

UNCLASSIFIED

MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB) EQUIPMENT FREQUENCY ALLOCATION GUIDANCE

Military Department	Equipment	Stage
Navy, Air Force, Army, Coast Guard	Microhard IPn320F C2 Data Link	4 - Operational

Section 1: ENCLOSURE


Enclosure Number	Description	Dated
1	J/F 12/10636	21 January 2014

Section 2: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED

Frequency (MHz)	Emissions	Power (Mean) (W)	Type of Service	Operation Location(s)
375.0 - 386.0	280KF1D	1.0	Aeronautical Mobile and Land Mobile	US & P

Section 3: MCEB GUIDANCE

1. The enclosed application as described in Section 2 above is approved for operational use subject to the guidance below.
2. For the intended use in the aeronautical and land mobile services, the subject system is in accordance with the US Table of Frequency Allocations.
3. Based on the information provided, the subject equipment complies with the frequency stability requirements of NTIA Manual Section 5.2.1, as well as the out-of-band, harmonic and spurious level requirements of NTIA Manual Section 5.2.2.2
4. Continued compliance with the provisions of the standards cited in paragraph 3 above, is mandatory.
5. Frequency assignment requests must be submitted using Standard Frequency Action Format (SFAF) and be coordinated with the cognizant Area Frequency Coordinator (AFC) in accordance with ACP-190 SUPP-1(C), Guide to Frequency Planning, prior to activation.
6. Operation of the subject equipment shall be in accordance with applicable Military Communications-Electronics Board(MCEB)/NTIA channeling plans. Proposals for frequency assignments that are non-compliant with the applicable channeling plan may be difficult or impossible to obtain.

Steering Member, ESG Working Group, MCEB Frequency Panel	Signature 	Date FEB 19 2014	IRAC/SPS Number: Doc. 40374/1 SPS-19873/1	Page 1 of 2
Downgrading Instructions		Distribution J-12 Holders	MCEB J-12 Number J/F 12/10636/1	

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MILITARY COMMUNICATIONS ELECTRONICS BOARD (MCEB)

EQUIPMENT FREQUENCY ALLOCATION GUIDANCE

MCEB GUIDANCE
CONTINUATION PAGE

Equipment

Microhard IPn320F C2 Data Link

Section 3: MCEB GUIDANCE (Continued)

7. Operational use within various theater commands outside the United States has not been approved. Approval for operational use in the intended deployment area requires appropriate COCOM statement (s) that the subject system has been deemed frequency supportable. Spectrum supportability comments can be found in the Host Nation Spectrum Worldwide Database Online, <https://hnswoo.disa.mil/>.
8. The subject equipment has been coordinated with the NTIA Spectrum Planning Subcommittee (SPS). The following additional guidance has been provided:
 - a) Navy operates this system in accordance with the provisions of Footnote G27 to the National Table of Frequency Allocations, which limits fixed and mobile services in the frequency band 375-386 MHz to the military services.
 - b) Navy coordinates all frequency assignment actions for the frequency band 375-386 MHz with the Military Assignment Group, in accordance with Section 1.3.2 of the NTIA Manual
 - c) Navy ensures that personnel are protected from radiation levels that exceed generally accepted exposure criteria.

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MCEB J-12 Number

J/F 12/10636/1

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SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

The title of this application is : Microhard IPn320F C2 Data Link

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

Refer to your Security Manual for further guidance.

The Application Level Special Handling is : A

Approved for public release; distribution is unlimited (DoD Directive 5230.24)

DOWNGRADING INSTRUCTIONS

Special Handling Instruction : A

J/F 12/10636

CLASSIFICATION

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FULL RECORD PRINT FOR Microhard IPn320F C2 Data Link

Selected Frequencies

(U) 375.0000 MHz - 386.0000 MHz

Application Title

(U)Microhard IPn320F C2 Data Link

System Name : (U) Microhard IPn320F C2 Data Link**(Nomenclature)**

Coord.ID/JF12 Num. : J/F 12/10636
Stage : (U) 4 - Operational
Agency : (U)N - Department of the Navy
NTIA Certified : (U) No
Date Of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 9/9/2013 18:13:26 (GMT)
Overall Security : Unclassified

System Description

(U)Command and control link for FURY Unmanned Air Vehicle

Geographic Areas for Stage 4

(U)US &P, (U) US & P (U) Single Point
 Lat/Lon : (U)

Predefined Trunking? : (U) No

Certification of Spectrum Support Information**Attachments**

File Name : (U) All_Remarks.txt
File Name : (U) N_RepReq_Microhard_IPn320F_C2_Data_Link_St4.pdf
File Name : (U) SPS-19528_1 Navy Req Microhard IPn320F-C2-Datalink St4.pdf

Recommending Official : Stephen J. Butcher
Title : Chairman Spectrum Planning Subcommittee
Certifying Official : Edward M. Davison
Title : Deputy Associate Administrator

To Address : (U) Navy Marine Corps Spectrum Center
 P.O. Box 549
 Ft. Meade, MD 20755-0549

From Address : (U)NAVAIR 4.5000E
 575 I Ave Ste 1
 Building 3008
 Pt. Mugu, CA 93042

Point(s) of Contact :
 (U)Lynne Clarke 805-989-3610
 Les Jue 805-989-7884

Target Date(s)

System Approval : (U) 6/1/2013
System Activation : (U) 6/1/2013
System Termination : (U) 6/1/2033

National Coord. Required?Yes

NSEP Use : (U) No

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Extent of Use

(U)24/7 Intermittent

ITU Waiver : (U) No**Number Of Units** : (U) 20**Num. Units in Same Environment:** (U) 4**Estimated Initial Cost of the System** : (U) \$ 100000**System Cost Comments**

(U)\$5,000 per radio

Information Transfer Requirement

(U)CPFSK@230400 bps

System Essentiality

(U)Command and control of the UAV is critical and required during training and mission operations. The C2 systems provides for command and control of the UAV as well as providing for status and state of health information from the UAV to the ground control station.

Replacement Information

(U)Not applicable

Stations**Station Name** : (U)Ground Control Station**Transmitters**

(U) IPn320F (FAST MODE)

Receivers

(U) IPn320F (FAST MODE)

Antennas

(U) 380-10H

(U) V3800

Station Name : (U)FURY UAV**Transmitters**

(U) IPn320F (FAST MODE)

Receivers

(U) IPn320F (FAST MODE)

Antennas

(U) 6B-UHFX-XS-1

Selected Modes**Link****Transmitting Station**

(U)FURY UAV

Receiving Station

(U)Ground Control Station

Radio Service : Aeronautical Mobile**Station Classes** : MA, MAD**Equipment Combination****Transmitter** : (U) IPn320F (FAST MODE)**Tx Antenna** : (U) 6B-UHFX-XS-1**Receiver** : (U) IPn320F (FAST MODE)**Rx Antenna** : (U) 380-10H

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Selected Modes

<u>Frequency</u>	<u>Em. Des</u>	<u>Power</u>	<u>Notes</u>
(U) 375.0000 MHz - 386.0000 MHz	(U) 280KF1D	(U) 1.000 W Mean	PRI

Equipment Combination

Transmitter : (U) IPn320F (FAST MODE)
 Tx Antenna : (U) 6B-UHFX-XS-1
 Receiver : (U) IPn320F (FAST MODE)
 Rx Antenna : (U) V3800

Selected Modes

<u>Frequency</u>	<u>Em. Des</u>	<u>Power</u>	<u>Notes</u>
(U) 375.0000 MHz - 386.0000 MHz	(U) 280KF1D	(U) 1.000 W Mean	PRI

Link

<u>Transmitting Station</u>	<u>Receiving Station</u>
(U) Ground Control Station	(U) FURY UAV
Radio Service : Aeronautical Mobile	
Station Classes : MO	

Equipment Combination

Transmitter : (U) IPn320F (FAST MODE)
 Tx Antenna : (U) 380-10H
 Receiver : (U) IPn320F (FAST MODE)
 Rx Antenna : (U) 6B-UHFX-XS-1

Selected Modes

<u>Frequency</u>	<u>Em. Des</u>	<u>Power</u>	<u>Notes</u>
(U) 375.0000 MHz - 386.0000 MHz	(U) 280KF1D	(U) 1.000 W Mean	PRI

Equipment Combination

Transmitter : (U) IPn320F (FAST MODE)
 Tx Antenna : (U) V3800
 Receiver : (U) IPn320F (FAST MODE)
 Rx Antenna : (U) 6B-UHFX-XS-1

Selected Modes

<u>Frequency</u>	<u>Em. Des</u>	<u>Power</u>	<u>Notes</u>
(U) 375.0000 MHz - 386.0000 MHz	(U) 280KF1D	(U) 1.000 W Mean	PRI

FULL RECORD PRINT FOR Microhard IPn320F C2 Data Link

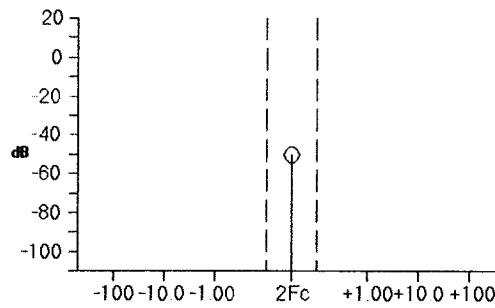
TRANSMITTER IPn320F (FAST MODE)

Nomenclature : (U) IPn320F (FAST MODE)
Manufacturer : (U) MICROHARD SYSTEM, INC.
Model Name : (U) IPn320F
Tx Type : (U) FM
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 9/5/2013 18:36:24 (GMT)
Tx Installation(s) : (U) Air Vehicle and Ground station
Filter Type : (U) Low Pass Filter
Freq. Stability : (U) 2.5ppm
Output Device : (U) Transistor
Tuning Method : (U) PLL Synthesizer
Radar/Comm : (U) Communications
Supp. of Harmonics : (U) No
Powers

Power Type: Mean
Upper Limit: (U) 1.000 W

Figure 1 - 2nd Harmonic Curve (U)

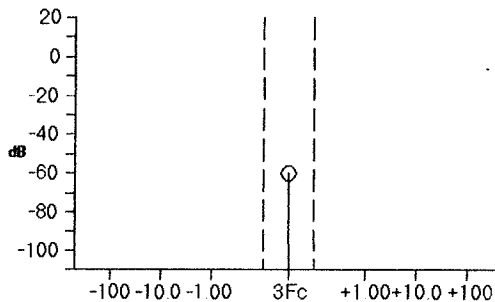
Atten. **Offset (Fo)**
 -50.0 dB 0.00000 kHz



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Figure 2 - 3rd Harmonic Curve (U)

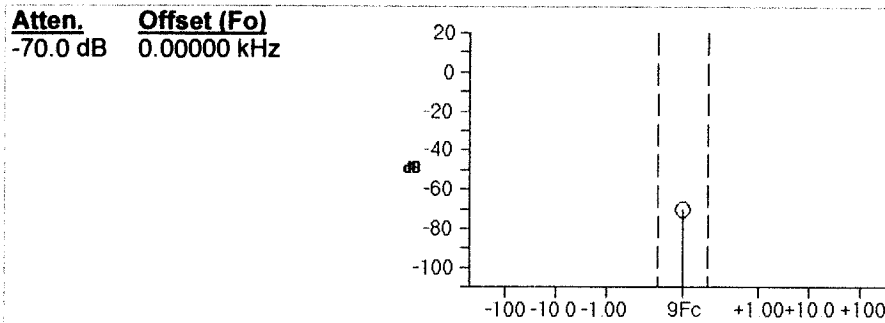
Atten. **Offset (Fo)**
 -60.0 dB 0.00000 kHz



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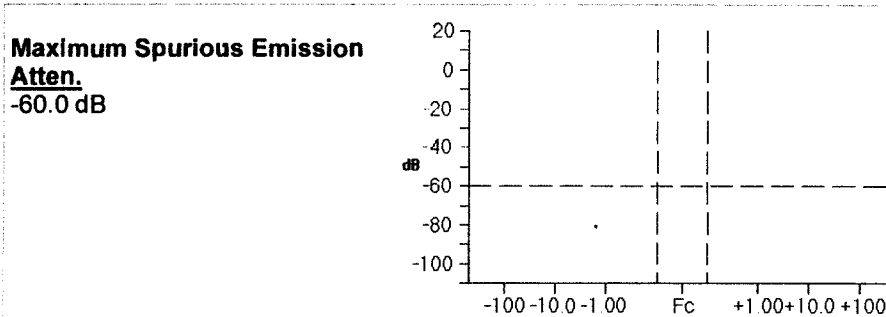
FULL RECORD PRINT FOR Microhard IPn320F C2 Data Link

Figure 3 - Other Harmonic Curve (U)



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Figure 4 - Spurious Emission Curve (U)



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Frequencies

Tuned Frequency : (U) 310.0000 MHz - 390.0000 MHz
 Tuning Increment : (U) 400.00 kHz
 Number Freq. Required : (U) 1
 Freq. Blocking Indicator : (U) No
 Lowest Usable Channel : (U) 310.0000 MHz
 Em. Designator : (U) 280KF1D
 Necessary BW : (U) 280.00 kHz

Modulation - 280KF1D

Occupied Bandwidth : (U) 290.00 kHz
 Measured/Calculated : (U) Measured
 Radar/Communications : (U) Communications
 Modulation Type : (U) Digital Modulation
 Spread Spectrum : No
 Dig. Modulation Type : (U) CPFSK - Continuous Phase Frequency Shift Keying

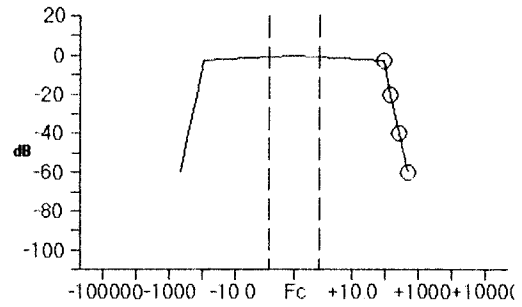
Digital Bit Rate : (U) 230400 bps

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Figure 5 - Fundamental Curve (U)

Meas/Calc : Measured
Level Offset (Fo)

-3.00 dB	90.000 kHz
-20.0 dB	140.00 kHz
-40.0 dB	275.00 kHz
-60.0 dB	475.00 kHz



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RECEIVER IPn320F (FAST MODE)

Nomenclature : (U) IPn320F (FAST MODE)
Manufacturer : (U) MICROHARD SYSTEM, INC.
RxType : (U) Dual Conversion Superheterodyne
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 5/7/2013 18:01:40 (GMT)
Rx Installation(s) :
 (U) Air Vehicle and Ground station
Freq. Stability : (U) 2.5ppm
Image Reject : (U) 60.0 dB
Oscillator Tuned : (U) Above
Tuning Method : (U) PLL Synthesizer
Maximum Bit Rate : (U) 230400 bps
Min. Post Detection Freq. : (U) 120.0000 MHz
Preselection Type : (U) LC Filter

Frequencies

Tuned Frequency: (U) 310.0000 MHz - 390.0000 MHz
Tuning Increment (U) 280.00 kHz

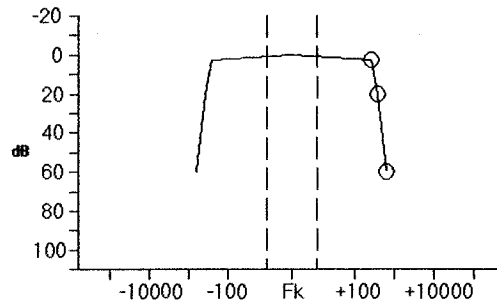
Sensitivities

Em. Designator : (U) 280KF1D
Necessary BW : (U) 280.00 kHz
Perf. Crit. : (U) BER - Bit Error Rate
Perf. Value : (U) 0.001
Sensitivity : (U) -107 dBm
Noise Fig. : (U) 3.50 dB
Noise Temp. : (U) 359 K
Spur. Reject : (U) 60.0 dB

Figure 6 - IF Selectivity Curve (U)

IF Freq. (Fk): 243.9500 MHz
Meas/Calc : Measured

Atten.	Offset (Fo)
3.00 dB	250.00 kHz
20.0 dB	375.00 kHz
60.0 dB	650.00 kHz



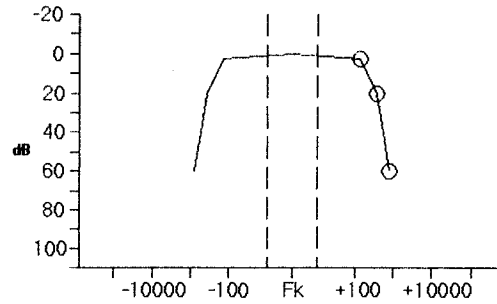
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Figure 7 - IF Selectivity Curve (U)

IF Freq. (Fk): 10.70000 MHz
 Meas/Calc : Measured

Atten.	Offset (Fo)
3.00 dB	140.00 kHz
20.0 dB	370.00 kHz
60.0 dB	800.00 kHz

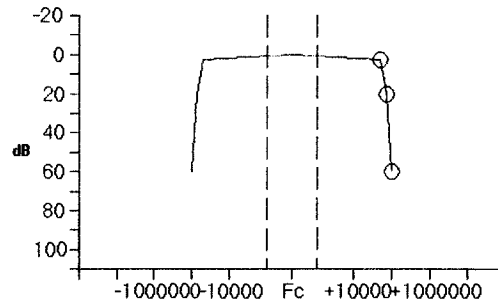


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Figure 8 - RF Selectivity Curve (U)

Meas/Calc : Measured

Atten.	Offset (Fo)
3.00 dB	50000 kHz
20.0 dB	75000 kHz
60.0 dB	100000 kHz



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ANTENNA 6B-UHFX-XS-1

Nomenclature : (U) 6B-UHFX-XS-1
Manufacturer : (U) ANTCOM CONRPORATION
Model Name : (U) 6B-UHFX-XS-1
Antenna Type : (U) Monopole
Antenna Category : Linear
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 3/14/2013 14:10:47 (GMT)
Lower Freq. Limit : (U) 250.0000 MHz
Upper Freq. Limit : (U) 550.0000 MHz
Polarization : (U) Vertical
Main Beam Gain : (U) 2.00 dBi
1st Horz. Sidelobe Atten.: (U) 0.000 dB
1st Vert. Sidelobe Atten.: (U) 0.000 dB
Atten. Rel/Act : (U) Relative dB
Horz. Beamwidth : (U) 360 degrees
Vert. Beamwidth : (U) 45.0 degrees

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ANTENNA V3800

Nomenclature : (U) V3800
Manufacturer : (U) ASTRON WIRELESS TECHNOLOGIES
Model Name : (U) V3800
Antenna Type : (U) Monopole
Antenna Category : Linear
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 3/14/2013 14:08:34 (GMT)
Lower Freq. Limit : (U) 370.0000 MHz
Upper Freq. Limit : (U) 390.0000 MHz
Polarization : (U) Vertical
Main Beam Gain : (U) 1.00 dBi
1st Horz. Sidelobe Atten.: (U) 0.000 dB
1st Vert. Sidelobe Atten.: (U) 0.000 dB
Atten. Rel/Act : (U) Relative dB
Horz. Beamwidth : (U) 360 degrees
Vert. Beamwidth : (U) 77.0 degrees

FULL RECORD PRINT FOR Microhard IPn320F C2 Data Link

ANTENNA 380-10H

Nomenclature : (U) 380-10H
Manufacturer : (U) ASTRON WIRELESS TECHNOLOGIES
Model Name : (U) 380-10H
Antenna Type : (U) Yagi Unidirectional Array
Antenna Category : Linear
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 1/21/2014 14:56:41 (GMT)
Date/Time Last Mod. : 5/7/2013 17:45:33 (GMT)
Lower Freq. Limit : (U) 375.0000 MHz
Upper Freq. Limit : (U) 386.0000 MHz
Polarization : (U) Horizontal and Vertical
Main Beam Gain : (U) 12.0 dBi
1st Horz. Sidelobe Atten.: (U) 14.0 dB
1st Vert. Sidelobe Atten.: (U) 14.0 dB
Atten. Rel/Act : (U) Relative dB
Horz. Beamwidth : (U) 45.0 degrees
Vert. Beamwidth : (U) 45.0 degrees

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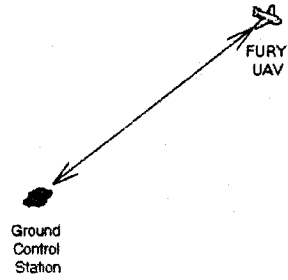
Frequency List

Tx Station	Rx Station	Frequency (MHz)	Em. Des.	Radio Service	Stn. Classes
(U) FURY UAV	(U) Ground Control	(U) 375.0000 -	(U) 280KF1D	Aeronautical Mobile	MA,MAD
(U) Ground Control	(U) FURY UAV	386.0000			MO

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Line Diagram: Microhard IPn320F C2 Data Link



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