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ALSEP DATA SUBSYSTEM
TEST PARAMETERS

This ATM is a preliminary list of test parameters that will be checked for the ALSEP Data Subsystem components and integrated subsystem using the GSE Data Subsystem Test Set. The list is intended to be used in arriving at a finalized list of tests and accuracies required so that the design of the Data Subsystem Test Set can be started.

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1.0 COMPONENT LEVEL

1.1 TRANSMITTER

<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
1. DC Power Input:	$P_{Total} = 9.2$ watts max. $P_{+29V} = 8.95 \pm 0.15$ w at $+29$ V $\pm 1\%$ $P_{+12V} = 0.25 \pm 0.15$ w at $+12$ V $\pm 1\%$	
2. Frequency:	Chan. 1 - 2278.245 MC \pm _____ Chan. 2 - 2276.757 MC \pm _____ Chan. 3 - 2277.229 MC \pm _____	
3. RF Power Output:	+ 30 dbm (+ 1, -0)	
4. Output PM Deviation:	$\pm 1.25 \pm 0.063$ radians for 4.5 ± 0.1 V P-P mod. input at 10 cps to 100 kc/s	
5. Spurious PM:	Less than 1.4° RMS	
6. Spurious AM:	Less than 0.5% for input of 4.5 ± 0.1 V P-P from 10 cps to 100 kc/s	
7. Spurious Output:	50 db below carrier level from 10 Mc to 3500 Mc	
8. Prob. Error:	No errors with transmitter integrated to ALSEP S. C. Phase Modulator.	
9. Telemetry Voltages:	$0 \rightarrow 5$ V DC with $\pm 5\%$ match to calibration curves.	



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1.2 RECEIVER

	<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
1.	DC Power Input:	$P = 1.25$ watts max. at $12\text{ V} \pm 1\%$	
2.	Input VSWR:	< 1.5 at 2119 ± 1 Mc < 2.0 at 2109 and 2129 Mc	
3.	Noise Figure:	Less than 10 db	± 1 db
4.	IF Bandpass:	3 dbBw = 175 - 225 kc with fc at 60 Mc 60 dbBw = 600 kc max with fc at 60 Mc	
5.	Local Osc. Frequency:	2059 Mc + _____	
6.	Input L. O. Rejection:	Less than -20 dbm at 2059 Mc	
7.	Phase Demod. Output:	1 volt $\pm 10\%$ radian over peak phase deviation 2.56 radians at -101 to -61 dbm input and mod. freq. of 10 cps to 5 kcps	
8.	FM Demod. Linearity:	$< \pm 5\%$ overinput $\Delta f = 2119$ Mc \pm kcps and -101 to -61 dbm input power.	
9.	Prob. Error:	$< 10^{-9}$ over -101 to -61 dbm input for both steady state and dynamic input change at 1 Kc sweep.	
10.	Prob. Error Versus CWI:	CW Signals less than -50 dbm at ± 10 Mc from 2119 Mc at input shall not degrade P. E. specified above.	



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Test Set
Meas.
Accuracy

<u>Parameter</u>	<u>Value Required</u>	
11. Telemetry Voltages:	0 → 5 V DC with <u>± 5%</u> match to calibration curves.	

1.3 DIPLEXER

Test Set
Meas.
Accuracy

<u>Parameter</u>	<u>Value Required</u>	
1. VSWR:	See Table 1:	

Max. VSWR	Δf (Mc)	Diplexer Port Termination				Sw. Pos
		RCV	ANT	XMT-A	XMT-B	
1.36	2275-2280	50 ohm	VSWR	50 ohm	50 ohm	A & B ↑ ↓ A & B
1.36	2275-2280	50 ohm	50 ohm	VSWR	50 ohm	
1.36	2275-2280	50 ohm	50 ohm	50 ohm	VSWR	
1.36	2118-2120	VSWR	50 ohm	50 ohm	50 ohm	
1.36	2118-2120	50 ohm	VSWR	50 ohm	50 ohm	
1.50	2275-2280	50 ohm	Short	VSWR	Short	
1.50	2275-2280	50 ohm	Short	Short	VSWR	

2. Insertion Loss: See Table 2:

Max. Loss (db)	Δf (Mc)	From Port	To Port	Sw. Pos.
1.5	2275-2280	XMT-A	ANT	A
1.5	2275-2280	XMT-B	ANT	B
2.5	2118-2120	ANT	RCV	A & B

NOTE: Unused ports terminated in 50 ohms.



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Test Set Meas. Accuracy

3. Parameter Failure Mode Isolation: Value Required See Table 3:

Minimum Isolation (db)	Δf (Mc)	From Port	To Port	Sw. Pos.	Ant. Port Term.
20	2275-2280	XMT-A	XMT-B	A & B	50 ohm
20	↕	XMT-A	XMT-B	↕	Short
20		XMT-B	XMT-A		50 ohm
20	2275-2280	XMT-B	XMT-A	A & B	Short

NOTE: Receiver port terminated in 50 ohms.

4. Rejection: See Tables 4 & 5 See Tables 4 & 5
5. Switching Speed: 1 millisecond or less to switch from 10% to 90% RF output points after application of +12 V \pm 1%, 150 mw switching power.
6. RF Power Handling: 1.5 watts CW over Δf of 2275 to 2280 Mc in either Transmitter Port to a terminated or shorted Antenna Port shall not degrade switching or RF characteristics after short is removed.



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Table 4
Loss Versus Frequency for Diplexer Transmitter A/B Port
to Antenna Port

<u>Frequency (Mc)</u>	<u>Loss Limit (db)</u>	<u>Test Set Measurement Accuracy (\pm db)</u>
10.000	80 min.	
100.000		
200.000		
300.000		
400.000		
500.000		
1000.000		
1500.000		
2119.000	80 min.	
2138.245	40 min.	
2274.825	1.5 max.	
2276.757		
2277.229		
2277.500		
2278.245		
2280.175		
2416.757	40 min.	
2446.188	80 min.	
3000.000	80 min.	
3500.000	80 min.	



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Table 5

Loss Versus Frequency for Diplexer Antenna Port to Receiver Port

<u>Frequency (Mc)</u>	<u>Loss Limit (db)</u>	<u>Test Set Measurement Accuracy (\pm db)</u>
10.000	80 min.	
100.000	↑ ↓	
200.000		
300.000		
400.000		
500.000		
1000.000		
1500.000		
1999.000	80 min.	
2059.000	50 min.	
2117.910	2.5 max.	
2119.000	2.5 max.	
2120.090	2.5 max.	
2179.000	40 min.	
2239.000	80 min.	
2276.757	100 min.	
2277.229	↑ ↓	
2278.245		
3000.000	100 min.	



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Table 5 (Continued)

Loss Versus Frequency for Diplexer Antenna Port to Receiver Port

<u>Frequency (Mc)</u>	<u>Loss Limit (db)</u>	<u>Test Set Measurement Accuracy (+ db)</u>
3500.000	100 min.	
4000.000	100 min.	
5000.000	40 min.	
10000.000	40 min.	

1.4 COMMAND DECODER

<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
1. Squelch Output:		
2. Audio Signal Output:		
3. Bit Stream Output:		
4. Command Output:		
5. Command Demand Output:		
6. Command Discretes:		
7. DC Power:		
8. Telemetry:		
9. Test Points:		



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1.5 DATA PROCESSOR

<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
1. Encoding Accuracy:		
2. Data Word High and Low Limits:		
3. Frequency:		
4. Housekeeping Analog Data:		
5. DC Power:		
6. Test Points:		

2.0 SUBSYSTEM LEVEL

<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
1. Transmitter Output Frequency:	Chan. 1 - 2278.245 Mc+ Chan. 2 - 2276.757 Mc+ Chan. 3 - 2277.229 Mc+	
2. Transmitter Phase Deviation:	1.25 ± 0.63 radians peak	
3. Transmitter Output Power at Antenna Port:	+ 30 dbm (+1, -1.5)	
4. Command Processing:	Decode and process commands with no errors.	
5. Telemetry Data Processing:	Process digital inputs with no errors and process analog inputs with an accuracy of ± 5% of calibration curves.	



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<u>Parameter</u>	<u>Value Required</u>	<u>Test Set Meas. Accuracy</u>
6. Antenna Function:	Shall not degrade the performance noted in 1, 2, 4, and 5 for RF air link.	
7. DC Power Input:	$P_{Total} = 18.10$ watts max. $P_{+29 V} = \underline{\hspace{1cm}}$ watts at +29V $\pm 1\%$ $P_{+12 V} = \underline{\hspace{1cm}}$ watts at +12V $\pm 1\%$ $P_{-12 V} = \underline{\hspace{1cm}}$ watts at -12V $\pm 1\%$ $P_{+4.5 V} = \underline{\hspace{1cm}}$ watts at +4.5V $\pm 1\%$	