### TRANSMITTER EQUIPMENT CHARACTERISTICS

1. **NOMENCLATURE, MANUFACTURER’S MODEL NO.**
   - n1320F (Serial Version)
   - IPn1320F (Ethernet / USB Version)

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

3. **TRANSMITTER INSTALLATION**
   

4. **TRANSMITTER TYPE**
   - FM

5. **TUNING RANGE**
   - 1350 to 1390 MHz

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

7. **RF CHANNELING CAPABILITY**
   - 1350 to 1390 MHz w/ <100 Hertz increments

8. **EMISSION DESIGNATOR(S)**
   - FM Modulated
     - 280kF1D @ 230kbps
     - 480kF1D @ 345kbps

9. **FREQUENCY TOLERANCE**
   - 2 PPM

10. **FILTER EMPLOYED**
    - Yes

11. **SPREAD SPECTRUM**
    - Yes

12. **EMISSION BANDWIDTH**
    - Calculated
      - a. -3 dB 150 kHz (230kbps) 225kHz (345kbps)
      - b. -20 dB 280 kHz (230kbps) 375kHz (345kbps)
      - c. -40 dB 540 kHz (230kbps) 775kHz (345kbps)
      - d. -60 dB 1100 kHz (230kbps) 1.25MHz (345kbps)
      - e. OC-BW 290 kHz (230kbps) 485kHz (345kbps)

13. **MAXIMUM BIT RATE**
    - 230.4 kbps / 345 kbps
    - NT (option)

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

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

16. **PRE-EMPHASIS**
    - Yes

17. **DEVIAION RATIO**
    - 0.5 to 1

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

19. **POWER**
    - a. MEAN up to 1 Watt (optional higher power available 2W)
    - b. PEP up to 1Watt

20. **OUTPUT DEVICE**
    - HBT

21. **HARMONIC LEVEL**
    - a. 2nd -60 dB
    - b. 3rd -54 dBc

22. **SPURIOUS LEVEL**
    - -60 dBc

23. **FCC TYPE ACCEPTANCE NO.**
    - N/A

24. **REMARKS**
    - BOX 19. 2W order Option available for Government Users “-2W”

**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 100 Hertz resolution between 1350 to 1390 MHz
RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER’S MODEL NO. 
   N1320F (Serial Version)  IPn1320F (Ethernet / USB Version)

2. MANUFACTURER’S NAME 
   Microhard Systems Inc.

3. RECEIVER INSTALLATION

4. RECEIVER TYPE 
   Dual Conversion Superheterodyne

5. TUNING RANGE 
   1350 to 1390 MHz

6. METHOD OF TUNING 
   Synthesis PLL

7. RF CHANNELING CAPABILITY 
   1350 to 1390 MHz w/ <100 Hertz increments

8. EMISSION DESIGNATOR(S) 
   FM Modulated

9. FREQUENCY TOLERANCE 
   2 PPM

10. IF SELECTIVITY 
    | 1st | 2nd | 3rd |
    |------|------|------|
    | a. -3 dB | 450 kHz | 280kHz / 500kHz |
    | b. -20 dB | 650 kHz | 740 kHz / 850 kHz |
    | c. -60 dB | 1.3MHz | 1600 kHz / 2000 kHz |

11. RF SELECTIVITY (X and complete as applicable) 
    | CALCULATED | X MEASURED |
    | a. -3 dB | 55MHz |
    | b. -20 dB | 75 MHz |
    | c. -60 dB | 150 MHz |

12. IF FREQUENCY 
    | 1st | 2nd | 3rd |
    |------|------|------|
    | a. 1st | 243.95MHz |
    | b. 2nd | 10.7MHz |
    | c. 3rd | |

13. MAXIMUM POST DETECTION FREQUENCY 
    120kHz @ 230.4kbps  175 kHz @ 345kbps

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. MAXIMUM BIT RATE 
    230.4 kbps

17. SENSITIVITY 
    a. SENSITIVITY -108 dBm
    b. CRITERIA 10^-4 BER
    c. NOISE FIG »»»» 3 dB

18. DE-EMPHASIS (X one) 
    a. YES X b. NO

19. IMAGE REJECTION 
    - 60 dBc

20. SPURIOUS REJECTION 
    > 60 dBc

21. REMARKS
    Item 10. IF Selectivity (230.4kbps / 345kbps)

DD Form 1494, AUG 96
# ANTENNA EQUIPMENT CHARACTERISTICS

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