<table>
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<td>FREQUENCY REQUIREMENTS</td>
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<tr>
<td>TARGET STARTING DATE</td>
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<tr>
<td>EXTENT OF USE</td>
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<tr>
<td>GEOGRAPHICAL AREA</td>
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<td>NUMBER OF UNITS</td>
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<tr>
<td>OTHER J/F 12 APPLICATION NUMBER(S) TO BE</td>
<td></td>
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<tr>
<td>NAMES AND TELEPHONE NUMBERS</td>
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<td>REMARKS</td>
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**DOD GENERAL INFORMATION**

**APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION**

**CLASSIFICATION**

**UNCLASSIFIED**

**DATE**

**FORM APPROVED OMB No. 0704-0188**

**Page 1 of Pages**

**DD Form 1494, AUG 96**
## TRANSMITTER EQUIPMENT CHARACTERISTICS

1. **NOMENCLATURE, MANUFACTURER’S MODEL NO.**
   - MHX320 (310 to 390 MHz model)

2. **MANUFACTURER’S NAME**
   - Microhard Systems Inc.

3. **TRANSMITTER INSTALLATION**

4. **TRANSMITTER TYPE**
   - FM

5. **TUNING RANGE**
   - 310 – 390 MHz

6. **METHOD OF TUNING**
   - Synthesis PLL

7. **RF CHANNELING CAPABILITY**
   - 310 – 390 MHz with <50 Hertz increments

8. **EMISSION DESIGNATOR(S)**
   - FM Modulated
   - 280kF1D

9. **FREQUENCY TOLERANCE**
   - 1.5 PPM

10. **FILTER EMPLOYED (X one)**
    - a. YES
    - b. NO

11. **SPREAD SPECTRUM (X one)**
    - a. YES
    - b. NO

12. **EMISSION BANDWIDTH (X and complete as applicable)**
    - □ CALCULATED
    - □ MEASURED

13. **MAXIMUM BIT RATE**
    - a. -3 dB: 95 kHz
    - b. -20 dB: 280 kHz
    - c. -40 dB: 750 kHz
    - d. -60 dB: 1400 kHz
    - e. OC-BW: 300 kHz

14. **MODULATION TECHNIQUES AND CODING**
    - CPFSK

15. **MAXIMUM MODULATION FREQUENCY**
    - 116 kHz

16. **PRE-EMPHASIS (X one)**
    - □ a. YES
    - □ b. NO

17. **DEVIACTION RATIO**
    - 1.25

18. **PULSE CHARACTERISTICS**
    - N/A (frequency modulated)

19. **POWER**
    - a. MEAN: up to 1 Watt
    - b. PEP: up to 1 Watt

20. **OUTPUT DEVICE**
    - Transistor

21. **SPURIOUS LEVEL**
    - a. 2nd: -60 dBc
    - b. 3rd: -70 dBc

22. **FCC TYPE ACCEPTANCE NO.**
    - N/A
    - □ a. OTHER

24. **REMARKS**

Microhard Systems Inc.

#17, 2135 – 32nd Avenue NE
Calgary, AB, Canada
T2E 6Z3
Phone: (403) 248-0028
Fax: (403) 248-2762
Attn: Hany Shenouda

This radio can be used in a fixed frequency mode or a frequency hopping mode where 50 frequency can be program into the radio in less than 50 Hertz resolution between 310 to 390 MHz.
## RECEIVER EQUIPMENT CHARACTERISTICS

1. **NOMENCLATURE, MANUFACTURER'S MODEL NO.**
   MHX320 (310 to 390 MHz model)

2. **MANUFACTURER'S NAME**
   Microhard Systems Inc.

3. **RECEIVER INSTALLATION**

4. **RECEIVER TYPE**
   Dual Conversion Superheterodyne

5. **TUNING RANGE**
   310 – 390 MHz

6. **METHOD OF TUNING**
   Synthesis PLL

7. **RF CHANNELING CAPABILITY**
   310 – 390 MHz w/ <50 Hertz increments

8. **EMISSION DESIGNATOR(S)**
   FM Modulated

9. **FREQUENCY TOLERANCE**
   1.5 PPM

10. **IF SELECTIVITY**
    | 1st | 2nd | 3rd |
    |-----|-----|-----|
    | a.  | -3 dB | 450 kHz | 280 kHz |
    | b.  | -20 dB | 590 kHz | 650 kHz |
    | c.  | -60 dB | 800 kHz | 1.25 MHz |

11. **RF SELECTIVITY (X and complete as applicable)**
    | CALCULATED | X | MEASURED |
    |------------|---|---------|
    | a. -3 dB | 100MHz | |
    | b. -20 dB | 150 MHz | |
    | c. -60 dB | 280 MHz | |

12. **IF FREQUENCY**
    | 1st | 2nd | 3rd |
    |-----|-----|-----|
    | a. | 243.95MHz | |
    | b. | 10.7MHz (Fast Rx) | |
    | c. | 16.0MHz (Fast Rx) | |

13. **MAXIMUM POST DETECTION FREQUENCY**
    120 kHz

14. **MINIMUM POST DETECTION FREQUENCY**
    N/A

15. **OSCILLATOR TUNED**
    | 1st | 2nd | 3rd |
    |-----|-----|-----|
    | a. | ABOVE TUNED FREQUENCY | X | X |
    | b. | BELOW TUNED FREQUENCY | |
    | c. | EITHER ABOVE OR BELOW THE FREQUENCY | |

16. **SENSITIVITY**
    | a. SENSITIVITY | 105 dBm (230.4kbps) |
    | b. CRITERIA | 10^{-4} BER S/N = 12dB Typical |
    | c. NOISE FIG | < 3 dB |

17. **DE-EMPHASIS (X one)**
    | X | a. YES | b. NO |

18. **IMAGE REJECTION**
    - 60 dBC

19. **SPURIOUS REJECTION**
    > 60 dBC

20. **REMARKS**

Microhard Systems Inc.
#110 1144-29th Avenue NE
Calgary, AB, Canada
T2E 7P1
Phone: (403) 248-0028
Fax: (403) 248-2762
Attn: Hany Shenouda

Item 11. RF selectivity for the front end of the Receiver Only. This radio can be used in a fixed frequency mode or a frequency hopping mode where 50 frequency can be program into the radio in less than 50 Hertz resolution between 310 to 390 MHz.
## Antenna Equipment Characteristics

### 1. Classification
- [ ] a. Transmitting
- [ ] b. Receiving
- [ ] c. Transmitting and Receiving

### 2. Nomenclature, Manufacturer's Model No.

### 3. Manufacturer's Name

### 4. Frequency Range

### 5. Type

### 6. Polarization

### 7. Scan Characteristics
- a. Type

### 8. Gain
- a. Main Beam
  - (1) Max Elev
- b. 1st Major Side Lobe
  - (2) Min Elev
  - (3) Scan Rate

### 9. Beamwidth
- a. Horizontal
  - (1) Sector Scanned
- b. Vertical
  - (2) Scan Rate
- c. Horizontal Scan
- d. Sector Blank (X one)
  - [ ] (1) Yes
  - [ ] (2) No

### 10. Remarks
This entire system is configured to operate within warehouse buildings. Some internal antennae may be necessary to allow uninterrupted communication between the bar code scanners and the base station within the building. The base station transceiver will be networked to directly to the server. Data will be transferred via RF between bar code scanners and the base station. The server will also be networked to other Family Housing terminals.
**APPLICATION FOR SPECTRUM REVIEW**

**NTIA GENERAL INFORMATION**

1. **APPLICATION TITLE**

2. **SYSTEM NOMENCLATURE**

3. **STAGE OF ALLOCATION (X one)**
   - a. STAGE 1 CONCEPTUAL
   - b. STAGE 2 EXPERIMENTAL
   - c. STAGE 3 DEVELOPMENTAL
   - d. STAGE 4 OPERATIONAL

4. **FREQUENCY REQUIREMENTS**
   - a. FREQUENCY(IES)
   - b. EMISSION DESIGNATOR(S)

5. **PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) (X one)**
   - a. YES
   - b. NO

6. **INFORMATION TRANSFER REQUIREMENTS**

7. **ESTIMATED INITIAL COST OF THE SYSTEM**

8. **TARGET DATE FOR**
   - a. APPLICATION APPROVAL
   - b. SYSTEM ACTIVATION
   - c. SYSTEM TERMINATION

9. **SYSTEM RELATIONSHIP AND ESSENTIALITY**

10. **REPLACEMENT INFORMATION**

11. **RELATED ANALYSIS AND/OR TEST DATA**

12. **NUMBER OF MOBILE UNITS**

13. **GEOGRAPHICAL AREA FOR**
   - a. STAGE 2
   - b. STAGE 3
   - c. STAGE 4

14. **LINE DIAGRAM**
    See page(s)

15. **SPACE SYSTEMS**
    See page(s)

16. **TYPE OF SERVICE(S) FOR STAGE 4**

17. **STATION CLASS(ES) FOR STAGE 4**

18. **REMARKS**

**DOWNGRADING INSTRUCTIONS**

N/A

**CLASSIFICATION**

UNCLASSIFIED

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**Downgrading Instructions**

N/A