



BIF003W/B-237655-86  
20 February 1986

25X1

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Sheet Count: 19  
Copy No.: X 13 (35)  
Unit 27

Rev A



**LORRI II**

**FLIGHT READINESS REVIEW**

20 FEBRUARY 1986

CONTRACT NO. [ ]

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## LORRI II EHF PERFORMANCE CHARACTERISTICS

PARAMETER	GSS RANGE	GSS RESOLUTION	GSS* ACCURACY (95%)	PREDICTED PERFORMANCE
FREQUENCY (P AND CW)	26 TO 42 GHz	250 MHz	±150 MHz	UNCERTAINTY (95%) ≤ ±140 MHz
PULSE WIDTH (P ONLY)	0.022 TO 0.39 μsec	NO SPEC	±43 nsec	UNCERTAINTY (95%) ≤ ±3 nsec
	0.39 TO 9.63 μsec	NO SPEC	±100 nsec/10% OF PW	UNCERTAINTY (95%) ±60 nsec/0.25%
PRI (P ONLY)	50 TO 3333 μsec	N/A	10 TO 1000 nsec	UNCERTAINTY (95%) ≤ 0.2 TO 13.6 nsec
DYNAMIC RANGE (P AND CW)	0 TO 30 dB ABOVE DETECTION THRESHOLD	N/A	N/A	DYNAMIC RANGE ≥ 37 dB (CW) > 30 dB (P)
SIGNAL AMPLITUDE (P AND CW)	N/A	1 dB	±5 dB**	UNCERTAINTY (95%) ≤ ±2.3 dB**

\*ALL REQUIRED PARAMETER ACCURACIES ARE MET.

\*\*AMPLITUDE ACCURACY IS REFERENCED TO THE RECEIVER INPUT PORTS.

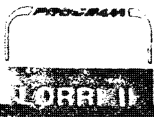
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# LORRI II EHF SENSITIVITY PERFORMANCE (DF AND OMNI)

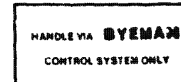
SIGNAL/CHANNEL	SYSTEM SENSITIVITY* (dBm)			GSS/ESTIMATED
	BAND 1 (26 - 30 GHz)	BAND 2 (30 - 34 GHz)	BAND 3 (34 - 38 GHz)	BAND 4 (38 - 42 GHz)
PULSE (WB DF)**	/-99.3	/-100.3	/-99.1	/-98.9
PULSE (NB DF)	-98.0/-105.7	-99.1/-106.3	-100.1/-105.5	-101.0/-104.1
PULSE (WB OMNI)**	/-70.3	/-70.8	/-70.5	/-70.2
PULSE (NB OMNI)	-70.9/-76.7	-71.3/-76.8	-71.7/-76.1	-72.0/-75.4
CW (DF)***	-129.0/-136.3	-130.1/-136.3	-131.1/-136.4	-132.0/-134.9
CW (OMNI)***	-101.9/-107.3	-102.3/-106.8	-102.7/-107.0	-103.0/-106.2

\*SENSITIVITY ESTIMATES ARE BASED ON THE MINIMUM ANTENNA GAIN WITHIN THE ACCESS REGION (OMNI AND DF) AND PAYLOAD SENSITIVITY AVERAGED OVER TEMP AND OVER EACH OF THE FOUR BANDS. A 3 dB POLARIZATION LOSS HAS ALSO BEEN USED IN THE ESTIMATE. IMPROVEMENT/DEGRADATION WITH PULSEWIDTH TRACKED THE GSS TO WITHIN 0.2 dB.

\*\*THERE IS NO GSS SPEC ON WIDEBAND (WB) PULSE SENSITIVITY.

\*\*\*RECEIVER SENSITIVITY FOR THE CW RADIOMETER IS BASED ON THE SIGNAL LEVEL REQUIRED TO GENERATE 17 dB SNR AT THE OUTPUT.

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## LORRI II VHF (POLARIMETER) PULSE PERFORMANCE CHARACTERISTICS

PARAMETER	RANGE (GSS)	RESOLUTION (GSS)	ACCURACY (95%) (GSS)	PREDICTED PERFORMANCE*
FREQUENCY	130 TO 180 MHz	100 kHz	±200 kHz	UNCERTAINTY (95%) ≤ ±112 kHz
PULSEWIDTH	5 - 50 μsec 50 - 2500 μsec	1 μsec	±1 μsec OR ±1 %	UNCERTAINTY (95%) ≤ ±1.0 μsec
PRI	>1100 μsec			
ERP	UP TO 153 dBm	0.5 dB	±2 dB (152 - 165 MHz) ±3 dB (130 - 148 MHz) ±3 dB (165 - 180 MHz)	UNCERTAINTY (95%) ≤ ±1.8 dB (152 - 165 MHz) ±1.8 dB (130 - 148 MHz) ±1.8 dB (165 - 180 MHz)
TILT ANGLE	0 - 180 deg	3.75 deg	±10° + 10% OF ESTI- MATED FARADAY	UNCERTAINTY (95%) ≤ ±8.3 deg (MEAS) + ±10% OF FARADAY
INVERSE AXIAL RATIO	0 TO +1.0 (RHCP) 0 TO -1.0 (LHCP)	0.10	±0.15	UNCERTAINTY (95%) ≤ ±0.14 (NEAR CIRCULAR POLARIZATION)
DYNAMIC RANGE	53 dB (INST) 30 dB (ATTEN)	N/A	N/A	60 dB (INST) 28 dB (ATTEN)
SENSITIVITY	-44 dBm**	N/A	N/A	-44.5 dBm**

\*ALL SPEC REQUIREMENTS MET

\*\*SENSITIVITY REDUCED 10 dB TO MINIMIZE PROBABILITY OF SATURATION PERFORMANCE

BASED ON MINIMUM SENSITIVITY AT 77 deg OFF AXIS AND AVERAGED OVER  
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## LORRI-II W-BAND PERFORMANCE CHARACTERISTICS

PARAMETER	GSS RANGE	GSS RESOLUTION	GSS ACCURACY	PREDICTED PERFORMANCE*
<u>PULSE AND CW AS APPLICABLE</u>				
FREQUENCY	70 TO 74 GHz AND 92 TO 96 GHz	250 MHz	±200 MHz	±150 MHz ACCURACY
PULSEWIDTH	21.4 TO 3.86 μsec 0.36 TO 9.63 μsec	21.4 nsec 214 nsec	±41.8 nsec ±0.1 μsec +10% OF P.W.	±3 nsec ACCURACY ±60 nsec OR 0.25% ACCURACY
DYNAMIC RANGE	26 dB	N/A	N/A	29 dB DYNAMIC RANGE
SENSITIVITY				
250 MHz (BW)	-98.5 dBm MATCHED POLARIZATION PW = 50 nsec	N/A	N/A	-101.7 dBm SENSITIVITY
4 GHz (BW)	-93.5 dBm (MATCHED POLARIZATION)	N/A	N/A	-95.7 dBm SENSITIVITY
AMPLITUDE	-	1 dB	±5 dB	±3 dB ACCURACY
ANTENNA BEAMWIDTH	6 deg	N/A	N/A	AVERAGE BEAMWIDTH >6.0 deg

\*ALL DESIGN GOALS WERE MET.

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## LORRI II EHF PERFORMANCE CHARACTERISTICS

PARAMETER	GSS RANGE	GSS RESOLUTION	GSS* ACCURACY (95%)	PREDICTED PERFORMANCE
FREQUENCY (P AND CW)	26 TO 42 GHz	250 MHz	±150 MHz	UNCERTAINTY (95%) ≤ ±140 MHz
PULSE WIDTH (P ONLY)	0.022 TO 0.39 μsec	NO SPEC	±43 nsec	UNCERTAINTY (95%) ≤ ±3 nsec
	0.39 TO 9.63 μsec	NO SPEC	±100 nsec/10% OF PW	UNCERTAINTY (95%) ±60 nsec/0.25%
PRI (P ONLY)	50 TO 3333 μsec	N/A	10 TO 1000 nsec	UNCERTAINTY (95%) ≤ 0.2 TO 13.6 nsec
DYNAMIC RANGE (P AND CW)	0 TO 30 dB ABOVE DETECTION THRESHOLD	N/A	N/A	DYNAMIC RANGE ≥ 37 dB (CW) > 30 dB (P)
SIGNAL AMPLITUDE (P AND CW)	N/A	1 dB	±5 dB**	UNCERTAINTY (95%) ≤ ±2.3 dB**

\*ALL REQUIRED PARAMETER ACCURACIES ARE MET.

\*\*AMPLITUDE ACCURACY IS REFERENCED TO THE RECEIVER INPUT PORTS.

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# LORRI II EHF SENSITIVITY PERFORMANCE (DF AND OMNI)

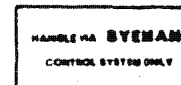
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\*SENSITIVITY ESTIMATES ARE BASED ON THE MINIMUM ANTENNA GAIN WITHIN THE ACCESS REGION (OMNI AND DF) AND PAYLOAD SENSITIVITY AVERAGED OVER TEMP AND OVER EACH OF THE FOUR BANDS. A 3 dB POLARIZATION LOSS HAS ALSO BEEN USED IN THE ESTIMATE. IMPROVEMENT/DEGRADATION WITH PULSEWIDTH TRACKED THE GSS TO WITHIN 0.2 dB.

\*\*THERE IS NO GSS SPEC ON WIDEBAND (WB) PULSE SENSITIVITY.

\*\*\*RECEIVER SENSITIVITY FOR THE CW RADIOMETER IS BASED ON THE SIGNAL LEVEL REQUIRED TO GENERATE 17 dB SNR AT THE OUTPUT.

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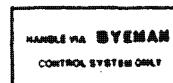
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**LORRI II VHF (POLARIMETER)  
PULSE PERFORMANCE CHARACTERISTICS**

PARAMETER	RANGE (GSS)	RESOLUTION (GSS)	ACCURACY (95%) (GSS)	PREDICTED PERFORMANCE*
FREQUENCY	130 TO 180 MHz	100 kHz	±200 kHz	UNCERTAINTY (95%) ≤ ±112 kHz
PULSEWIDTH	5 - 50 μsec 50 - 2500 μsec	1 μsec	±1 μsec OR ±1 %	UNCERTAINTY (95%) ≤ ±1.0 μsec
PRI	>1100 μsec	1 μsec	±1.5 μsec	UNCERTAINTY (95%) ≤ 0.85 μsec
ERP	UP TO 153 dBm	0.5 dB	±2 dB (152 - 165 MHz) ±3 dB (130 - 148 MHz) ±3 dB (165 - 180 MHz)	UNCERTAINTY (95%) ≤ ±1.8 dB (152 - 165 MHz) ±1.8 dB (130 - 148 MHz) ±1.8 dB (165 - 180 MHz)
TILT ANGLE	0 - 180 deg	3.75 deg	±10° + 10% OF ESTI- MATED FARADAY	UNCERTAINTY (95%) ≤ ±8.3 deg (MEAS) + ±10% OF FARADAY
INVERSE AXIAL RATIO	0 TO +1.0 (RHCP) 0 TO -1.0 (LHCP)	0.10	±0.15	UNCERTAINTY (95%) ≤ ±0.14 (NEAR CIRCULAR POLARIZATION)
DYNAMIC RANGE	53 dB (INST) 30 dB (ATTEN)	N/A	N/A	60 dB (INST) 28 dB (ATTEN)
SENSITIVITY	-44 dBm**	N/A	N/A	-44.5 dBm**

\*ALL SPEC REQUIREMENTS MET

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BASED ON MINIMUM SENSITIVITY AT 77 deg OFF AXIS AND AVERAGED OVER  
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## LORRI-II W-BAND PERFORMANCE CHARACTERISTICS

PARAMETER	GSS RANGE	GSS RESOLUTION	GSS ACCURACY	PREDICTED PERFORMANCE*
PULSE AND CW AS APPLICABLE				
FREQUENCY	70 TO 74 GHz AND 92 TO 96 GHz	250 MHz	±200 MHz	±150 MHz ACCURACY
PULSEWIDTH	21.4 TO 3.85 μsec 0.36 TO 9.63 μsec	21.4 nsec 214 nsec	±41.8 nsec ±0.1 μsec +10% OF P.W.	±3 nsec ACCURACY ±60 nsec OR 0.25% ACCURACY
DYNAMIC RANGE	25 dB	N/A	N/A	29 dB DYNAMIC RANGE
SENSITIVITY				
250 MHz (BW)	-98.5 dBm MATCHED POLARIZATION PW = 50 nsec	N/A	N/A	-101.7 dBm SENSITIVITY
4 GHz (BW)	-93.5 dBm (MATCHED POLARIZATION)	N/A	N/A	-95.7 dBm SENSITIVITY
AMPLITUDE	-	1 dB	±5 dB	±3 dB ACCURACY
ANTENNA BEAMWIDTH	6 deg	N/A	N/A	AVERAGE BEAMWIDTH >6.0 deg

\*ALL DESIGN GOALS WERE MET.

~~TOP SECRET~~ [REDACTED]

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