

Results: 2002 W1AW Frequency Measuring Test – November 6, 2002

Introduction.

With today's digital radios, it is easy to be complacent about frequency. In the days of sliderule dials, hams had to be ever vigilant. Calibrations against W1AW or other Official Transmitting Stations were the rule. High-stability master oscillators and 10 Hz resolution make knowing one's frequency a lot easier, but the requirements to operate within license privileges are as strong as ever. To that end, the ARRL is sponsoring a series of measuring tests, beginning with frequency. These tests will exercise the capabilities of hams to measure important operating parameters, improve their understanding of complex radios and give them a better mental picture of their transmitted signals. The goal is a more technically aware amateur confident of compliance with FCC regulations.—H. Ward Silver, N0AX.

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On November 6, 2002 at 9:45 PM EST, W1AW sent a series of tones (and Morse Code) on four (4) amateur bands. The event, while publicized, did not give out the exact frequencies on which W1AW was transmitting; rather close approximations. The purpose of this "test" was for amateurs to measure as close as possible the transmitted frequencies.

One of the goals was not only to exercise the capabilities of amateurs to properly measure frequency, but also to measure (if you will) their understanding of the characteristics of a signal. (For more information on this, please see *The ARRL Frequency Measuring Tests*, October 2002 *QST*, pp. 51-54, or off the ARRL web page at, <http://www.arrl.org/w1aw/fmt/0210051.pdf>.)

How were the transmissions performed?

For the test, W1AW used four (4) Harris RF-3200 exciters and Harris RF-3230 power amplifiers. Each amplifier was running approximately 1kW. The exciters were keyed simultaneously using the standard W1AW bulletin/code practice program and keyer matrixes. The frequencies were measured using an Optoelectronics 8010 Frequency Counter, with a 10 MHz signal reference supplied by a Hewlett Packard Z3801 GPS/Frequency Standard. The test consisted of 20-second key-down transmissions, followed by a series of dits, followed by station identification.

The frequencies on which W1AW was transmitting were as follows:

80 meters:	3579335.2 Hz
40 meters:	7046882.3 Hz
20 meters:	14049083.8 Hz
15 meters:	21069674.5 Hz

Band/Call Area Breakdown.

There were 137 participants in the 2002 FMT. This included one station from Europe, a few from Canada and even one from Hawaii (**CHART A**). The highest number of participants came from the 4th Call Area.

Interestingly enough, the highest number of submissions came from California, with Ohio and Virginia coming in at a close second and third, respectively (**CHART B**).

There were quite a number of 40-meter submissions as compared with the other bands (**CHART C**). It's worth noting, however, that only ten (**10**) amateurs in all copied the FMT transmissions on all four bands.

Error Rates.

The Error Rates in ppm ranged anywhere from +235.3 to -317.02 ppm (on no particular band). Error rates were fairly consistent with many individuals. For example, an amateur copies us on three bands. If the measuring procedures were accurate, then the error rates for each band were very close. There were only a few amateurs that copied us well on one band, but missed the mark on another.

There were also a few extremes, however. Some amateurs measured our signals only to the hundred hertz point. For example, one measurement came in at 7047000 Hz. This led to a difference of -117.7 Hz. There may be a number of reasons why this occurred (such as display resolution); however, this is up to the individual to determine the cause.

Breakdown By Band.

Since there were a number of amateurs who copied us on more than one band, the callsign listings are based on each band. The bands are also broken down by error rates. The first sets of calls are of those amateurs with error rates of +/- 1 ppm. The next is +/- 5 ppm, and lastly, +/- 30 ppm. Therefore, you may see callsigns listed multiple times:

80 Meters (+/- 1 ppm)

AD5T, G4JNT, K3KQ, K4VA, K8DJT, K8ZEC, K9PS, KA8BDD, KB8TQ, KD1VV, KG4QWC, KLØS/4, N2AMC, N4MW, N6NKO, N8OB, N8UR, NØNB, VE2FAB, VE2IQ, VE3OAT, W1TAG, W2KI, W3CSW, W3JW, W3SZ, W4JCK, W4NTO, W4QA, W4UK, W8AC, W8EH, WA1RAJ, WA2DVU, WA2IKL, WA3MAE, WA5LUY, WA9ZZZ, WØSS

80 Meters (+/- 5 ppm)

AD5T, AF8A, G4JNT, K3KQ, K4VA, K8DJT, K8KK, K8ZEC, K9PS, KA4VCA, KA8BDD, KB1HBC, KB8TQ, KD1VV, KG4QWC, KLØS/4, N1YLE, N2AMC, N3CRP, N3SNU, N3ZOC, N4DKE, N4MW, N6NKO, N8OB, N8UR, NE2T, NØNB, VE2FAB, VE2IQ, VE3OAT, W1BYH, W1TAG, W2DSX, W2KI, W2VMX, W2ZK, W3CSW, W3FAY, W3JW, W3PR, W3SZ, W3ULS, W4JCK, W4NTO, W4QA, W4UK, W8AC, W8EH, WA1RAJ, WA2DVU, WA2IKL, WA3MAE, WA5LUY, WA9ZZZ, WE9T, WJ2F, WØHBK, WØSS

80 meters (+/- 30 ppm):

AB1AV, AD5T, AF8A, G4JNT, K3KQ, K4UD, K4VA, K8DJT, K8KK, K8ZEC, K9PS, KA4VCA, KA8BDD, KA8FUP, KB1HBC, KB8TQ, KC9AMM, KD1VV, KG4QWC, KLØS/4, N1YLE, N2AMC, N3CRP, N3SNU, N3ZOC, N4DKE, N4MW, N4ONT, N5OHL, N6NKO, N8OB, N8UR, NE2T, NØNB, VE2FAB, VE2IQ, VE2OWL, VE3OAT, W1BYH, W1TAG, W2DSX, W2KI, W2VMX, W2ZK, W3CSW, W3FAY, W3JW, W3PR, W3SZ, W3ULS, W4JCK,

W4NTO, W4QA, W4UK, W8AC, W8EH, WA1RAJ, WA2DVU, WA2IKL, WA3MAE, WA4PKL, WA5LUY, WA9ZZZ, WB4ARK, WB5SYT, WE9T, WJ2F, WØHBK, WØSS

40 Meters (+/- 1 ppm)

AC6AO, AD5T, AE5B, AF8A, AF9A, G4JNT, K3KQ, K4VA, K4YCR, K5DL, K6OQK, K7ITM, K8DJT, K8ZEC, K9PS, KA5QEP, KA8BDD, KB8TQ, KD1VV, KIØLS, KLØS/4, KM5I, N3CRP, N4MW, N5DZ, N5EG, N6NKO, N6TP, N8UR, NC7V, NE2T, NØNB, VE2IQ, VE3OAT, W1TAG, W2KI, W2ZK, W3CSW, W3JW, W3SZ, W3ULS, W4JCK, W4NTO, W4QA, W4UK, W6BCZ, W6QI, W7ISD, W7SC, W7TVI, W8EH, W9GOC, WA2IKL, WA5LUY, WA7MXZ, WB6VRN, WW6D, WØPHD, WØSS

40 Meters (+/- 5 ppm)

AC6AO, AD5T, AE5B, AF8A, AF9A, AJ3J, G4JNT, K3KQ, K4JI, K4UD, K4VA, K4YCR, K5DL, K5ZTY, K6OQK, K7ITM, K8DJT, K8ZEC, K9PS, KA5QAH, KA5QEP, KA8BDD, KB3CXD, KB5DPE, KB8TQ, KC9AMM, KD1VV, KF6B, KG4QWC, KIØLS, KLØS/4, KM2R, KM5I, KW5I, KØVXM, N1YLE, N3CRP, N3ZOC, N4MW, N5DZ, N5EG, N6NKO, N6TP, N8UR, N9SR, NC7V, NE2T, NØNB, VE2IQ, VE3OAT, W1TAG, W2DSX, W2KI, W2VMX, W2ZK, W3CSW, W3JW, W3PR, W3SZ, W3ULS, W4JCK, W4NTO, W4QA, W4UK, W4WJ, W6BCZ, W6LSN, W6QI, W6TPQ, W7ISD, W7SC, W7TVI, W8EH, W9GOC, WA2IKL, WA3YGQ, WA5LUY, WA7MXZ, WA8ERA, WB4ARK, WB4HUX, WB5SYT, WB6VRN, WBØRPA, WJ2F, WW6D, WØHBK, WØPHD, WØSS

40 meters (+/- 30 ppm):

AA3ML, AA5G, AC6AO, AD5T, AE5B, AF4VZ, AF8A, AF9A, AJ3J, G4JNT, K3KQ, K4JI, K4UD, K4VA, K4YCR, K5DL, K5ZTY, K6OQK, K7ITM, K8DJT, K8ZEC, K9PS, KA5QAH, KA5QEP, KA8BDD, KB1HBC, KB3CXD, KB5DPE, KB8TQ, KC6ETU, KC7KPG, KC9AMM, KD1VV, KD6HXQ, KF6B, KG4QWC, KH7T, KIØLS, KLØS/4, KM2R, KM5I, KW5I, KØVXM, N1YLE, N1ZRG, N3CRP, N3EO, N3SNU, N3ZOC, N4MW, N4ONT, N5DZ, N5EG, N6NKO, N6TP, N8UR, N9SR, NC7V, NE2T, NØNB, VE2IQ, VE2OWL, VE3OAT, W1TAG, W2DSX, W2KI, W2VMX, W2ZK, W3CSW, W3FAY, W3JW, W3PR, W3SZ, W3ULS, W4JCK, W4NTO, W4QA, W4UK, W4WJ, W6BCZ, W6LSN, W6QI, W6TPQ, W7ISD, W7SC, W7TVI, W8EH, W9GOC, WA2IKL, WA3YGQ, WA5LUY, WA7MXZ, WA8DHP, WA8ERA, WB4ARK, WB4HUX, WB4QKQ, WB5SYT, WB6VRN, WBØRPA, WJ2F, WW6D, WØHBK, WØHXL, WØPHD, WØSS

20 Meters (+/- 1 ppm)

AA5G, AC6AO, AE5B, AF9A, K3KQ, K5DL, K5ZTY, K6OQK, K7ITM, K8ZEC, KB8TQ, KM5I, N4MW, N5EG, N6TP, N8OB, N8UR, N9SR, NE2T, NØNB, VE3OAT, W1TAG, W2KI, W3CSW, W3JW, W3ULS, W4UK, W4WJ, W6BCZ, W6LSN, W6QI, W7HB, WA2IKL, WB6VRN, WW6D, WØPHD, WØSS

20 Meters (+/- 5 ppm)

AA5G, AC6AO, AE5B, AF9A, K3KQ, K4JI, K5DL, K5ZTY, K6OQK, K7ITM, K8DJT, K8ZEC, KB5DPE, KB8TQ, KC6ETU, KF6B, KM2R, KM5I, KW5I, N1YLE, N3ZOC, N4MW, N5EG, N6TP, N8OB, N8UR, N9SR, NE2T, NØNB, VE3OAT, W1TAG, W2DSX, W2KI, W2VMX, W3CSW, W3JW, W3ULS, W4UK, W4WJ, W6BCZ, W6LSN, W6QI, W7HB, WA2IKL, WA7MXZ, WA8ERA, WB5SYT, WB6FLY, WB6VRN, WJ2F, WW6D, WØPHD, WØSS

20 meters (+/- 30 ppm):

AA3ML, AA5G, AC6AO, AE5B, AF9A, K3KQ, K4JI, K5DL, K5ZTY, K6OQK, K7ITM, K8DJT, K8ZEC, KB5DPE, KB8TQ, KC6ETU, KF6B, KM2R, KM5I, KW5I, N1YLE, N1ZRG, N3SNU, N3ZOC, N4MW, N5EG, N5OHL, N6TP, N8OB, N8UR, N9SR, NE2T, NØNB, VE3OAT, W1TAG, W2DSX, W2KI, W2VMX, W3CSW, W3JW, W3ULS, W4UK, W4WJ, W6BCZ, W6LSN, W6QI, W6TPQ, W7HB, WA2IKL, WA7MXZ, WA8ERA, WB5SYT, WB6FLY, WB6VRN, WJ2F, WW6D, WØPHD, WØSS

15 Meters (+/- 1 ppm)

KB8TQ, W1TAG, WA2IKL

15 Meters (+/- 5 ppm)

KB8TQ, N1YLE, W1TAG, W2DSX, W2KI, WA2IKL

15 meters (+/- 30 ppm):

K4UD, KB8TQ, N1YLE, W1TAG, W2DSX, W2KI, WA2IKL

What does the future hold for another Frequency Measuring Test?

A number of amateurs noted that they enjoyed the test. They look forward to additional tests, not only so they can maintain their “measuring skills,” but also because it was an enjoyable event. Judging by some of the comments made with submissions, participation was based a bit more on the fun involved, rather than merely being a technical exercise. So although there were not hundreds of participants to the 2002 FMT, there was enough activity to prompt future FMTs.

They may not always be merely frequency measuring tests, per se. The next one may be a “tone test.” In other words, amateurs will need to measure a tone frequency, such as that used for a radio-teletype signal.

Another FMT is scheduled for 2003. Details will appear in an upcoming issue of *QST* magazine, and also on the W1AW FMT web page.

Chart A

2002 FMT by Call Area

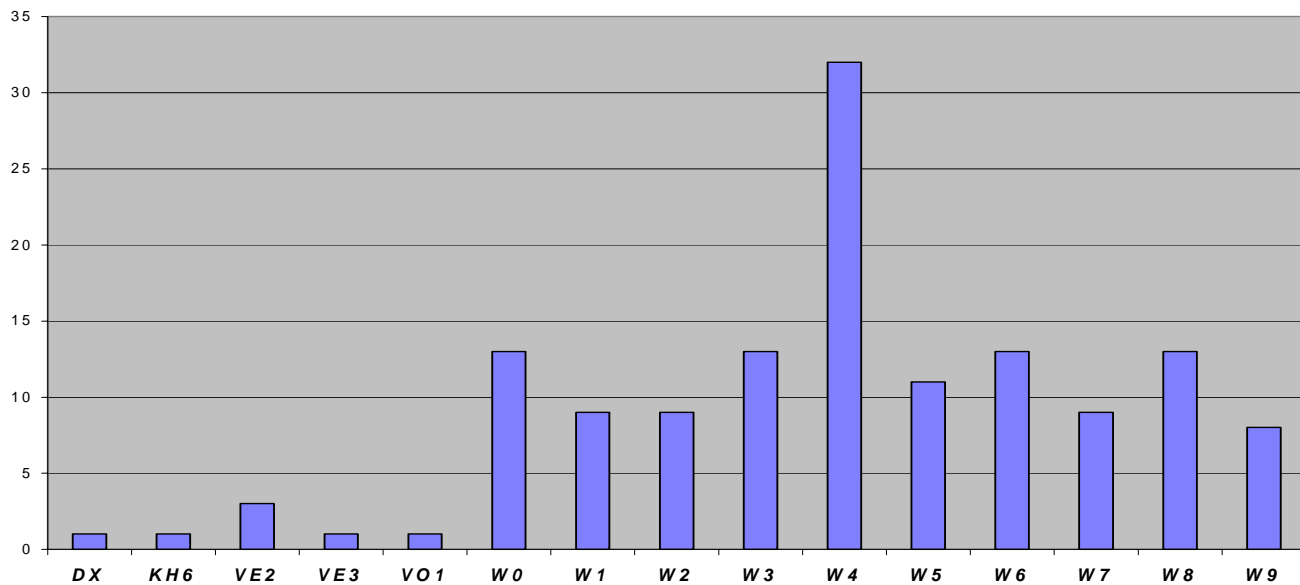


Chart B

2002 FMT by State

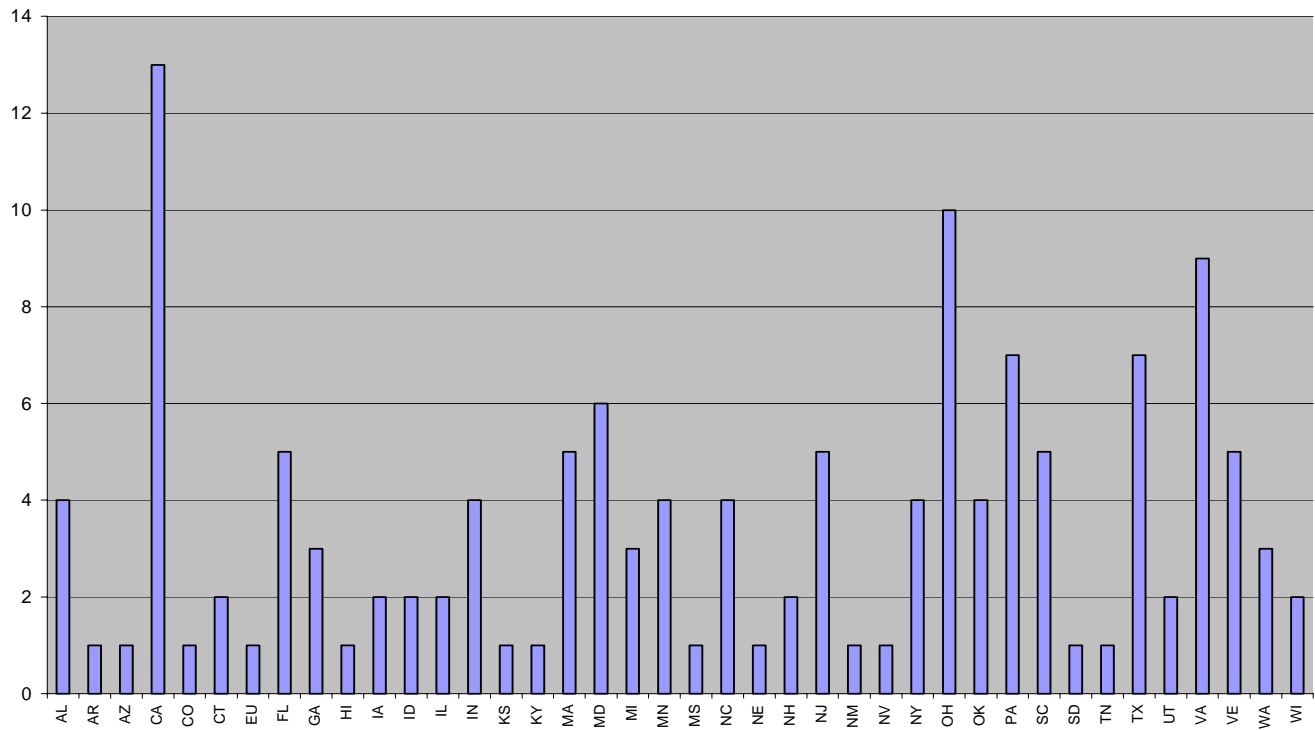


Chart C

2002 FMT by Band

