

FCC EMISSION DESIGNATORS
Detailed List
Last Rev. 1998

WARC-79, the World Administrative Radio Conference that rewrote many of the world's radio regulations, adopted a new system of emission classification. The traditional A (Amplitude), F (Frequency), and P (Pulse) was intuitive, but limited and clumsy when dealing with new modes.

The world's radio bodies, including the FCC, gradually phased in the new system until today it completely replaces the old one.

The formula for the new designations, loosely from ITU radio regulations 264 through 273, and Appendix 6, Part A, is:

[BBBB]MNI[DM], where

[] means optional when writing emission specs.

[BBBB] = Necessary Bandwidth (shown in FCC records, but is often omitted elsewhere)

Uses a letter and three numbers. The letter goes where the decimal point should be placed, and denotes a magnitude:

| | |
|---|-----|
| H | Hz |
| K | kHz |
| M | MHz |
| G | GHz |

Some common bandwidths are:

| | |
|----------|------|
| 400 Hz | 400H |
| 2.4 kHz | 2K40 |
| 12.5 kHz | 12K5 |
| 6 MHz | 6M00 |

M = Modulation Type

| | |
|---|--|
| N | None |
| A | AM (Amplitude Modulation), double sideband, full carrier |
| H | AM, single sideband, full carrier |
| R | AM, single sideband, reduced or controlled carrier |
| J | AM, single sideband, suppressed carrier |
| B | AM, independent sidebands |
| C | AM, vestigial sideband (commonly analog TV) |
| F | Angle-modulated, straight FM |
| G | Angle-modulated, phase modulation (common; sounds like FM) |
| D | Carrier is amplitude and angle modulated |
| P | Pulse, no modulation |
| K | Pulse, amplitude modulation (PAM, PSM) |
| L | Pulse, width modulation (PWM) |
| M | Pulse, phase or position modulation (PPM) |
| Q | Pulse, carrier also angle-modulated during pulse |
| W | Pulse, two or more modes used |
| X | All cases not covered above |

N = Nature of modulating signal

- 0 None
- 1 Digital, on-off or quantized, no modulation
- 2 Digital, with modulation
- 3 Single analog channel
- 7 Two or more digital channels
- 8 Two or more analog channels
- 9 Composite, one or more digital channel, one or more analog
- X All cases not covered above

I = Information type

- N None
- A Aural telegraphy, for people (Morse code)
- B Telegraphy for machine copy (RTTY, fast Morse)
- C Analog fax
- D Data, telemetry, telecommand
- E Telephony, voice, sound broadcasting
- F Video, television
- W Combinations of the above
- X All cases not covered above

[DM] = additional details, not used by FCC, optional elsewhere

D = Detail

RTTY/modems:

- A Two condition code, differing numbers or durations (Morse)
- B Two condition code, same number and duration, no error check
- C Two condition code, same num & dur, error check
- D Four condition code, 1 or more bits per condition
- E Multi condition code, 1 or more bits per condition
- F Multi condition code, conditions may combine

Audio:

- G Broadcast quality (mono)
- H Broadcast quality (stereo/multichannel)
- J Commercial quality
- K Commercial quality, analog freq inversion or band scrambling
- L Commercial quality, FM pilot tone (i.e. Lincompres)

Video:

- M Monochrome
- N Color
- W Combination
- X All cases not covered above

M = Multiplex type

- N None
- C Code division
- F Frequency division
- T Time division
- W Combination of above
- X All other types

 Converting Between Old & New Systems

| USE | OLD | NEW |
|---|------------|--------------|
| Pure carrier | A0, F0 | N0N |
| Morse telegraphy (by ear) | A1 | A1A |
| Modulated CW Morse | A2 | A2A |
| AM voice | A3 | A3E |
| SSB, suppressed carrier | A3J | J3E |
| SSB, reduced carrier | A3R | R3E |
| SSB, full carrier | A3H | H3E |
| Television | A5 | C3F |
| | | |
| RTTY (F.S.K.) | F1 | F1B |
| RTTY (A.F.S.K.) | F2 | F2B |
| FM voice (Narrowband) | F3 | F3E, 20K0F3E |
| | | |
| Packet Data/Teleprinters with Audio Sub-Carrier | 20F2 | 20K0F2B |
| | | |
| Data with Audio Sub-carrier | 3F2 | 3K00F2D |
| | 6F2 | 6K00F2D |
| | 20F2 | 20K0F2D |
| | | |
| Analog Voice | 20F3 | 20K0F3E |
| | | |
| Digital Voice | 20F3Y | 20K0F1E |
| | | |
| Digital Facsimile without Audio Sub-Carrier | 20F4 | 20K0F1C |
| | | |
| Digital Facsimile with Audio Sub-Carrier | 20F4 | 20K0F2C |
| | | |
| Analog Facsimile | 20F4 | 20K0F3C |
| | | |
| Composite of Digital & Analog Information | 3F9 | 3K00F9W |
| | 6F9 | 6K00F9W |
| | 20F9 | 20K0F9W |
| | | |
| Packet Data/Teleprinters without Audio Sub-Carrier | 20F9Y | 20K0F1B |
| | | |
| Digital Data | 20F9Y | 20K0F1D |

LAND MOBILE EMISSIONS

| old | new | old | new |
|------------|------------|------------|------------|
| A0 | N0N | P0 | P0N |
| A1 | A1A | P9 | P0N |
| A3 | A3E | A2J | J2B |
| A3J | J3E | A3H | H3E |
| A7J | J8W | A9J | J9W |
| A9 | A9W | P1 | P1D |
| A9Y | A1D | F2Y | F2D |
| F0 | N0N | A0H | H0N |
| F1 | F1B | A7 | A8D |
| F2 | F2D | F7 | F8D |
| F3 | F3E | | |
| F3Y | F1E | | |
| F4 | F3C | | |
| F9 | F9W | | |
| F9Y | F1D | | |
| A2H | H2D | | |
| A2 | A2D | | |

MICROWAVE EMISSIONS

| old | new |
|------------|---|
| F9 | F8W (If bw is less than 50 convert to F2D) |
| F9Y | F7W (If bw is less than 50 convert to F2D) |
| F3 | F3E |
| A9Y | A7W |
| A5 | A3F |
| A9 | A8W |
| A5C | C3F |
| F2 | F2D |
| F5 | F3F |

And here is the relevant section of FCC rules:

From General Docket No. 80-739

Section 2.201 Emission, modulation, and transmission characteristics.

The following system of designating emission, modulation, and transmission characteristics shall be employed.

- (a) Emissions are designated according to their classification and their necessary bandwidth.
- (b) A minimum of three symbols are used to describe the basic characteristics of radio waves. Emissions are classified and symbolized according to the following characteristics:
 - (1) First symbol - type of modulation of the main carrier;
 - (2) Second Symbol - nature of signal(s) modulating the main carrier;
 - (3) Third symbol - type of information to be transmitted.

NOTE: A fourth and fifth symbol are provided for additional information and are shown in Appendix 6, Part A of the ITU Radio Regulations. Use of the fourth and fifth symbol is optional. Therefore, the symbols may be used as described in Appendix 6, but are not required by the Commission.

(c) First Symbol - types of modulation of the main carrier:

- | | |
|--|---|
| (1) Emission of an unmodulated carrier | N |
| (2) Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle modulated): | |
| - Double-sideband | A |
| - Single-sideband, full carrier | H |
| - Single-sideband, reduced or variable level carrier | R |
| - Single-sideband, suppressed carrier | J |
| - Independent sidebands | B |
| - Vestigial sideband | C |
| (3) Emission in which the main carrier is angle-modulated: | |
| - Frequency modulation | F |
| - Phase modulation | G |
| NOTE: Whenever frequency modulation "F" is indicated, Phase modulation "G" is also acceptable. | |
| (4) Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence | D |
| (5) Emission of pulses:* | |
| - Sequence of unmodulated pulses | P |
| - A sequence of pulses: | |
| - Modulated in amplitude | K |
| - Modulated in width/duration | L |
| - Modulated in position/phase | M |
| - In which the carrier is angle-modulated during the period of the pulse | Q |
| - Which is a combination of the foregoing or is produced by other means | V |
| (6) Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, a combination of two or more of the following modes: amplitude, angle, pulse | W |
| (7) Cases not otherwise covered | X |

*Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g., pulse code modulation) should be designated under (2) or (3).

- (d) Second Symbol - nature of signal(s) modulating the main carrier:
- | | |
|--|---|
| (1) No modulating signal | 0 |
| (2) A single channel containing quantized or digital information without the use of a modulating sub-carrier, excluding time-division multiplex | 1 |
| (3) A single channel containing quantized or digital information with the use of a modulating sub-carrier, excluding time-division multiplex | 2 |
| (4) A single channel containing analogue information | 3 |
| (5) Two or more channels containing quantized or digital information | 7 |
| (6) Two or more channels containing analogue information | 8 |
| (7) Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information | 9 |
| (8) Cases not otherwise covered | X |
- (e) Third Symbol - type of information to be transmitted:
- | | |
|---|---|
| (1) No information transmitted | N |
| (2) Telegraphy - for aural reception | A |
| (3) Telegraphy - for automatic reception | B |
| (4) Facsimile | C |
| (5) Data transmission, telemetry, telecommand | D |
| (6) Telephony (including sound broadcasting) | E |
| (7) Television (video) | F |
| (8) Combination of the above | W |
| (9) Cases not otherwise covered | X |
- (f) Type B emission: As an exception to the above principles, damped waves are symbolized in the Commission's rules and regulations as type B emission. The use of type B emissions is forbidden.
- (g) Whenever the full designation of an emission is necessary, the symbol for that emission, as given above, shall be preceded by the necessary bandwidth of the emission as indicated in Section 2.202 (b) (1).

Section 2.202 Bandwidths.

(b) Necessary bandwidths.

- (1) The necessary bandwidth shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.