

UNCLASSIFIED

J/F 12/09312/2

SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

The title of this application is: Microhard Systems, Inc. Model MHX320 and MHX420
Transceiver

The overall classification of this application is: **UNCLASSIFIED**

The following Special Handling summary lists the applicable markings for the printed page(s).
It is your responsibility to place all Special Handling markings on the cover page of the application.

If an Entire Application was printed, the following Special Handling summary lists the applicable markings for the Entire Application.

If an Individual Page (TX, RX, ANT, etc.) was printed, the following Special Handling summary lists the applicable markings for the printed page. It is your responsibility to make certain that any Special Handling markings that are unique to the Individual Page are also reflected on the cover of the Entire Application.

If the "I" code is shown below, the "SEE REMARKS" refers to the REMARKS block on the applicable page.

Refer to your Security Manual for further guidance.

No Application Level Special Handling
No Page Level Special Handling

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All Application Level Special Handling markings (if any) will appear at the top of the Special Handling list for each individual page type. Field Level markings will follow. It is your responsibility to mark the individual pages of this application in accordance with the procedures in your Security Manual. The following summaries are provided for that purpose.

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APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION UNCLASSIFIED	DATE 08-07-2007	J/F 12/09312/2
			Page 1 of 9 Pages

DOD GENERAL INFORMATION

TO	AF Frequency Management Agency.DON 2461 Eisenhower Ave., Suite 1203 Alexandria, VA 22331-1500	FROM	96CG/SCWF (AAC 0632L) 201 W Eglin Blvd, Ste 206 Eglin AFB FL 32542-6849
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1. APPLICATION TITLE	(U)	Microhard Systems, Inc. Model MHX320 and MHX420 Transceiver
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2. SYSTEM NOMENCLATURE	(U)	Microhard Systems, Inc. Model MHX320 and MHX420 Advanced Concept Technology Demonstration (ACTD)
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3. STAGE OF ALLOCATION	(U)	☐ a. STAGE 1 CONCEPTUAL	☐ b. STAGE 2 EXPERIMENTAL	☐ c. STAGE 3 DEVELOPMENTAL	☒ d. STAGE 4 OPERATIONAL
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4. FREQUENCY REQUIREMENTS			
a. FREQUENCY(IES)	(U)	310 MHz - 328.6 MHz	335.4 MHz - 380 MHz
b. EMISSION DESIGNATORS	(U)	25K0F1D	280KF1D

5. TARGET STARTING DATE FOR SUBSEQUENT STAGES			
a. STAGE 2	(U)	NA	
b. STAGE 3	(U)	NA	
c. STAGE 4	(U)	NA	

6. EXTENT OF USE	(U)	Intermittent
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7. GEOGRAPHICAL AREA FOR		
a. STAGE 2	(U)	NA
b. STAGE 3	(U)	NA
c. STAGE 4	(U)	DOD Test & Training Ranges in the US&P; Schofield Barracks, HI

8. NUMBER OF UNITS			
a. STAGE 2	(U)	NA	
b. STAGE 3	(U)	NA	
c. STAGE 4	(U)	60	

9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT	(U)	2
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10. OTHER J/F 12 APPLICATION ID(S) TO BE		11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11?
(U)	☒ a. SUPERSEDED J/F 12/9312	(U)
	☐ b. RELATED	☐ a. YES
		☒ b. NO
		☐ c. NAVAIL

12. NAMES AND TELEPHONE NUMBERS	(U)		
a. PROGRAM MANAGER	Bradford Tousley	(1) COMMERCIAL 703-696-2355	(2) DSN
b. PROJECT ENGINEER	Bradford Tousley	(1) COMMERCIAL 703-696-2355	(2) DSN

13. REMARKS	(U)	
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DOWNGRADING INSTRUCTIONS	J/F 12/09312/2
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TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.

(U) MHX320

2. MANUFACTURER'S NAME

(U) Microhard Systems Inc.

3. TRANSMITTER INSTALLATION

(U) Ground Terminal, Air & Grd Vehicle

4. TRANSMITTER TYPE

(U) Communication

5. TUNING RANGE

(U) 310 MHz - 390 MHz

6. METHOD OF TUNING

(U) PLL Synthesizer

7. RF CHANNELING CAPABILITY

(U) 310 MHz, 50 Hz increments

8. EMISSION DESIGNATORS

(U) 280KF1D (U) 25K0F1D (U)

9. FREQUENCY TOLERANCE

(U) 1.5 ppm

12. EMISSION BANDWIDTH

☐ CALCULATED ☒ MEASURED

10. FILTER EMPLOYED

(U) ☒ a. YES ☐ b. NO

a. -3 dB (U) 95 KHz (U) 23 KHz (U)

b. -20 dB (U) 280 KHz (U) 41 KHz (U)

c. -40 dB (U) 750 KHz (U) 90 KHz (U)

d. -60 dB (U) 1400 KHz (U) 250 KHz (U)

e. OC-BW (U) 280 KHz (U) 25 KHz (U)

11. SPREAD SPECTRUM

(U) ☒ a. YES ☐ b. NO

13. MAXIMUM BIT RATE

(U) 230.4 Kbps

15. MAXIMUM MODULATION FREQUENCY

(U) (See Remarks)

14. MODULATION TECHNIQUES AND CODING

(U) Continuous Phase FSK;
FH (See Remarks)

17. DEVIATION RATIO

(U) (See Remarks)

16. PRE-EMPHASIS

(U) ☒ a. YES ☐ b. NO

18. PULSE CHARACTERISTICS

a. RATE (U) NA (U) NA (U)

b. WIDTH (U) NA (U) NA (U)

c. RISE TIME (U) NA (U) NA (U)

d. FALL TIME (U) NA (U) NA (U)

e. COMP RATIO (U) NA (U) NA (U)

19. POWER

a. MEAN (U) 1 W (U) 1 W (U)
- 10 W - 10 W

b. PEP (U) (U) (U)

20. OUTPUT DEVICE

(U) Transistor

21. HARMONIC LEVEL

a. 2nd (U) -60 dB

b. 3rd (U) -70 dB

c. OTHER (U) -60 dB

22. SPURIOUS LEVEL

(U) -60 dB

23. FCC TYPE ACCEPTANCE NO.

(U) NA

24. REMARKS (U) Item 10: LC Filter; 3 dB bandwidth is 100 MHz

Item 14: The radio may operate on a single frequency or it may hop over a frequency list containing as many as 50 entries. Hop rate is 2.5 hps for both emissions.

Items 13, 15, and 17:

Mode	High	Low
Emission Designator	280KF1D	25K0F1D
Item 13: Bit Rate (kbps)	230.4	19.2
Item 15: Max Mod Freq (kHz)	116	10
Item 17: Deviation Ratio	1.25	1.04

Item 19a: Microhard BiAMP-320 Bi-directional RF Amplifier added as part of the MHX 320 model will increase the maximum power from 1 to 10 watts.

TRANSMITTER REMARK OVERFLOW PAGE

Note: The High Data Rate Emission enables the communication of platform telemetry data to the ground station during system development. The Low Data Rate Emission may be used without adverse loss of control of the platform.

Item 16: Pre-Emphasis is 3 dB.

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TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.

(U) MHX420

2. MANUFACTURER'S NAME

(U) Microhard Systems Inc.

3. TRANSMITTER INSTALLATION

(U) Ground Terminal, Air Vehicle

4. TRANSMITTER TYPE

(U) Communication

5. TUNING RANGE

(U) 310 MHz - 390 MHz

6. METHOD OF TUNING

(U) PLL Synthesizer

7. RF CHANNELING CAPABILITY

(U) 310 MHz, 50 Hz increments

8. EMISSION DESIGNATORS

(U) 280KF1D (U) 25K0F1D (U)

9. FREQUENCY TOLERANCE

(U) 1.5 ppm

12. EMISSION BANDWIDTH

☐

CALCULATED

☒

MEASURED

10. FILTER EMPLOYED

(U) ☒ a. YES ☐ b. NO

a. -3 dB (U) 95 KHz (U) 23 KHz (U)

b. -20 dB (U) 280 KHz (U) 41 KHz (U)

c. -40 dB (U) 750 KHz (U) 90 KHz (U)

d. -60 dB (U) 1400 KHz (U) 250 KHz (U)

e. OC-BW (U) 280 KHz (U) 25 KHz (U)

11. SPREAD SPECTRUM

(U) ☒ a. YES ☐ b. NO

13. MAXIMUM BIT RATE

(U) 230.4 Kbps

15. MAXIMUM MODULATION FREQUENCY

(U) (See Remarks)

14. MODULATION TECHNIQUES AND CODING

(U) Continuous Phase FSK;
FH (See Remarks)

17. DEVIATION RATIO

(U) (See Remarks)

16. PRE-EMPHASIS

(U) ☒ a. YES ☐ b. NO

18. PULSE CHARACTERISTICS

a. RATE (U) NA (U) NA (U)

b. WIDTH (U) NA (U) NA (U)

c. RISE TIME (U) NA (U) NA (U)

d. FALL TIME (U) NA (U) NA (U)

e. COMP RATIO (U) NA (U) NA (U)

19. POWER

a. MEAN (U) 1 W (U) 1 W (U)

b. PEP (U) (U) (U)

20. OUTPUT DEVICE

(U) Transistor

21. HARMONIC LEVEL

a. 2nd (U) -60 dB

b. 3rd (U) -70 dB

c. OTHER (U) -60 dB

22. SPURIOUS LEVEL

(U) -60 dB

23. FCC TYPE ACCEPTANCE NO.

(U) NA

24. REMARKS (U)

Item 10: LC Filter; 3 dB bandwidth is 100 MHz

Item 14: The radio may operate on a single frequency or it may hop over a frequency list containing as many as 50 entries. Hop rate is 2.5 hps for both emissions.

Items 13, 15, and 17:

Mode	High	Low
Emission Designator	280KF1D	25K0F1D
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Item 15: Max Mod Freq (kHz)	116	10
Item 17: Deviation Ratio	1.25	1.04

Note: The High Data Rate Emission enables the communication of platform telemetry data to the ground station during system development. The Low Data Rate Emission may be used without adverse loss of control of the platform.

Item 16: Pre-Emphasis is 3 dB.

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RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) MHX320 & MHX420

2. MANUFACTURER'S NAME

(U) Microhard Systems Inc.

3. RECEIVER INSTALLATION

(U) Ground Terminal, Air Vehicle

4. RECEIVER TYPE

(U) Dual Stage Superheterodyne

5. TUNING RANGE

(U) 310 MHz - 390 MHz

6. METHOD OF TUNING

(U) PLL Synthesizer

7. RF CHANNELING CAPABILITY

(U) 310 MHz, 50 Hz increments

8. EMISSION DESIGNATORS

(U) 280KF1D 25K0F1D

9. FREQUENCY TOLERANCE

(U) 1.5 ppm

11. RF SELECTIVITY

☐

CALCULATED

☒

MEASURED

a. -3 dB (U) 100 MHz

b. -20 dB (U) 150 MHz

c. -60 dB (U) 280 MHz

d. Preselection Type (U) LC Filter

10. IF SELECTIVITY

1st (U)

2nd (U)

3rd (U)

a. -3 dB 450 KHz

(See Remarks)

b. -20 dB 590 KHz

c. -60 dB 800 KHz

12. IF FREQUENCY

a. 1st (U) 243.95 MHz

b. 2nd (U) (See Remarks)

c. 3rd (U)

13. MAXIMUM POST DETECTION FREQUENCY

(U) 120 KHz

14. MINIMUM POST DETECTION FREQUENCY

(U) NA

16. MAXIMUM BIT RATE

(U) 230.4 Kbps

15. OSCILLATOR TUNED

1st (U)

2nd (U)

3rd (U)

a. ABOVE TUNED FREQUENCY

X

X

b. BELOW TUNED FREQUENCY

c. EITHER ABOVE OR BELOW
THE FREQUENCY

17. SENSITIVITY

a. SENSITIVITY (U) (See Remarks)

b. CRITERIA (U) SNR = 12dB; 10-6 BER

c. NOISE FIG (U) 3 dB

d. NOISE TEMP (U) NA

18. DE-EMPHASIS

(U)

☒

a. YES

☐

b. NO

19. IMAGE REJECTION

(U) 60 dB

20. SPURIOUS REJECTION

(U) 60 dB

21. REMARKS (U)

Items 10, 12b and 17a; the parameters vary as a function of emission designator as follows:

Item 10: Second IF Filtering

Attenuation Bandwidth (KHz)

Emissions	280KF1D	25K0F1D
3	280	25
20	650	45
60	1250	225

Item 12b: Second IF Frequency

Emissions	280KF1D	25K0F1D
	10.7 MHz	450 kHz

RECEIVER REMARK OVERFLOW PAGE

Item 17a Sensitivity (dBm)

Emissions	280KF1D	25K0F1D
	-105	-114

Item 18: De-Emphasis is 3 dB.

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ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) ☐ a. TRANSMITTING ☐ b. RECEIVING ☒ c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) GRUHF

3. MANUFACTURER'S NAME
(U) Radiall Inc

4. FREQUENCY RANGE
(U) 300 MHz - 400 MHz

5. TYPE (U) Monopole

7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

6. POLARIZATION
(U) Vertical

b. VERTICAL SCAN (U) NA

8. GAIN

(1) Max Elev (U) NA

a. MAIN BEAM
(U) 2 dBi

(2) Min Elev (U) NA

b. 1st MAJOR SIDE LOBE
(U) NA

(3) Scan Rate (U) NA

9. BEAMWIDTH

c. HORIZONTAL SCAN (U) NA

a. HORIZONTAL
(U) 360 deg

(1) Sector Scanned (U) NA

b. VERTICAL
(U) 70 deg

(2) Scan Rate (U) NA

d. SECTOR BLANKING (U) ☐ (1) YES ☒ (2) NO

10. REMARKS (U)

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ANTENNA CONTINUATION PAGE

APPLICATION FOR SPECTRUM REVIEW	CLASSIFICATION UNCLASSIFIED	PAGE 9
NTIA GENERAL INFORMATION		
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2. SYSTEM NOMENCLATURE (U) Microhard Systems, Inc. Model MHX320 and MHX420 Advanced Concept Technology Demonstration (ACTD)		
3. STAGE OF ALLOCATION (U) ☐ a. STAGE 1 CONCEPTUAL ☒ b. STAGE 2 EXPERIMENTAL ☐ c. STAGE 3 DEVELOPMENTAL ☐ d. STAGE 4 OPERATIONAL		
4. FREQUENCY REQUIREMENTS a. FREQUENCY(IES) (U) 310 MHz - 328.6 MHz 335.4 MHz - 380 MHz b. EMISSION DESIGNATORS (U) 280KF1D 25K0F1D		
5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (U) The transceiver provides command and control information to and from the micro air vehicle. (WARTIME USE) ☐ a. YES ☒ b. NO		
6. INFORMATION TRANSFER REQUIREMENTS (U) 230.4 kbps		
7. ESTIMATED INITIAL COST OF THE SYSTEM (U) \$2500		
8. TARGET DATE FOR		
a. APPLICATION APPROVAL (U) ASAP	b. SYSTEM ACTIVATION (U) ASAP	c. SYSTEM TERMINATION (U) 12-31-2020
9. SYSTEM RELATIONSHIP AND ESSENTIALITY (U) NA		
10. REPLACEMENT INFORMATION (U) NA		
11. RELATED ANALYSIS AND/OR TEST DATA (U) NA		
12. NUMBER OF MOBILE UNITS (U) 60		
13. GEOGRAPHICAL AREA FOR		
a. STAGE 2 (U) NA		
b. STAGE 3 (U) NA		
c. STAGE 4 (U) DOD Test & Training Ranges in the US&P; Schofield Barracks, HI		
14. LINE DIAGRAM (U) See Page(s) 8		15. SPACE SYSTEMS (U) See Page(s) NA
16. TYPE OF SERVICE(S) FOR STAGE 4 (U) Mobile		17. STATION CLASS(ES) FOR STAGE 4 (U) FLD MOE
18. REMARKS (U)		
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