SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

The title of this application is: FreeWave P-Series Telemetry Radio

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 "!" 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

SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS

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

Page Type:	Page #:	Classification:	Special Handling Requirement:
DoD Page	1	UNCLASSIFIED	
Transmitter Page 1	2	UNCLASSIFIED	
TX Remark Overflow	3	UNCLASSIFIED	
TX Data Overflow	4	UNCLASSIFIED	
Receiver Page 1	5	UNCLASSIFIED	
Antenna Page 1	6	UNCLASSIFIED	
Antenna Page 2	7	UNCLASSIFIED	
Antenna Page 3	8	UNCLASSIFIED	
Antenna Page 4	9	UNCLASSIFIED	
Antenna Page 5	10	UNCLASSIFIED	
Antenna Page 6	11	UNCLASSIFIED	
Antenna Page 7	12	UNCLASSIFIED	
NTIA Page	13	UNCLASSIFIED	

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION UNCLASSIFIED	DATE 03/09/2004	J/F 12/09011
			Page 1 of 13 Pages

DOD GENERAL INFORMATION

TO	FROM
USMCEB	Office of the Army Spectrum Manager (Submitted by: White Sands Missile Range ATTN: CSTE-DTC-WS-IO-IF)

1. APPLICATION TITLE (U) FreeWave P-Series Telemetry Radio

2. SYSTEM NOMENCLATURE (U) FreeWave P-Series Telemetry Radio

3. STAGE OF ALLOCATION (U) [ ] a. STAGE 1 CONCEPTUAL [ ] b. STAGE 2 EXPERIMENTAL [ ] c. STAGE 3 DEVELOPMENTAL [X] d. STAGE 4 OPERATIONAL

4. FREQUENCY REQUIREMENTS
   a. FREQUENCY(IES) (U) 1350 MHz - 1390 MHz
   b. EMISSION DESIGNATORS (U) 230KF1D

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

7. GEOGRAPHICAL AREA FOR
   a. STAGE 2 (U) NA
   b. STAGE 3 (U) NA
   c. STAGE 4 (U) WSMR, NM; Holloman AFB, NM; McGregor, NM; (See Remarks)

8. NUMBER OF UNITS

a. STAGE 2 (U) NA	b. STAGE 3 (U) NA	c. STAGE 4 (U) 50

9. NUMBER OF UNITS OPERATING SIMULTANEOUSLY IN THE SAME ENVIRONMENT (U) 10

10. OTHER J/F 12 APPLICATION ID(S) TO BE (U)
    [ ] a. SUPERSEDED
    [ ] b. RELATED

11. IS THERE ANY OPERATIONAL REQUIREMENT AS DESCRIBED IN THE INSTRUCTIONS FOR PARAGRAPH 11? (U) [ ] a. YES [X] b. NO [ ] c. NAVAIL

12. NAMES AND TELEPHONE NUMBERS (U)

a. PROGRAM MANAGER Jim Bernard	(1) COMMERCIAL 505-678-1753	(2) DSN 258-1753
b. PROJECT ENGINEER Jeff Westfall	(1) COMMERCIAL 505-678-2144	(2) DSN 258-2144

13. REMARKS (U) Item 7c: Patuxent River, MD; and CONUS Test & Training Ranges, Palmdale, CA

DOWNGRADING INSTRUCTIONS	J/F 12/09011
	CLASSIFICATION UNCLASSIFIED

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) FreeWave P-Series Transmitter with
See Data Overflow Page

2. MANUFACTURER'S NAME
(U) FreeWave Technologies, Inc.

3. TRANSMITTER INSTALLATION
(U) Ground/Airborne Vehicles

4. TRANSMITTER TYPE
(U) GFSK Communication

5. TUNING RANGE
(U) 1350 MHz - 1390 MHz

6. METHOD OF TUNING
(U) Digital Synthesizer

7. RF CHANNELING CAPABILITY
(U) 1350.144 MHz, 230.4 kHz increments

8. EMISSION DESIGNATORS
(U) 230KF1D (U) (U)

9. FREQUENCY TOLERANCE
(U) 1.5 ppm

10. FILTER EMPLOYED
(U) [X] a. YES [ ] b. NO

11. SPREAD SPECTRUM
(U) [X] a. YES [ ] b. NO

12. EMISSION BANDWIDTH
[ ] CALCULATED [X] MEASURED

a. -3 dB (U)	180 KHz	(U)	(U)
b. -20 dB (U)	230 KHz	(U)	(U)
c. -40 dB (U)	315 KHz	(U)	(U)
d. -60 dB (U)	400 KHz	(U)	(U)
e. OC-BW (U)	230 KHz	(U)	(U)

13. MAXIMUM BIT RATE
(U) 115.2 Kbps

15. MAXIMUM MODULATION FREQUENCY
(U) 57.6 KHz

14. MODULATION TECHNIQUES AND CODING
(U) 2 levels GFSK, Frequency Hopping
TDMA (See Remarks)

17. DEVIATION RATIO
(U) 1

16. PRE-EMPHASIS
(U) [ ] a. YES [X] b. NO

18. PULSE CHARACTERISTICS

a. RATE (U)	NA	(U)	(U)
b. WIDTH (U)	NA	(U)	(U)
c. RISE TIME (U)	NA	(U)	(U)
d. FALL TIME (U)	NA	(U)	(U)
e. COMP RATIO (U)	NA	(U)	(U)

19. POWER

a. MEAN (U)	5 W	(U)	(U)
b. PEP (U)	NA	(U)	(U)

20. OUTPUT DEVICE
(U) MOSFET

21. HARMONIC LEVEL

a. 2nd	(U)	-50 dB
b. 3rd	(U)	-70 dB
c. OTHER	(U)	-70 dB

22. SPURIOUS LEVEL
(U) -70 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U)

Item 10. Gaussian Low-Pass Filter.

Item 11. Frequency hopping is employed using up to 112 discrete software-selectable channels in an orthogonal hop sequence. Minimum hop band required is one channel. The hopping rate is software defined. Any channel or group of channels can be locked out.

Item 14. FreeWave Radios Support Point To Point, Point To Multipoint or TDMA operating mode and can operate in frequency hopping or fixed frequency mode. To avoid interference, only one radio at a time can radiate at a specific frequency. Using frequency hopping mode, multile radios can be simultaneouly transmitting, but each will use a specific hop pattern to minimize cross interference. Typical scenarios would involve fewer than 10 units simultaneously transmitting.

TRANSMITTER REMARK OVERFLOW PAGE

Transceiver can brodcast in one of 15 unique user-selectable spread patterns, determined by a frequency key ID number and a network ID number. A maximum of 15 units can broadcast simultaneously, each with its own unique orthogonal frequency hopping pattern to minimize interference with adjacent units using different hop patterns. No more than 5 simultaneously operating airborne units are anticipated during range tracking missions.

Item 19. An external Bi-Directional RF power amplifier (Aero Telemetry Model AMP-LR-M4CW or Gigacom model A-100) 5 Watts is required to establish and maintain the RF path link.

TRANSMITTER DATA OVERFLOW PAGE

1. NOMENCLATURE, MANUFACTURER'S MODEL NO. (U) Aero Telemetry AMP-LR-M4CW Linear Amplifier or Gigacom A-100 Linear Amplifier

5. TUNING RANGE

8. EMISSION DESIGNATORS

12. EMISSION BANDWIDTH

18. PULSE CHARACTERISTICS

19. POWER

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) FreeWave P-Series Receiver

2. MANUFACTURER'S NAME
(U) FreeWave Technologies, Inc

3. RECEIVER INSTALLATION
(U) Ground/Airborne Vehicles

4. RECEIVER TYPE
(U) Dual Conversion Superheterodyne

5. TUNING RANGE
(U) 1350 MHz - 1390 MHz

6. METHOD OF TUNING
(U) Digital Synthesizer

8. EMISSION DESIGNATORS
(U) 230KF1D

7. RF CHANNELING CAPABILITY
(U) 1350.144 MHz, 230.4 kHz increments

11. RF SELECTIVITY
[ ] CALCULATED [X] MEASURED

9. FREQUENCY TOLERANCE
(U) 1.5 ppm

10. IF SELECTIVITY	1st (U)	2nd (U)	3rd (U)
a. -3 dB	1.8 MHz	200 KHz	
b. -20 dB	3.4 MHz	230 KHz	
c. -60 dB	15 MHz	290 MHz	

a. -3 dB	(U)	46 MHz
b. -20 dB	(U)	68 MHz
c. -60 dB	(U)	170 MHz
d. Preselection Type	(U)	BP SAW Filter

12. IF FREQUENCY
a. 1st (U) 45.1584 MHz
b. 2nd (U) 921.6 KHz
c. 3rd (U)

13. MAXIMUM POST DETECTION FREQUENCY
(U) 200 KHz

14. MINIMUM POST DETECTION FREQUENCY
(U) NA

16. MAXIMUM BIT RATE
(U) 115.2 Kbps

15. OSCILLATOR TUNED	1st (U)	2nd (U)	3rd (U)
a. ABOVE TUNED FREQUENCY	X		
b. BELOW TUNED FREQUENCY			
c. EITHER ABOVE OR BELOW THE FREQUENCY		X	

17. SENSITIVITY

a. SENSITIVITY	(U)	- 106 dBm
b. CRITERIA	(U)	1 X 10E-6 BER; S/N = 19 dB
c. NOISE FIG	(U)	1.5 dB
d. NOISE TEMP	(U)	NA

18. DE-EMPHASIS
(U) [ ] a. YES [X] b. NO

19. IMAGE REJECTION
(U) 40 dB

20. SPURIOUS REJECTION
(U) 60 dB

21. REMARKS (U)

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) L-Band Base Station Antenna, CH3928

3. MANUFACTURER'S NAME
(U) Chu Associates

4. FREQUENCY RANGE
(U) 1350 MHz - 1390 MHz

5. TYPE (U) Phased-Array

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS

a. TYPE (U) NA

b. VERTICAL SCAN (U) NA

(1) Max Elev (U) NA

(2) Min Elev (U) NA

(3) Scan Rate (U) NA

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U) NA

(2) Scan Rate (U) NA

d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN

a. MAIN BEAM
(U) 7.0 dBi

b. 1st MAJOR SIDE LOBE
(U)

9. BEAMWIDTH

a. HORIZONTAL
(U) 360 deg

b. VERTICAL
(U) 13 deg

10. REMARKS (U)

Antenna Beam Pattern Is Tilted Upward Approximately 8 Degrees From The Horizon

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) L-Band Airborne Antenna, N129-14

3. MANUFACTURER'S NAME
(U) Dorne and Margolin

4. FREQUENCY RANGE
(U) 1350 MHz - 1390 MHz

5. TYPE (U) Monopole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS

a. TYPE (U) NA

b. VERTICAL SCAN (U) NA

(1) Max Elev (U) NA

(2) Min Elev (U) NA

(3) Scan Rate (U) NA

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U) NA

(2) Scan Rate (U) NA

d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN

a. MAIN BEAM
(U) 0 dBi

b. 1st MAJOR SIDE LOBE
(U)

9. BEAMWIDTH

a. HORIZONTAL
(U) 360 deg

b. VERTICAL
(U) 13 deg

10. REMARKS (U)

Anticipated usage of this monopole antenna is for both airborne and ground based transceivers

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) 1360

3. MANUFACTURER'S NAME
(U) Stella Doradus Ireland Inc.

4. FREQUENCY RANGE
(U) 1350 MHz - 1395 MHz

5. TYPE (U) Co-linear array

6. POLARIZATION
(U)

7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

b. VERTICAL SCAN (U) NA

(1) Max Elev (U)

(2) Min Elev (U)

(3) Scan Rate (U)

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U)

(2) Scan Rate (U)

8. GAIN

a. MAIN BEAM
(U) 7 dBi

b. 1st MAJOR SIDE LOBE
(U)

9. BEAMWIDTH

a. HORIZONTAL
(U) 360 deg

b. VERTICAL
(U) 17 deg

d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

10. REMARKS (U)

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) A014155

3. MANUFACTURER'S NAME
(U) UB Corp

4. FREQUENCY RANGE
(U) 1.35 GHz - 1.55 GHz

5. TYPE (U) Monopole with Groundplane (See Remarks)

6. POLARIZATION
(U) Linear

7. SCAN CHARACTERISTICS

a. TYPE (U) FIXED

b. VERTICAL SCAN (U) NA

(1) Max Elev (U)

(2) Min Elev (U)

(3) Scan Rate (U)

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U)

(2) Scan Rate (U)

d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN

a. MAIN BEAM
(U) 5 dBi

b. 1st MAJOR SIDE LOBE
(U)

9. BEAMWIDTH

a. HORIZONTAL
(U) 360 deg

b. VERTICAL
(U) 30 deg

10. REMARKS (U)

Item 5: 1/4 wave monopole with groundplane in a teflon radome

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) FreeWave Technologies P-601X005

3. MANUFACTURER'S NAME
(U) The Istitu Group, Inc.

4. FREQUENCY RANGE
(U) 1350 MHz - 1390 MHz

5. TYPE (U) Dipole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) FIXED
b. VERTICAL SCAN (U) NA
(1) Max Elev (U) NA
(2) Min Elev (U) NA
(3) Scan Rate (U) NA
c. HORIZONTAL SCAN (U) NA
(1) Sector Scanned (U) NA
(2) Scan Rate (U) NA
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 2.15 dBi
b. 1st MAJOR SIDE LOBE
(U) NA

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 45 deg

10. REMARKS (U)

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) BS1350XL5WB (see remarks)

3. MANUFACTURER'S NAME
(U) COMTELCO

4. FREQUENCY RANGE
(U) 1200 MHz - 1550 MHz

5. TYPE (U) Monopole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) NA
b. VERTICAL SCAN (U) NA
(1) Max Elev (U) NA
(2) Min Elev (U) NA
(3) Scan Rate (U) NA
c. HORIZONTAL SCAN (U) NA
(1) Sector Scanned (U) NA
(2) Scan Rate (U) NA
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 4.5 dBi
b. 1st MAJOR SIDE LOBE
(U) NA

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 35 deg

10. REMARKS (U)

Item 2: ARDS-LITE L-Band Base Antenna

ANTENNA EQUIPMENT CHARACTERISTICS

1. (U) [ ] a. TRANSMITTING [ ] b. RECEIVING [X] c. TRANSMITTING AND RECEIVING

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) L Band Base antenna BS1350XL5WB

3. MANUFACTURER'S NAME
(U) COMTELCO

4. FREQUENCY RANGE
(U) 1.2 GHz - 1.5 GHz

5. TYPE (U) Monopole

6. POLARIZATION
(U) Vertical

7. SCAN CHARACTERISTICS
a. TYPE (U) FIXED
b. VERTICAL SCAN (U) NA
(1) Max Elev (U) NA
(2) Min Elev (U) NA
(3) Scan Rate (U) NA
c. HORIZONTAL SCAN (U) NA
(1) Sector Scanned (U) NA
(2) Scan Rate (U) NA
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 6.65 dBi
b. 1st MAJOR SIDE LOBE
(U) NA

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 35 deg

10. REMARKS (U)

Note: Antenna beam pattern is tilted upwards 7 degrees.

NTIA GENERAL INFORMATION

1. APPLICATION TITLE (U) FreeWave P-Series Telemetry Radio

2. SYSTEM NOMENCLATURE (U) FreeWave P-Series Telemetry Radio

3. STAGE OF ALLOCATION (U) [ ] a. STAGE 1 CONCEPTUAL [ ] b. STAGE 2 EXPERIMENTAL [ ] c. STAGE 3 DEVELOPMENTAL [X] d. STAGE 4 OPERATIONAL

4. FREQUENCY REQUIREMENTS
   a. FREQUENCY(IES) (U) 1350 MHz - 1390 MHz
   b. EMISSION DESIGNATORS (U) 230KF1D

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) [ ] a. YES [X] b. NO
   (U) The airborne transceiver will downlink GPS derived Time-Space-Position Information (TSPI) and test vehicle status information to receiving stations on the ground. The ground based transceivers will uplink commands and system information to the airborne test vehicles.

6. INFORMATION TRANSFER REQUIREMENTS (U) 115.2 KBPS over the air (OTA) capability

7. ESTIMATED INITIAL COST OF THE SYSTEM (U) $3,000 per transceiver

8. TARGET DATE FOR

a. APPLICATION APPROVAL	b. SYSTEM ACTIVATION	c. SYSTEM TERMINATION
(U) 03/01/2004	(U) 03/15/2004	(U) NAvail

9. SYSTEM RELATIONSHIP AND ESSENTIALITY (U) These transceivers are incorporated into expendable GPS TSPI packages installed on drones, cruise missiles, and other stand-off weapons (SOW) platforms. These expendable packages communicate with interface devices at ground relay sites which are part of the (See Remarks)

10. REPLACEMENT INFORMATION (U) None

11. RELATED ANALYSIS AND/OR TEST DATA (U)

12. NUMBER OF MOBILE UNITS (U) 50

13. GEOGRAPHICAL AREA FOR
    a. STAGE 2 (U)
    b. STAGE 3 (U)
    c. STAGE 4 (U) WSMR, NM; Holloman AFB, NM; McGregor, NM; (See Remarks)

14. LINE DIAGRAM (U) See Page(s) 10

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) MOEC MOD FLD MOEA MOEB

18. REMARKS (U)
Item 9: tri-service Advanced Range Data System (ARDS) GPS TSPI.

Item 13c: Patuxant River, MD; and CONUS Test & Training Ranges, Palmdale, CA

DOWNGRADING INSTRUCTIONS

J/F 12/09011

CLASSIFICATION UNCLASSIFIED