**2013 Second Meeting, ARRL Board of Directors**

**Report of the Ad Hoc Symbol Rate Rule Modernization Committee**

The mandate the Ad Hoc Symbol Rate Rule Modernization Committee was established at minute 38 of the 2013 Annual Meeting:

*Whereas, the symbol rate limitations found in the FCC’s rules governing the Amateur Radio Service were codified in 1989, and*

*Whereas, advances in digital communications techniques have rendered these limitations obsolete, and*

*Whereas, the continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art is a fundamental purpose of the Amateur Radio Service;*

*Now therefore be it resolved, the ARRL Board of Directors establishes an Ad Hoc Symbol Rate Rule Modernization Committee (the Committee), and*

*Be it further resolved, that the Committee shall evaluate potential modifications to the Amateur Service rules to permit and facilitate the use and development of high symbol rate digital communications techniques, and*

*Be it further resolved, that the Committee shall recommend modifications to the ARRL Board of Directors for consideration at the Board’s July 2013 meeting.*

 The Committee conducted its work via email reflector, and reached consensus to recommend removal of the symbol rate limitations contained in Section 97.307(f) of the Commission’s Rules, while maintaining authorized bandwidth limitations.

The present rules restricting symbol rates were established in 1984, and reflected the state of the art at that time. The restrictions are summarized in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| Band(s) | Maximum Symbol Rate | Authorized Bandwidth | Rule Reference |
| 160-12 meters (excluding the 60 meter channels) | 300 bauds | N/A | 97.307(f)(3) |
| 10 meters | 1200 bauds | N/A | 97.307(f)(4) |
| 50 and 144 MHz | 19.6 kilobauds | 20 kHz | 97.307(f)(5) |
| 219 MHz | N/A | 100 kHz | 97.307(f)(13) |
| 222 and 420 MHz | 56 kilobauds  | 100 kHz | 97.307(f)(6) |
| 902 MHz and above | N/A | N/A | 97.307(f)(7) |

The state of the art in digital communications has advanced since the present rules were first written. Transmission protocols are available and in use in other services in which symbol rate exceeds the present limitations of Section 97.307(f) of the Commission’s Rules, but the necessary bandwidth of the protocol is within the bandwidth of a typical HF single sideband channel (3 kHz), or the authorized bandwidths given in Section 97.307(f).

While an authorized bandwidth limitation is defensible in order to allow the equitable, efficient, and enjoyable sharing of the Amateur Radio spectrum, a symbol rate “speed limit” reflective of 1980s technology prohibits radio amateurs from utilizing state of the art technology, let alone contributing to the advancement of the radio art. In fact, the present rules for HF permit spectrum inefficiency, allowing data transmissions of unlimited bandwidth as long as the symbol rate is sufficiently slow.

Eliminating the symbol rate limitations for data emissions and substituting or retaining a maximum authorized bandwidth would permit the utilization of all HF data transmission protocols presently legal in the Amateur Radio Service, as well as state of the art protocols that fall within the authorized bandwidth. Such an approach would also standardize the criterion used to determine a permitted data transmission to be necessary bandwidth, eliminating symbol rate, and eliminating its confusion with baud rate. There is precedent for such an approach in the present Amateur Radio regulations: the 60 meter channels near 5.4 MHz have a maximum authorized bandwidth (2.8 kHz), and data may be transmitted on the channels, but there is no maximum symbol rate specified.

The Committee proposes no changes that would affect in any way the existing rules governing Morse telegraphy, phone, and image emissions. It is recommended to the Board of Directors that they seek changes to the Commission’s Rules as described in an associated motion and reflected in the attached annex, and that the Committee be dissolved.

Respectfully submitted,

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Dennis Bodson, W4PWF

David Sumner, K1ZZ

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Brennan Price, N4QX

**ANNEX**

PART 97: AMATEUR RADIO SERVICE

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Subpart D: Technical Standards

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97.305 - Authorized emission types.

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(c) A station may transmit the following emission types on the frequencies indicated, as authorized to the control operator, subject to the standards specified in § 97.307(f) of this part.

|  |  |  |  |
| --- | --- | --- | --- |
| Wavelength band | Frequencies | Emission types authorized | Standards see ? 97.307(f), paragraph: |
| MF: |  |  |  |
| 160 m | Entire band | RTTY, data | (3). |
| 160 m | Entire band | Phone, image | (1), (2). |
| HF: |  |  |  |
| 80 m | Entire band | RTTY, data | (3), (9). |
| 75 m | Entire band | Phone, image | (1), (2). |
| 40 m | 7.000-7.100 MHz | RTTY, data | (3), (9) |
| 40 m | 7.075-7.100 MHz | Phone, image | (1), (2), (9), (11) |
| 40 m | 7.100-7.125 MHz | RTTY, data | (3), (9) |
| 40 m | 7.125-7.300 MHz | Phone, image | (1), (2) |
| 30 m | Entire band | RTTY, data | (3). |
| 20 m | 14.00-14.15 MHz | RTTY, data | (3). |
| 20 m | 14.15-14.35 MHz | Phone, image | (1), (2). |
| 17 m | 18.068-18.110 MHz | RTTY, data | (3). |
| 17 m | 18.110-18.168 MHz | Phone, image | (1), (2). |
| 15 m | 21.0-21.2 MHz | RTTY, data | (3), (9). |
| 15 m | 21.20-21.45 MHz | Phone, image | (1), (2). |
| 12 m | 24.89-24.93 MHz | RTTY, data | (3). |
| 12 m | 24.93-24.99 MHz | Phone, image | (1), (2). |
| 10 m | 28.0-28.3 MHz | RTTY, data | (3). |
| 10 m | 28.3-28.5 MHz | Phone, image | (1), (2), (10). |
| 10 m | 28.5-29.0 MHz | Phone, image | (1), (2). |
| 10 m | 29.0-29.7 MHz | Phone, image | (2). |
| VHF: |  |  |  |
| 6 m | 50.1-51.0 MHz | MCW, phone, image, RTTY, data | (2), (5). |
| Do | 51.0-54.0 MHz | MCW, phone, image, RTTY, data, test | (2), (5), (8). |
| 2 m | 144.1-148.0 MHz | MCW, phone, image, RTTY, data, test | (2), (5), (8). |
| 1.25 m | 219-220 MHz | Data | (13) |
| Do | 222-225 MHz | RTTY, data, test MCW, phone, SS, image | (2), (6), (8) |
| UHF: |  |  |  |
| 70 cm | Entire band | MCW, phone, image, RTTY, data, SS, test | (6), (8). |
| 33 cm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 23 cm | Entire band | MCW, phone, image, RTTY, data, SS, test | (7), (8), and (12). |
| 13 cm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| SHF: |  |  |  |
| 9 cm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 5 cm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 3 cm | Entire band | MCW, phone, image, RTTY, data, SS, test | (7), (8), and (12). |
| 1.2 cm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| EHF: |  |  |  |
| 6 mm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 4 mm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 2.5 mm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 2 mm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
| 1mm | Entire band | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |
|  | Above 275 GHz | MCW, phone, image, RTTY, data, SS, test, pulse | (7), (8), and (12). |

\* \* \*

97.307 - Emission standards.

\* \* \*
(f) The following standards and limitations apply to transmissions on the frequencies specified in § 97.305(c) of this part.

\* \* \*

(3) A RTTY or data emission using a specified digital code listed in § 97.309(a) of this part may be transmitted. A RTTY, data or multiplexed emission using an unspecified digital code under the limitations listed in § 97.309(b) of this part also may be transmitted. The authorized bandwidth is 2.8 kHz.

(4) - [Reserved.]

(5) A RTTY, data or multiplexed emission using a specified digital code listed in § 97.309(a) of this part may be transmitted. A RTTY, data or multiplexed emission using an unspecified digital code under the limitations listed in § 97.309(b) of this part also may be transmitted. The authorized bandwidth is 20 kHz.

(6) A RTTY, data or multiplexed emission using a specified digital code listed in § 97.309(a) of this part may be transmitted. A RTTY, data or multiplexed emission using an unspecified digital code under the limitations listed in § 97.309(b) of this part also may be transmitted. The authorized bandwidth is 100 kHz.

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