Frequency Allocation Summary

From the Airborne (U) equipment we will transmit
10.71 Mb/s, ½ FEC, clear O-QPSK - designated in 1494 as 21M4G1D
It must be in the 14.4 GHz – 14.83 GHz range, on a 5 MHz increment

From the Surface (N) equipment we will transmit
2 Mb/s, ½ FEC, clear BPSK - designated in 1494 as 8M00G1D
It must be in the 15.150 GHz – 15.350 GHz range, on a 5 MHz increment

Surface (N) 1494

APPLICATION FOR SPECTRUM REVIEW	CLASSIFICATION UNCLASSIFIED	PAGE 1 OF 19

NTIA GENERAL INFORMATION

1. APPLICATION TITLE (U) L-3 Wideband Data Link (CWDL)

2. SYSTEM NOMENCLATURE (U) Wideband Data Link (CWDL)

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) 14.400 GHz - 14.830 GHz 15.150 GHz - 15.350 GHz

b. EMISSION DESIGNATORS (U) 8M00G1D 21M4G1D

See Data Overflow Page

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) ☐ a. YES ☐ b. NO

(U) The Wideband Data Links provide near-real-time C3 and wideband sensor discrimination capabilities between airborne platforms and surface terminals at programmable rates.

6. INFORMATION TRANSFER REQUIREMENTS (U)

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 (U) Related/Similar systems: Guardrail J/F 12/6534, Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST), Modular Interoperable Data Link (MIST) J/F 12/6649, ATARS J/F 12/6562, Real Time Sensor Data Link (RTSDL)

10. REPLACEMENT INFORMATION (U)

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

12. NUMBER OF MOBILE UNITS (U)

13. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U)

c. STAGE 4 (U)

14. LINE DIAGRAM (U) See Page(s)	15. SPACE SYSTEMS (U) See Page(s) NA
16. TYPE OF SERVICE(S) FOR STAGE 4 (U)	17. STATION CLASS(ES) FOR STAGE 4 (U) FA

18. REMARKS ()

DOWNGRADING INSTRUCTIONS	SIN/
	CLASSIFICATION UNCLASSIFIED

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Wideband Data Link (CWDL) Surface Transmitter

2. MANUFACTURER'S NAME
(U) L-3 Communications

3. TRANSMITTER INSTALLATION
(U) Ground Locations

4. TRANSMITTER TYPE
(U) BPSK, Communications

5. TUNING RANGE
(U) 15.150 GHz - 15.350 GHz

6. METHOD OF TUNING
(U) Crystal Controlled PLL Synthesizer

8. EMISSION DESIGNATORS (See Data Overflow Page)
(U) (U) 8M00G1D (U)

7. RF CHANNELING CAPABILITY
(U) G15.15, 5MHz increments

12. EMISSION BANDWIDTH (See Data Overflow Page)
[X] CALCULATED [ ] MEASURED

9. FREQUENCY TOLERANCE
(U) 0.03 ppm

a. -3 dB	(U)	(U) 3.49 MHz	(U)
b. -20 dB	(U)	(U) 21.16 MHz	(U)
c. -40 dB	(U)	(U) NA	(U)
d. -60 dB	(U)	(U) 68.6 MHz	(U)
e. OC-BW	(U)	(U) 23.86 MHz	(U)

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

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

13. MAXIMUM BIT RATE
(U) 2 Mb/s

15. MAXIMUM MODULATION FREQUENCY
(U) NA

14. MODULATION TECHNIQUES AND CODING
(U) See Remarks

17. DEVIATION RATIO
(U) NA

18. PULSE CHARACTERISTICS (See Data Overflow Page)

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

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

19. POWER (See Data Overflow Page)

a. MEAN	(U) 2W	(U)	(U)
b. PEP	(U) NA	(U) NA	(U) NA

20. OUTPUT DEVICE
(U) Solid State Power Amplifier

21. HARMONIC LEVEL

a. 2nd	(U)	-65 dB
b. 3rd	(U)	-65 dB
c. OTHER	(U)	-80 dB

22. SPURIOUS LEVEL
(U) -80 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U)

7. 15.15 GHz, 5 MHz increments

10. 12-section waveguide filter

13. Includes R = 1/2 Convolutional Encoding FEC

14. 8M00G1D: 2Mb/s, R=1/2 FEC, CLEAR BPSK

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Wideband Data Link (CWDL) - Surface Receiver

2. MANUFACTURER'S NAME
(U) L-3 Communications

3. RECEIVER INSTALLATION
(U) Ground

4. RECEIVER TYPE
(U) Single Conversion Superheterodyne

5. TUNING RANGE
(U) 14.400 GHz - 14.830 GHz

6. METHOD OF TUNING
(U) Crystal Controlled PLL Synthesizer

8. EMISSION DESIGNATORS 21M4G1D
(U) See Data Overflow Page

7. RF CHANNELING CAPABILITY
(U) G14.4 5MHz Increments

11. RF SELECTIVITY
[X] CALCULATED [ ] MEASURED

9. FREQUENCY TOLERANCE
(U) 10 ppm

10. IF SELECTIVITY	1st (U)	2nd (U)	3rd (U)
a. -3 dB	36.5 MHz	NA	NA
b. -20 dB	59.1 MHz	NA	NA
c. -60 dB	103.7 MHz	NA	NA

a. -3 dB	(U)	570 MHz
b. -20 dB	(U)	607 MHz
c. -60 dB	(U)	725 MHz
d. Preselection Type	(U)	Waveguide Filter

12. IF FREQUENCY
a. 1st (U) 680 MHz
b. 2nd (U) NA
c. 3rd (U) NA

13. MAXIMUM POST DETECTION FREQUENCY
(U) NA

14. MINIMUM POST DETECTION FREQUENCY
(U) NA

16. MAXIMUM BIT RATE
(U) 10.71 Mb/s

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

17. SENSITIVITY
a. SENSITIVITY (U) -91 dBm
b. CRITERIA (U) BER = 10E-6
c. NOISE FIG (U) 3.5 dB
d. NOISE TEMP (U) NA

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

19. IMAGE REJECTION
(U) 85 dB

20. SPURIOUS REJECTION
(U) 85 dB

21. REMARKS (U) 7. 14.4 GHz, 5 MHz increments

ANTENNA EQUIPMENT CHARACTERISTICS

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

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) TCDL-N 36" Surface Antenna

3. MANUFACTURER'S NAME
(U) L-3 Communications

4. FREQUENCY RANGE
(U) 14400 MHz - 15350 MHz

5. TYPE (U) Parabolic Reflector

6. POLARIZATION
(U) Right-Hand Circular

7. SCAN CHARACTERISTICS
a. TYPE (U) MECHANICAL SCAN
b. VERTICAL SCAN (U) Mechanical
(1) Max Elev (U) +85 deg
(2) Min Elev (U) -5 deg
(3) Scan Rate (U) 10 degrees/second
c. HORIZONTAL SCAN (U) Mechanical
(1) Sector Scanned (U) 0-360 degrees
(2) Scan Rate (U) 10 degrees/second
d. SECTOR BLANKING (U) [ ] (1) YES [X] (2) NO

8. GAIN
a. MAIN BEAM
(U) 40 dBi
b. 1st MAJOR SIDE LOBE
(U) 12 dBi @ 2.5 deg

9. BEAMWIDTH
a. HORIZONTAL
(U) 1.7 deg
b. VERTICAL
(U) 1.7 deg

10. REMARKS (U)

4. Frequencies in MHz (14.40 GHz - 15.35 GHz)

8b. 12 dBi (elevation) @ 2.5 deg.
21 dBi (azimuth) @ 2.3 deg.

ANTENNA EQUIPMENT CHARACTERISTICS

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

2. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Single Band Surface Omni Antenna

3. MANUFACTURER'S NAME
(U) L-3 Communications

4. FREQUENCY RANGE
(U) 14.4 GHz - 15.350 GHz

5. TYPE (U) Dipole

6. POLARIZATION
(U) Right-Hand Circular

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

8. GAIN

a. MAIN BEAM
(U) 3 dBi

b. 1st MAJOR SIDE LOBE
(U) -2.5 dBi @ 40 deg

c. HORIZONTAL SCAN (U) NA

(1) Sector Scanned (U) NA

(2) Scan Rate (U) NA

9. BEAMWIDTH

a. HORIZONTAL
(U) 360 deg

b. VERTICAL
(U) 36 deg

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

10. REMARKS (U)

GENERAL CONTINUATION PAGE

The Wideband Data Link (CWDL) is a secure, digital wideband data link intended to provide connectivity between aircraft and surface platforms at data rates from 200 kb/s to 45 Mb/s. Interfaces for user network data (Ethernet), Video, and Acoustic sensor data are provided to provide a near-real-time transmission of user or sensor data between airborne and surface platforms.

Airborne (U) 1494

APPLICATION FOR EQUIPMENT FREQUENCY ALLOCATION	CLASSIFICATION UNCLASSIFIED	DATE	J/F 12/
			Page 1 of 16 Pages

DOD GENERAL INFORMATION

TO	FROM

1. APPLICATION TITLE (U) Tactical Common Data Link (TCDL)

2. SYSTEM NOMENCLATURE (U) Tactical Common Data Link (TCDL)

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

4. FREQUENCY REQUIREMENTS

a. FREQUENCY(IES) (U)	15.15 GHz - 15.35 GHz	14.40 GHz - 14.83 GHz	
b. EMISSION DESIGNATORS (U)		8M00G1D	21M4G1D

See Data Overflow Page

5. TARGET STARTING DATE FOR SUBSEQUENT STAGES

a. STAGE 2 (U) NA	b. STAGE 3 (U) NA	c. STAGE 4 (U) 01-01-00

6. EXTENT OF USE (U)

7. GEOGRAPHICAL AREA FOR

a. STAGE 2 (U) NA

b. STAGE 3 (U)

c. STAGE 4 (U)

8. NUMBER OF UNITS

a. STAGE 2	b. STAGE 3	c. STAGE 4

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

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

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

12. NAMES AND TELEPHONE NUMBERS (U)

a. PROGRAM MANAGER	(1) COMMERCIAL	(2) DSN
b. PROJECT ENGINEER	(1) COMMERCIAL	(2) DSN

13. REMARKS (U)

Block 11: Operates with Army's AN/UPQ-3 (A/B) [J/F 12/ 6534] and Navy's Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST) AN/USQ-123(V). Also operates with Modular Interoperable Surface Terminal (MIST) [J/F 12/ 6649].

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Tactical Common Data Link (TCDL) - Airborne Transmitter

2. MANUFACTURER'S NAME
(U) L-3 Communications

3. TRANSMITTER INSTALLATION
(U) Aircraft Platform

4. TRANSMITTER TYPE
(U) OQPSK, Communications

5. TUNING RANGE
(U) 14.40 GHz - 14.83 GHz

6. METHOD OF TUNING
(U) Crystal Controlled Synthesizer

7. RF CHANNELING CAPABILITY
(U) 14.4GHz, 5MHz increments, 87 channels

8. EMISSION DESIGNATORS — See Data Overflow Page
(U) (U) 21M4G1D (U)

9. FREQUENCY TOLERANCE
(U) 0.03 ppm

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

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

12. EMISSION BANDWIDTH — See Data Overflow Page
[X] CALCULATED [ ] MEASURED

a. -3 dB	(U)		(U)	9.4 MHz	(U)
b. -20 dB	(U)		(U)	57.4 MHz	(U)
c. -40 dB	(U)		(U)	NA	(U)
d. -60 dB	(U)		(U)	228 MHz	(U)
e. OC-BW	(U)		(U)	63 MHz	(U)

13. MAXIMUM BIT RATE
(U) 10.71 Mbps

15. MAXIMUM MODULATION FREQUENCY
(U) NA

14. MODULATION TECHNIQUES AND CODING
(U) Rate 1/2 convolutional coding, constraint length 7.
1D is a DSSS waveform.

17. DEVIATION RATIO
(U) NA

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

18. PULSE CHARACTERISTICS — See Data Overflow Page

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

19. POWER — See Data Overflow Page

a. MEAN	(U)	2 W	(U)		(U)
b. PEP	(U)	NA	(U)	NA	(U) NA

20. OUTPUT DEVICE
(U) Solid State Power Amplifier (SSPA)

21. HARMONIC LEVEL
a. 2nd (U) -65 dB
b. 3rd (U) -65 dB
c. OTHER (U) -80 dB

22. SPURIOUS LEVEL
(U) -80 dB

23. FCC TYPE ACCEPTANCE NO.
(U) NA

24. REMARKS (U)

Block 10: Emission is controlled by two filters. The first filter is a 3-pole Chebyshev IF filter centered @ 680 MHz, with a 90 MHz 3 dB bandwidth. It provides 40 dB minimum stopband attenuation. The second filter is an RF waveguide filter with a 3 dB bandwith of 430 MHz. The wideband RF filtering provides 80 dB minimum stopband attenuation at 14.15 GHz and below and 105 dB minimum attenuation at 15.15 GHz and above.

Block 14:

21M4G1D: 10.71 Mb/s, R=1/2 FEC, clear O-QPSK

RECEIVER EQUIPMENT CHARACTERISTICS

1. NOMENCLATURE, MANUFACTURER'S MODEL NO.
(U) Tactical Common Data Link (TCDL) - Airborne Receiver

2. MANUFACTURER'S NAME
(U) L-3 Communications

3. RECEIVER INSTALLATION
(U) Aircraft Platform

4. RECEIVER TYPE
(U) Dual Conversion Superheterodyne

5. TUNING RANGE
(U) 15.15 GHz - 15.35 GHz

6. METHOD OF TUNING
(U) Crystal Controlled Synthesizer

8. EMISSION DESIGNATORS
(U) 8M00G1D
See Data Overflow Page

7. RF CHANNELING CAPABILITY
(U) 15.15GHz, 5MHz increments, 41 channels

11. RF SELECTIVITY
[X] CALCULATED [ ] MEASURED

9. FREQUENCY TOLERANCE
(U) 10 ppm

10. IF SELECTIVITY	1st (U)	2nd (U)	3rd (U)
a. -3 dB	200 MHz	120 MHz	NA
b. -20 dB	450 MHz	149 MHz	NA
c. -60 dB	1.5 GHz	278 MHz	NA

a. -3 dB	(U)	200 MHz
b. -20 dB	(U)	410 MHz
c. -60 dB	(U)	560 MHz
d. Preselection Type	(U)	Waveguide Filter

12. IF FREQUENCY
a. 1st (U) 2935 MHz
b. 2nd (U) 680 MHz
c. 3rd (U) NA

13. MAXIMUM POST DETECTION FREQUENCY
(U) NA

14. MINIMUM POST DETECTION FREQUENCY
(U) NA

16. MAXIMUM BIT RATE
(U) 2 Mb/s

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

17. SENSITIVITY
a. SENSITIVITY (U) -98 dBm
b. CRITERIA (U) BER 10E-6
c. NOISE FIG (U) 3.5 dB
d. NOISE TEMP (U) NA

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

19. IMAGE REJECTION
(U) 85 dB

20. SPURIOUS REJECTION
(U) 85 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) TCDL AIRBORNE ONMI ANTENNA

3. MANUFACTURER'S NAME
(U) L-3 Communications

4. FREQUENCY RANGE
(U) 14.40 GHz - 14.83 GHz

5. TYPE (U) Bicone

6. POLARIZATION
(U) Right-Hand Circular

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) 3.0 dBi
b. 1st MAJOR SIDE LOBE
(U)

9. BEAMWIDTH
a. HORIZONTAL
(U) 360 deg
b. VERTICAL
(U) 42 deg

10. REMARKS (U)

NTIA GENERAL INFORMATION

1. APPLICATION TITLE (U) Tactical Common Data Link (TCDL)

2. SYSTEM NOMENCLATURE (U) Tactical Common Data Link (TCDL)

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

4. FREQUENCY REQUIREMENTS
   a. FREQUENCY(IES) (U) 14.40 GHz - 14.83 GHz 15.15 GHz - 15.35 GHz
   b. EMISSION DESIGNATORS (U) 8M00G1D 21M4G1D
   See Data Overflow Page

5. PURPOSE OF SYSTEM, OPERATIONAL AND SYSTEM CONCEPTS (WARTIME USE) [ ] a. YES [ ] b. NO
   (U) The Tactical Common Data Link is a family of data links that provide C3 capabilities and connectivity between airborne platforms and surface terminals. It performs full duplex transfer of digital data between platforms at programmable rates.

6. INFORMATION TRANSFER REQUIREMENTS (U)

7. ESTIMATED INITIAL COST OF THE SYSTEM (U)

8. TARGET DATE FOR

a. APPLICATION APPROVAL (U)	b. SYSTEM ACTIVATION	c. SYSTEM TERMINATION

9. SYSTEM RELATIONSHIP AND ESSENTIALITY (U) Related/Similar systems: Guardrail J/F 12/ 6534, Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST), Modular Interoperable Data Link (MIST) J/F 12/ 6649, and ATARS J/F 12/ 6562

10. REPLACEMENT INFORMATION (U) None

11. RELATED ANALYSIS AND/OR TEST DATA (U) None

12. NUMBER OF MOBILE UNITS (U)

13. GEOGRAPHICAL AREA FOR
    a. STAGE 2 (U) NA
    b. STAGE 3 (U)
    c. STAGE 4 (U)

14. LINE DIAGRAM (U) See Page(s) 18

15. SPACE SYSTEMS (U) See Page(s)

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

17. STATION CLASS(ES) FOR STAGE 4 (U) MO MOD MOE

18. REMARKS (U)