

E.F. Johnson Company

Waseca, Minnesota 56093

Amendment

|                               |                                                                                                           |
|-------------------------------|-----------------------------------------------------------------------------------------------------------|
| FCC Identifier                | ATH2422004-1                                                                                              |
| Trade Name:                   | 2004 Repeater/Base Station                                                                                |
| Model Number:                 | 242-2044-133                                                                                              |
| Manufacturer:                 | E.F. Johnson Co.                                                                                          |
| FCC Rules:                    | FCC Part 90                                                                                               |
| Emission Designator:          | 8K10F1E                                                                                                   |
| Date:                         | February 1, 2002                                                                                          |
| Report Prepared and Approved: | John Oblak, Chief Engineer, E.F. Johnson Co.<br><br>Babar Baig, Electrical Engineer III, E.F. Johnson Co. |

## Qualifications of Engineering Personnel

Name: John S. Oblak

Title: Chief Engineer

Technical Education: BS, Electrical Engineering, University of Pittsburgh, April, 1973.  
MS, Electrical Engineering, University of Pittsburgh, April, 1978.

Technical Experience: Eleven years in the development and technical management of land mobile radio products, RCA Land Mobile Radio, Meadow Lands, PA.

Seventeen years in the development and technical management of land mobile radio products, E.F. Johnson Co., Waseca, MN.

Name: Babar Baig

Title: Electrical Engineer III

Technical Education: BS, Electrical Engineering, Bradley University, May, 1996.

Technical Experience: Two years in RF development engineering, Glenayre, Quincy, IL.

Three years in RF development engineering, E.F. Johnson Co. Waseca, MN.

## General Information

## Transmitter:

This report is an amendment to certification report ATH2422004-1, granted August 6, 1999. The original report showed compliance with FCC regulations for emission designators 16K0F3E and 11K0F3E.

The intent of this report is to show compliance for emission designator 8K10F1E. This modulation is generated by a DSP and applied to the input of the FM modulator. No changes have been made to the transmitter frequency determining and stabilization circuitry, the modulator stage, or transmitter RF circuitry. In addition, power and field strength ratings remain unchanged. Since the modulation involves bypassing the audio filtering, test results are submitted to demonstrate performance of the unit using this modulation source under the provisions of rule 90.210(d). The test data shows compliance with the requirements for occupied bandwidth as stated in section 90.210(d).

The data rate for the digital modulation is 9600 bits per second. The data efficiency is 9600 bps per 12.5 kHz channels.

This report gives additional data to show that the requested change is within the guidelines for Part 90 services. All other information, test data, and test procedures of the original report remain in effect, unless amended by this report. Please refer to the original report for schematics, photographs, and FCC label details.

Name of Test: Occupied Bandwidth

Rule part No.: 47 CFR 2.1049(h)

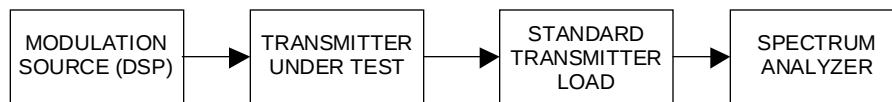
Minimum Standard: 90.210(d):  
 $f_0$  to  $f_0 \pm 5.625$  kHz 0 dB  
 $f_0 \pm 5.625$  to  $f_0 \pm 12.5$  kHz  $7.27(f_d - 2.88 \text{ kHz}) \text{ dB}$   
 $f_0 \pm 12.5$  to test bandwidth  $50 + 10 \log(P)$  or 70 dB

Test Results: Meets minimum standards of 90.210(d). See test results on following pages.

Test Equipment: Spectrum Analyzer, Hewlett Packard 8560E  
Attenuator, Bird 8322

Test Procedure: per TIA/EIA-102.CAAA

Test Setup:



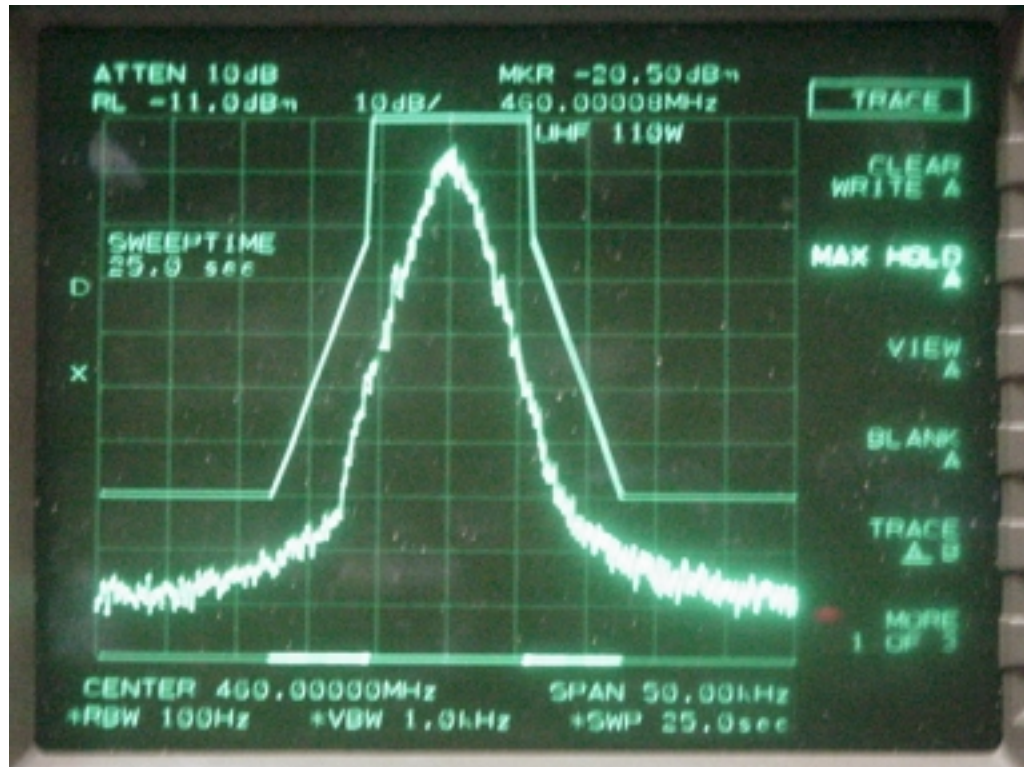
## Test Results:

Power: 110 Watts

Frequency: 460.0000 MHz

Modulation: 9.6 kbps, Pseudorandom pattern

Emission Designator: 8K10F1E



## Test Results:

Power: 25 Watts

Frequency: 460.0000 MHz

Modulation: 9.6 kbps, Pseudorandom pattern

Emission Designator: 8K10F1E

