of the aircraft operating agency followed by the flight identification number.
Aircraft (foreign registry) telephone .....	Foreign registry identification consisting of five characters. This may be preceded by the radiotelephony designator of the aircraft operating agency or it may be preceded by the type of the aircraft.
Aeronautical .....	Name of the city, area, or airdrome served together with such additional identification as may be required.
Aircraft survival craft .....	Appropriate reference to parent aircraft, e.g., the air carrier parent aircraft flight number or identification, the aircraft registration number, the name of the aircraft manufacturer, the name of the aircraft owner, or any other pertinent information.
Ship telegraph .....	When an official call sign is not yet assigned: Complete name of the ship and name of licensee. On 156.65 MHz: Name of ship. Digital selective call.
Ship telegraph .....	Digital selective call.
Public coast (radiotelephone) and Limited Coast (Radiotelephone).	The approximate geographic location in a format approved by the Commission.
Public coast (radiotelegraph) .....	Coast station identification number.
Fixed .....	Coast station identification number.
Fixed: Rural subscriber service .....	Geographic location. When an approved method of superimposed identification is used, QTT DE (abbreviated name of company or station). Assigned telephone number.