REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	–	Original Release	April 27, 2011	PRELIMINARY
	A	Added Customer Suggestions and made corrections	May 18, 2011	
	B	Changes to 2.0, 4.4, 4.10, Figure 8 and Data Template	May 31, 2011	

REV STATUS	REV	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	A
SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

REV STATUS	REV	A	A	A	A	B	A										
SHEETS	SHEET	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

SCD No.: 1000443 Rev. E02

	SIGN	DATE
DRAWN by	P. Wood	5/31/11
CHECKED by	P. Kuhn	5/31/11
ENGINEERING APPROVAL	D. Durbin	5/31/11
QUALITY APPROVAL	P. Wood	5/31/11

ISO 9001:2008 QMS FM Approvals MCMT. SYS. Rvk C073 The Dutch Accreditation Council

Final QA Approval:

PMI QA/QC

Digitally signed by Peter D Wood
DN: c=US, o=DST ACES Business Representative, ou=PLANAR MONOLITHICS INDUSTRIES INC, cn=Peter D Wood, 0.9.2342.19200300.100.1.1=A01096A00000123854 9A9CC000024C3
Date: 2011.05.31 15:43:57 -04'00'

PLANAR MONOLITHICS INDUSTRIES, INC.
7311-F GROVE ROAD, FREDERICK, MD 21704

FIRST ARTICLE TEST PROCEDURE

MODEL: ERDLVA-218-CW-LPD
PART No. 27314100

EXTENDED RANGE DETECTOR LOGARITHMIC VIDEO AMPLIFIER

SIZE: A	**FSCM: 05XQO**	**DRAWING No: PMIQA-11-0013**
REV: B	**SCALE: N/A**	**SHEET** 1 of 22

FIRST ARTICLE TEST PROCEDURE
(FATP)

PMI MODEL: ERDLVA-218-CW-LPD

PMI PART No: 27314100

EXTENDED RANGE DETECTOR LOGARITHMIC VIDEO AMPLIFIER
(ERDLVA)

Planar Monolithics Industries, Inc., 7311-F Grove Road, Frederick, MD 21704
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1.0 SCOPE

This procedure defines the tests required for the acceptance of a PMI Model ERDLVA-218-CW-LPD, Extended Range Detector Logarithmic Video Amplifier. **This acceptance test procedure is to be used in conjunction with Scientific Research Corporation Source Control Drawing 1000443**. In the event of a discrepancy ALL SPECIFICATION VALUES in SCD1000443 take priority over those within this document.

2.0 SELECTED TEST EQUIPMENT

Item No.	ITEM	MANUFACTURER	MODEL NUMBER
1	POWER SUPPLY	AGILENT	E3631A
2	PNA NETWORK ANALYZER	AGILENT	N5230A
3	OSCILLOSCOPE	AGILENT	DSO6034A
4	PSG ANALOG SIGNAL GENERATOR	AGILENT	E8257D
5	SWEEP OSCILLATOR	HEWLETT PACKARD	8350B
6	ARBITRARY WAVEFORM GENERATOR	AGILENT	33522A
7	POWER DIVIDER	ANAREN	44100 (2-18 GHz)
8	CRYSTAL DETECTOR	HEWLETT PACKARD	423A

Table-1

3.0 FIRST ARTICLE TESTING

First Article Testing attempts to verify that the design of the product will meet the requirements set by the customer. For this CW Immune, Extended Range, Detector Log Video Amplifier project the salient requirements set forth by the customer are as follows:

Item No.	Parameter	Required Value	Units of Measure	Goal	Note
1	**FREQUENCY RANGE**	2.0 to 18.0	GHz		
2	**POWER SUPPLY POS +**	12	Volts		10.8 to 12.5 VDC RANGE
3	**POWER SUPPLY NEG –**	12	Volts		-10.8 to -12.5 VDC RANGE
4	**TOTAL MAXIMUM POWER**	3.9	Watts		BOTH SUPPLIES
5	**OPERATING CASE TEMPERATURE**	-54 to +95	°C		
6	**STORAGE TEMPERATURE**	-62 to +95	°C		
7	**OUTPUT LOAD IMPEDANCE**	93	Ω		
8	**VIDEO OUTPUT RANGE**				

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Item No.	Parameter	Required Value	Units of Measure	Goal	Note
9	-60dBm	-0.5	Volts		
10	-60 <RF In < +4dBm	linear	Volts		
11	+4dBm	-5.5	Volts		
12	**OUTLINE DIMENSIONS**	2.04" X 1.67" X 0.472"	Inches		As per PMI dwg 27014104 IAW SRC dwg 1000443
13	**MAXIMUM WEIGHT**	8	Ounces	2.3	
14	**PACKAGE**	HERMETIC			
15	**CONNECTORS**				As per PMI dwg 27014104 IAW SRC dwg 1000443
16	**ADJUSTMENTS**	NO EXTERNAL			
17	**AM INPUT WITHOUT DAMAGE**	NO DAMAGE DUE TO CLOSELY SPACED SIGNALS			
18	**CW MAXIMUM**	+30	dBm		
19	**PEAK PULSED POWER**	+50	dBm		
20	**DUTY CYCLE**	1	%		
21	**PULSE DURATION**	10	µsec		
22	**RELIABILITY @95°C**	75k	Hours Minimum		As per Mil-HDBK-217F calculations
23	**TANGENTIAL SIGNAL SENSITIVITY (TSS) MINIMUM FROM: -54°C to +95°C**	-64	dBm	-68	
24	**LOGGING RANGE MINIMUM**	-60 to +4	dBm	-64 to 0	
25	**LINEARITY FOR ANY FREQUENCY MAXIMUM**				
26	FROM: -20°C TO +85°C	±1.50	dB	±1.0	TO BE TESTED OVER TEMPERATURE
27	FROM: -54°C TO +95°C	±1.75	dB	±1.0	TO BE TESTED OVER TEMPERATURE
28	**NOISE (Max. w/terminated input)**	100	mV rms	60	
29	**INPUT VSWR MAXIMUM**	2.0:1			
30	**LOG SLOPE**	77 ±5	mV/dB		TO BE TESTED OVER TEMPERATURE
31	**DC OFFSET**	±150	mV	0±75	
32	**SETTLING TIME TO ± 1dB**	50	nS	40	
33	**FREQUENCY FLATNESS MAXIMUM**	±2.0	dB		
34	**RISE TIME**				
35	TYPICAL	20	nS		
36	MAXIMUM	35	nS		
37	PROPAGATION DELAY	30	nS		
38	RECOVERY TIME MAXIMUM	500	nS		
39	PULSE RESPONSE W/NO CW (MIN. TO MAX.)	30nS to 100µS	Seconds	200nS to 20µS	
40	**DUTY CYCLE**				
41	AT MAXIMUM PULSE WIDTH	80	%	90	
42	AT MINIMUM PULSE WIDTH	50	%		
43	**CW IMMUNITY**				

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Item No.	Parameter	Required Value	Units of Measure	Goal	Note
44	RANGE	TSS to -40	dBm	≤1dB degradation of sensitivity from TSS to -25dBm and incremental degradation above -25dBm	
45	PULSE RESPONSE (MIN. TO MAX.)	30nS to 100µS	Seconds	200nS to 20µS	
46	PULSE WIDTH CONSIDERED "CW"	900µS	Seconds	20µS	
47	BASELINE SHIFT (MAX)	25	mV		
48	REJECTION TIME	1mS	Seconds		
49	DROOP	1.0	dB		
50	PULSE ON PULSE RESPONSE	Video output voltage vs. input response will remain unchanged for coincident or partially coincident signal powers. Total input power for multiple signals shall be processed as the sum of the individual signal powers at the time of coincidence.			

Table-2

4.0 TEST PROCEDURES

In order to verify that the design of the ERDLVA achieves the desired specification requirements the device must be tested and the results recorded. The following procedures and techniques will be followed using the various layout diagrams illustrated below. All tests shown are to be conducted at +25°C, or room ambient, unless stated differently in the procedural steps.

4.1 **VSWR** testing using layout in **Figure 1**.

4.1.1 Apply DC power per paragraph 3.0 line 2 & 3 above.

4.1.2 Set the RF power level on the PNA to -20dBm.

4.1.3 Set the PNA to sweep the frequency from 2.0 to 18.0 GHz

4.1.4 Record the maximum Return Loss and convert to VSWR and enter on the Summary Data Sheet included as Paragraph 6.1 (page 16).

4.1.5 Test to be conducted at -54°C, room ambient and +95°C.

4.2 **FLATNESS** testing using layout in **Figure 1**.

4.2.1 Apply DC power per paragraph 3.0 line 2 & 3 above.

4.2.2 Set power level on PNA to -54dBm.

4.2.3 Set the PNA to sweep the frequency from 2.0 to 18.0 GHz.

4.2.4 Test verification, do not record.

4.2.5 Set power level on PNA to -20dBm.

4.2.6 Test verification, do not record.

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4.3 PROPAGATION DELAY testing using layout in **Figure 2**.

4.3.1 Apply DC power per paragraph 3.0 line 2 & 3 above.

4.3.2 Set power level on Signal Generator to +7dBm.

4.3.3 Set the Frequency on the Signal Generator to 10GHz.

4.3.4 Set the Amplitude Modulation to 50% Duty Cycle with a 1µS Pulse Width.

4.3.5 Record the maximum delay from 50% of the Crystal Detector voltage to 50% of the ERDLVA video output voltage and enter on the Summary Data Sheet.

4.4 TANGENTIAL SIGNAL SENSITIVITY (TSS) to be tested using layouts in **Figure 3 and Figure 7**.

4.4.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.4.2 Set the Amplitude Modulation to 0.1% Duty Cycle with a 1µS Pulse Width.

4.4.3 Set the Frequency on the Signal Generator to 2.0GHz.

4.4.4 Adjust the power level and record the value of the power level where the maximum noise peak of the baseline is just clear of the minimum noise peak of the signal level and enter this value on the Summary Data Sheet.

4.4.5 Repeat step 4.4.4 at 4.0, 5.0, 8.0, 10.0 & 18.0 GHz

4.4.6 Tests to be conducted at -54°C, room ambient and +95°C

4.4.7 Repeat entire test using set up for Figure 7.

4.5 MAXIMUM NOISE testing using the layouts in **Figure 3 and Figure 7**.

4.5.1 Apply DC power per paragraph 3.0 line 2 & 3 above.

4.5.2 Turn the microwave power off, effectively terminating the input.

4.5.3 Set the Oscilloscope to measure within a 300MHz Bandwidth, AC Coupled and record the value of the Peak to Peak noise on the Summary Data Sheet.

4.5.4 Set the Oscilloscope to measure the RMS Noise and record on the Summary Data Sheet.

4.5.5 Tests to be conducted at -54°C, room ambient and +95°C.

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4.6 **RECOVERY TIME** testing using layouts in **Figure 3 and Figure 7**.

4.6.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.6.2 Set the Frequency on the Signal Generator to 2.0GHz.

4.6.3 Set the Amplitude Modulation to 0.1% Duty Cycle with a 10µS Pulse Width.

4.6.4 Set power level on Signal Generator to +4dBm.

4.6.5 Record the maximum time to settle to within 1dB of the baseline on the Summary Data Sheet.

4.6.6 Repeat test at 4.0, 5.0, 6.0, 8.0, 10.0 & 18.0 GHz.

4.6.7 Tests to be conducted at -54°C, room ambient and +95°C.

4.6.8 Repeat entire test using set up for Figure 7.

4.7 **DUTY CYCLE** testing using layout in **Figure 3 and Figure 7**.

4.7.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.7.2 Set the Frequency on the Signal Generator to 10.0GHz.

4.7.3 Set the Amplitude Modulation to 80% Duty Cycle with a 20µS Pulse Width.

4.7.4 Verify the CW nulling circuit is NOT triggered, record % of Duty Cycle & Plot.

4.7.5 Set the Amplitude Modulation to 50% Duty Cycle with a 200nS Pulse Width.

4.7.6 Verify the CW nulling circuit is NOT triggered, record % of Duty Cycle & Plot.

4.7.7 Observe results and record on the Summary Data Sheet.

4.7.8 Tests to be conducted at -54°C, room ambient and +95°C.

4.7.9 Repeat entire test using set up for Figure 7.

4.8 **RISE TIME** testing using layout in **Figure 3 and Figure 7**.

4.8.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.8.2 Set the Frequency on the Signal Generator to 10.0GHz.

4.8.3 Set the Amplitude Modulation to 0.1% Duty Cycle with a 10µS Pulse Width.

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4.8.4 Set power level on Signal Generator to +4dBm.

4.8.5 Record the maximum time from 10% to 90% Baseline to Pulse-top on the Summary Data Sheet.

4.7.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.7.7 Repeat entire test using set up for Figure 7.

4.9 SETTLING TIME testing using layout in **Figure 3 and Figure 7**.

4.9.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.9.2 Set the Frequency on the Signal Generator to 10.0GHz.

4.9.3 Set the Amplitude Modulation to 0.1% Duty Cycle with a 10µS Pulse Width.

4.9.4 Set the RF power level on the Signal Generator to +4dBm.

4.9.5 Record the maximum time to settle to within 1dB of the Pulse-top on the Summary Data Sheet.

4.9.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.9.7 Repeat entire test using set up for Figure 7.

4.10 LOG SLOPE, LOG LINEARITY, FLATNESS AND DC OFFSET testing using layout in **Figure 3 and Figure 7**.

4.10.1 Set up test equipment per Figure 3 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.10.2 Set the Amplitude Modulation to 0.1% Duty Cycle with a 10µS Pulse Width.

4.10.3 Set up the Signal Generator so one can vary the Frequency from 2.0 to 18.0 GHz in 250MHz increments while simultaneously varying the RF Power Level from -65dBm to +5dBm in 5dB increments. Step through the Frequency increments observing effect of the RF Power changes.

4.10.5 Observe the pulse top voltage potential at each power level and enter data into excel data template TP1 to calculate the Log Slop, Log Linearity, Flatness and the DC Offset with no RF power.

4.10.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.10.7 Repeat test with 130 foot RG180 test cable replacing the illustrated 7 foot test cable.

4.11.7 Repeat test with DC Power of 10.8vdc.

4.11.8 Repeat entire test using set up for Figure 7.

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4.11 **CW IMMUNITY RANGE** testing using layout in **Figure 4**.

4.11.1 Set up test equipment per Figure 4 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.11.2 Set up Signal Generator 1 Frequency to 10.0GHz and set the power level to -40dBm.

4.11.3 Set up Signal Generator 2 (sweep oscillator) Frequency to 9.0GHz and set the power level to -40dBm.

4.11.4 Set the Amplitude Modulation on Signal Generator 1 to 50% Duty Cycle with a 10µS Pulse Width.

4.11.5 Record the pulse top voltage potential when Signal Generator 2 power level is turned on and then again when the power is turned off.

4.11.6 Calculate the difference in voltage potential and convert to dB equivalent.

4.11.7 Tests to be conducted at -54°C, room ambient and +95°C.

4.12 **DROOP** testing using layout in **Figure 4**.

4.12.1 Set up test equipment per Figure 4 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.12.2 Set up Signal Generator Frequency to 10.0GHz and set the power level to -40dBm.

4.12.3 Set the Amplitude Modulation on Signal Generator 1 to 50% Duty Cycle with a 5mS Pulse Width.

4.12.4 Record the Droop of the pulse top voltage potential after 20µS.

4.12.5 Calculate the difference in voltage potential and convert to dB equivalent.

4.12.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.12.7 Repeat test after setting Signal Generator RF power lever to -10dBm.

4.13 **REJECTION TIME** testing using layout in **Figure 7**.

4.13.1 Set up test equipment per Figure 7 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.13.2 Set up Signal Generator Frequency to 10.0GHz and set the power level to -50dBm to 0dBm in 10dB Steps.

4.13.3 Set the Amplitude Modulation on the Signal Generator to 10% Duty Cycle with a 5mS Pulse Width.

4.13.4 Record the time the CW Immune Circuit takes to reject a CW Signal after 20µS.

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4.13.5 Plot the recorded data points.

4.13.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.14 PULSE CONSIDERED "CW" testing using layout in **Figure 7**.

4.14.1 Set up test equipment per Figure 7 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.14.2 Set up Signal Generator Frequency to 10.0GHz and set the power level to -40dBm.

4.14.3 Set the Amplitude Modulation on Signal Generator to 10% Duty Cycle with a 5mS Pulse Width.

4.14.4 Record the time the CW Immune Circuit takes to trigger the CW Rejection Circuit.

4.14.5 Plot the recorded data points.

4.14.6 Tests to be conducted at -54°C, room ambient and +95°C.

4.15 POWER testing using layout in **Figure 5**.

4.15.1 Set up test equipment per Figure 5 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.15.2 Set the voltages to ±10.8vdc and record currents, then, Repeat for ±12.5vdc and ±12.0vdc.

4.15.3 Tests to be conducted at -54°C, room ambient and +95°C.

4.16 PULSE ON PULSE VERIFICATION testing using layout in **Figure 6**.

4.16.1 Set up test equipment per Figure 6 and apply DC power per paragraph 3.0 line 2 & 3 above.

4.16.2 Set up Signal Generator #1 to vary the RF Power from -30dBm to 0dBm in 10dB steps.

4.16.3 Set power level on Signal Generator#2 to -20dBm.

4.16.4 Set the Frequency on Signal Generator#1 at 9.0GHz and Signal Generator #2 to 10.0GHz.

4.16.5 Set the Amplitude Modulation to 10% Duty Cycle with a 10µS Pulse Width.

4.16.6 Verify the pulses are processed as the sum of individual signal powers at the time(s) of coincidence and plot the results.

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4.17 **AM MODULATION** testing using layout in **Figure 8**.

4.17.1 Apply DC power per paragraph 3.0 line 2 & 3 above.

4.17.2 Set power level on Signal Generator 1 & 2 to -20dBm.

4.17.3 Set the Amplitude Modulation on Signal Generator 1 to 10% Duty Cycle with a 10µS Pulse Width.

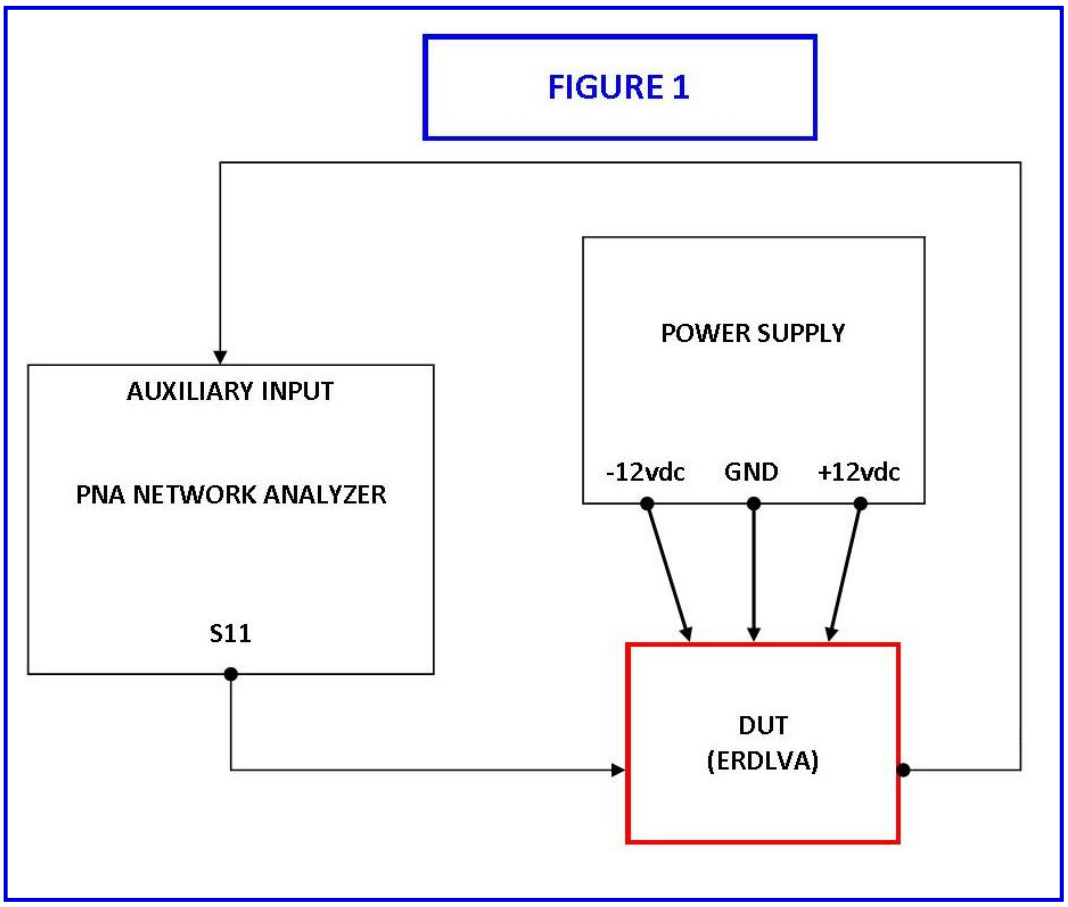
4.17.4 Set the Amplitude Modulation on Signal Generator 2 to 2% Duty Cycle with a 2µS Pulse Width.

4.17.5 Set the Frequency on the Signal Generator 2 to 10 GHz.

4.17.6 Vary the Frequency on Signal Generator1 and record the frequency just before the ERDLVA Output becomes unstable.

5.0 TEST LAYOUTS

5.1 Figure 1:



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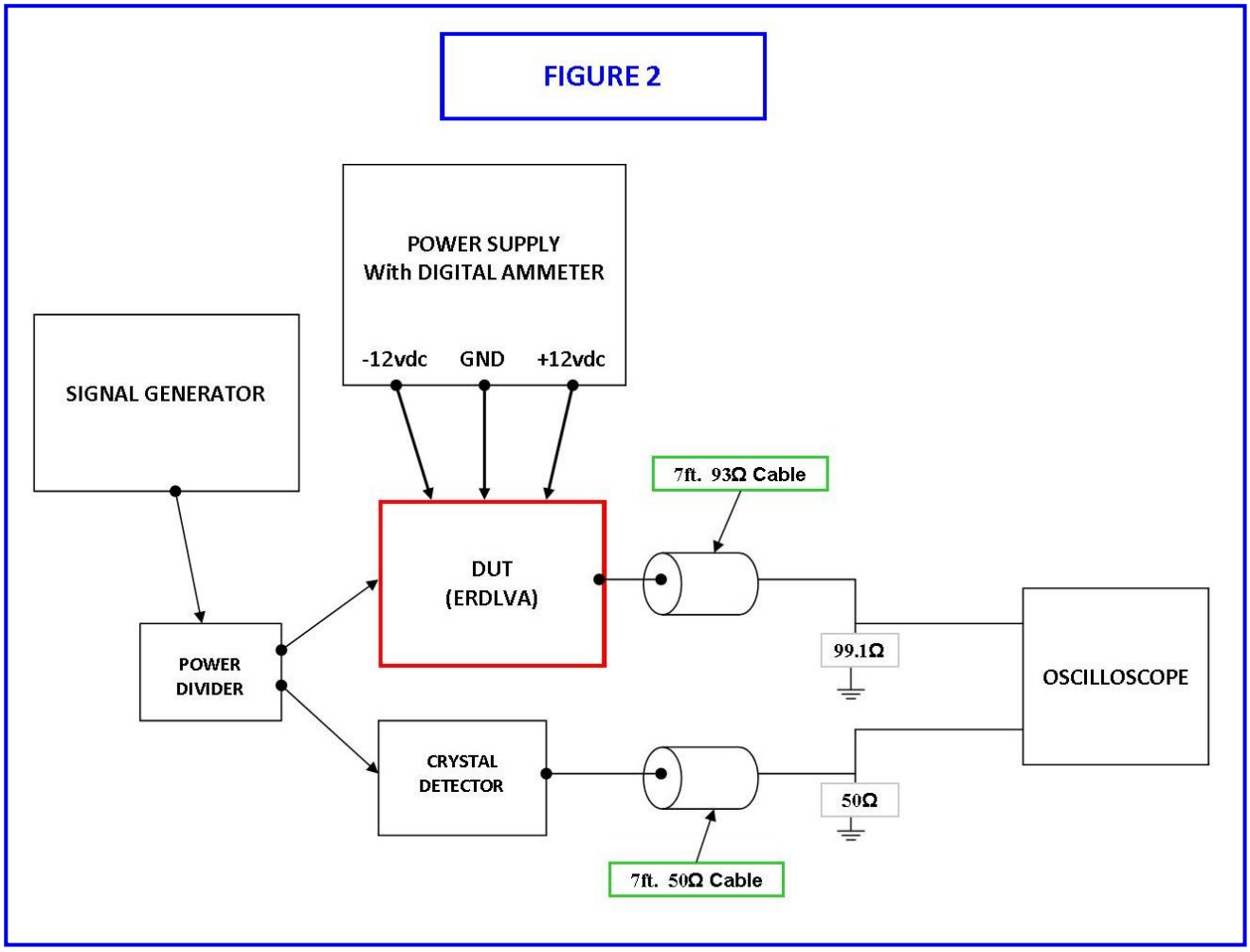
5.2 Figure 2:



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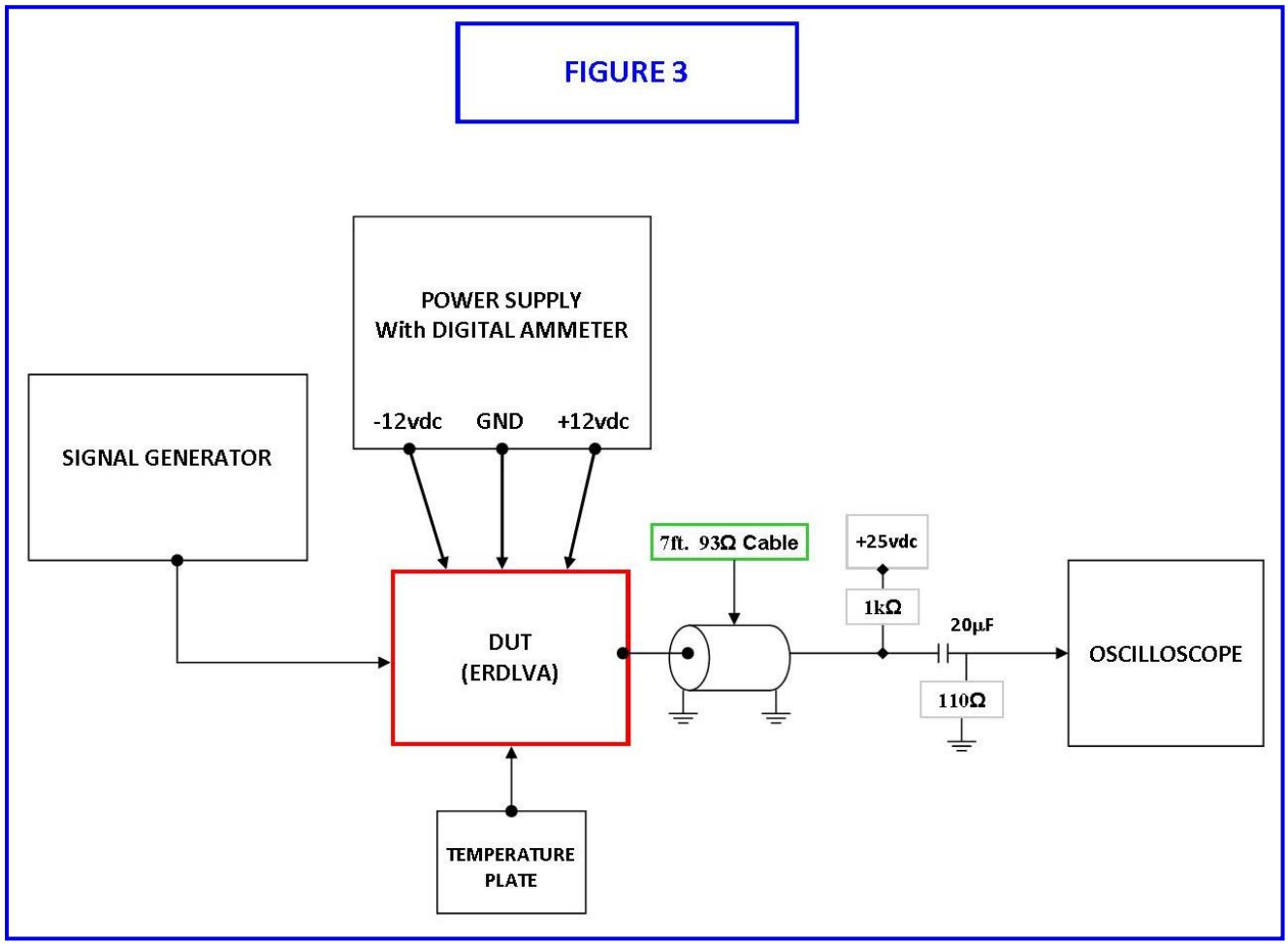
5.3 Figure 3:



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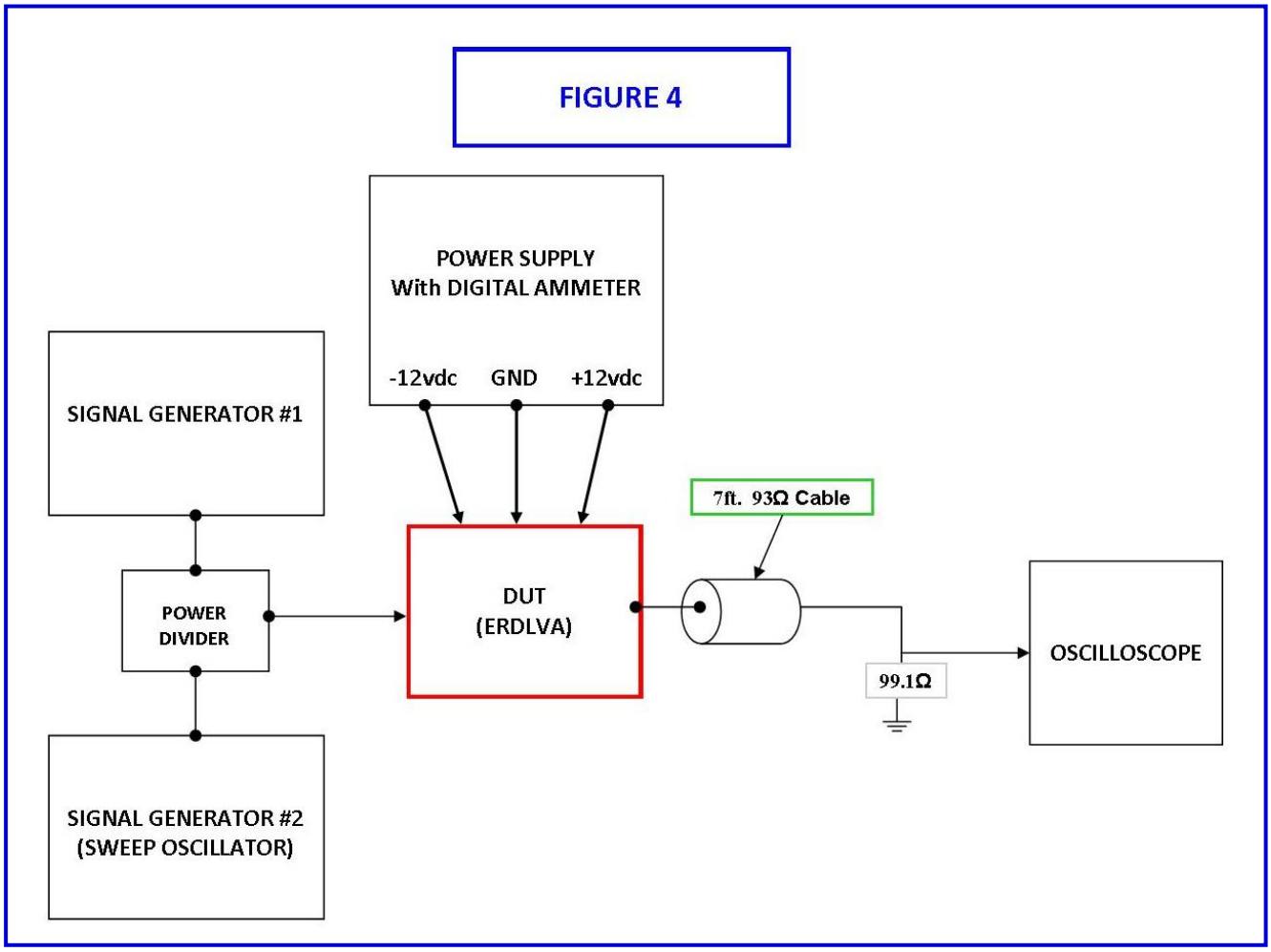
5.4 Figure 4:



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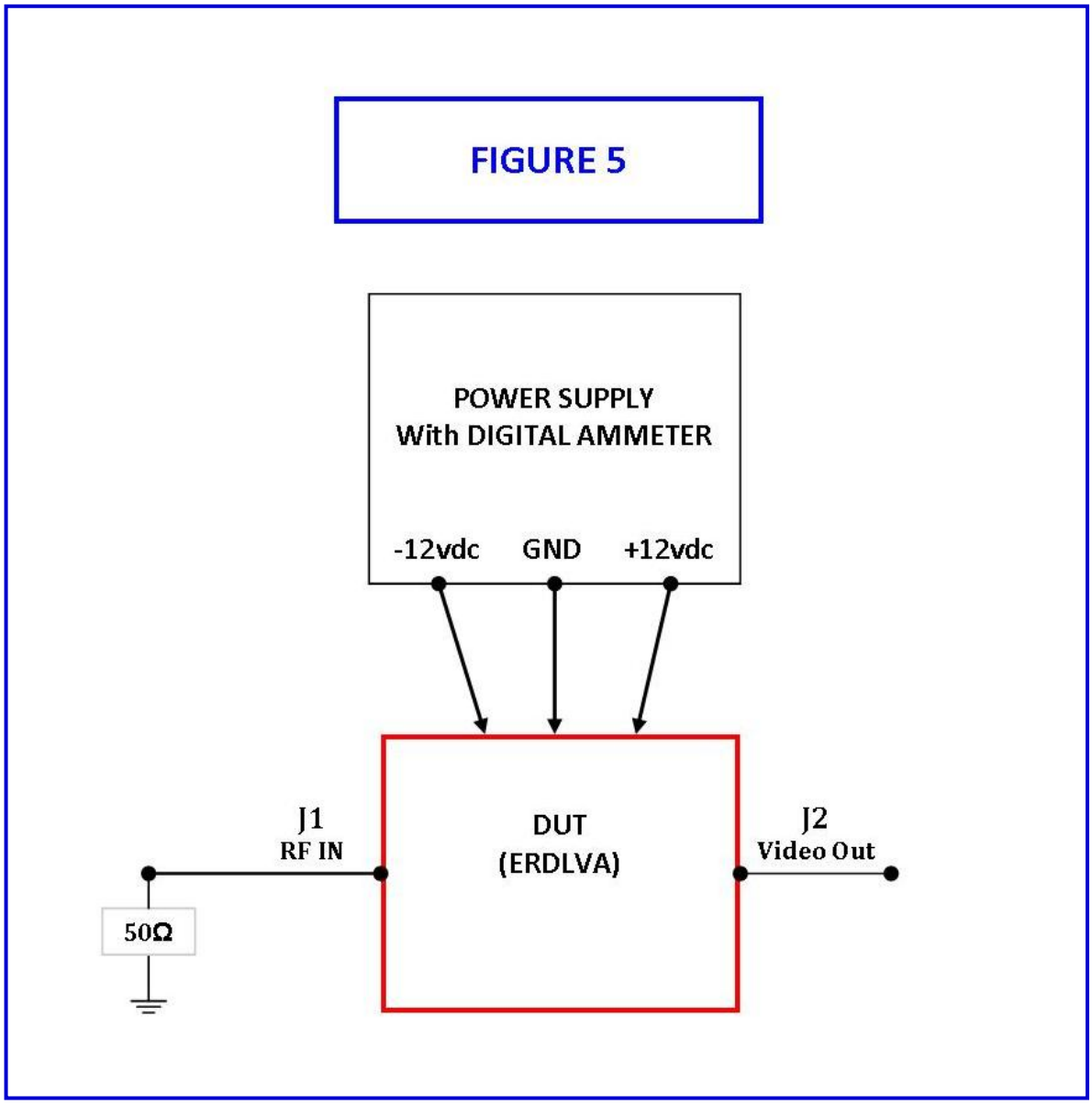
5.5 Figure 5:



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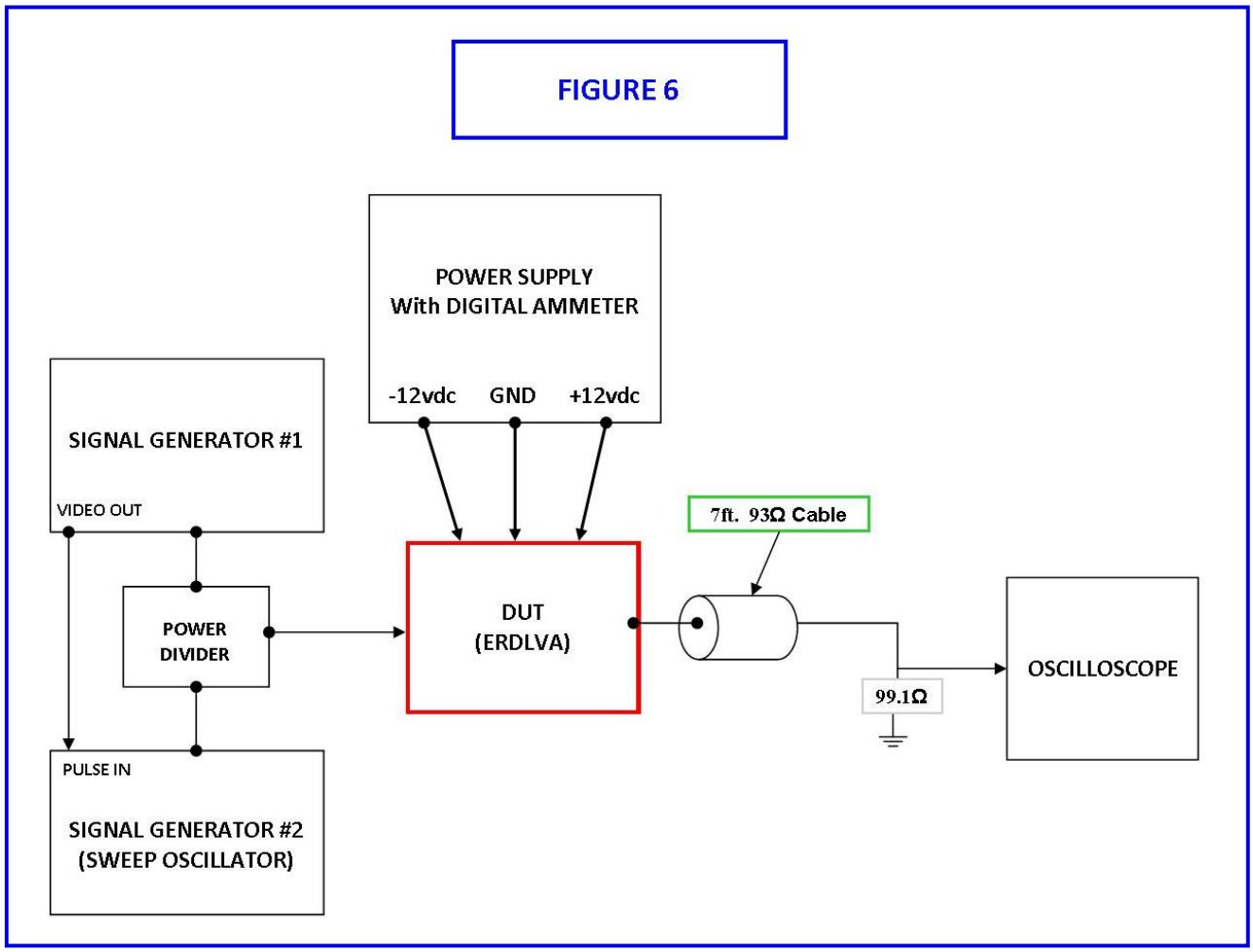
5.6 Figure 6:



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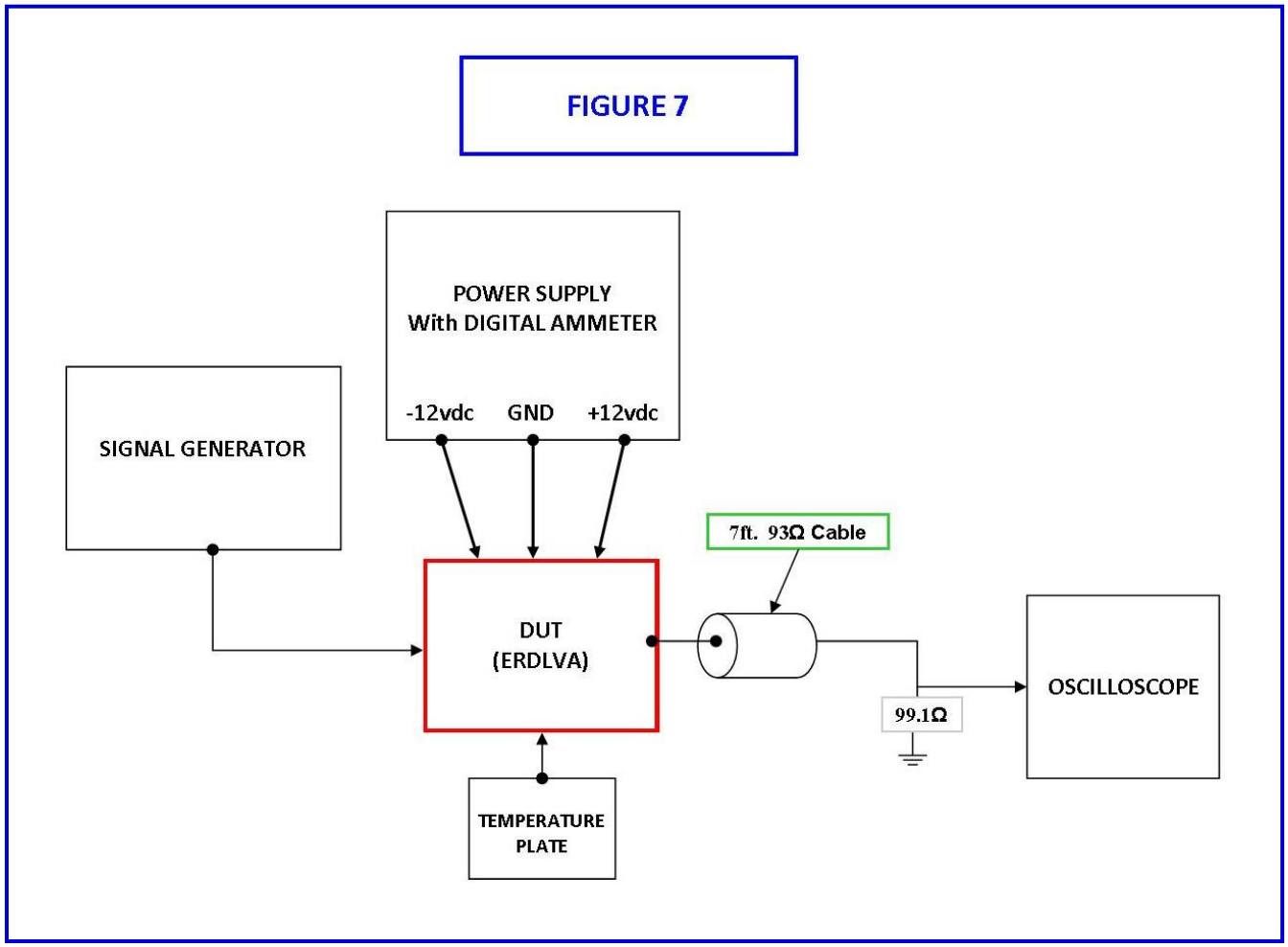
5.7 Figure 7:



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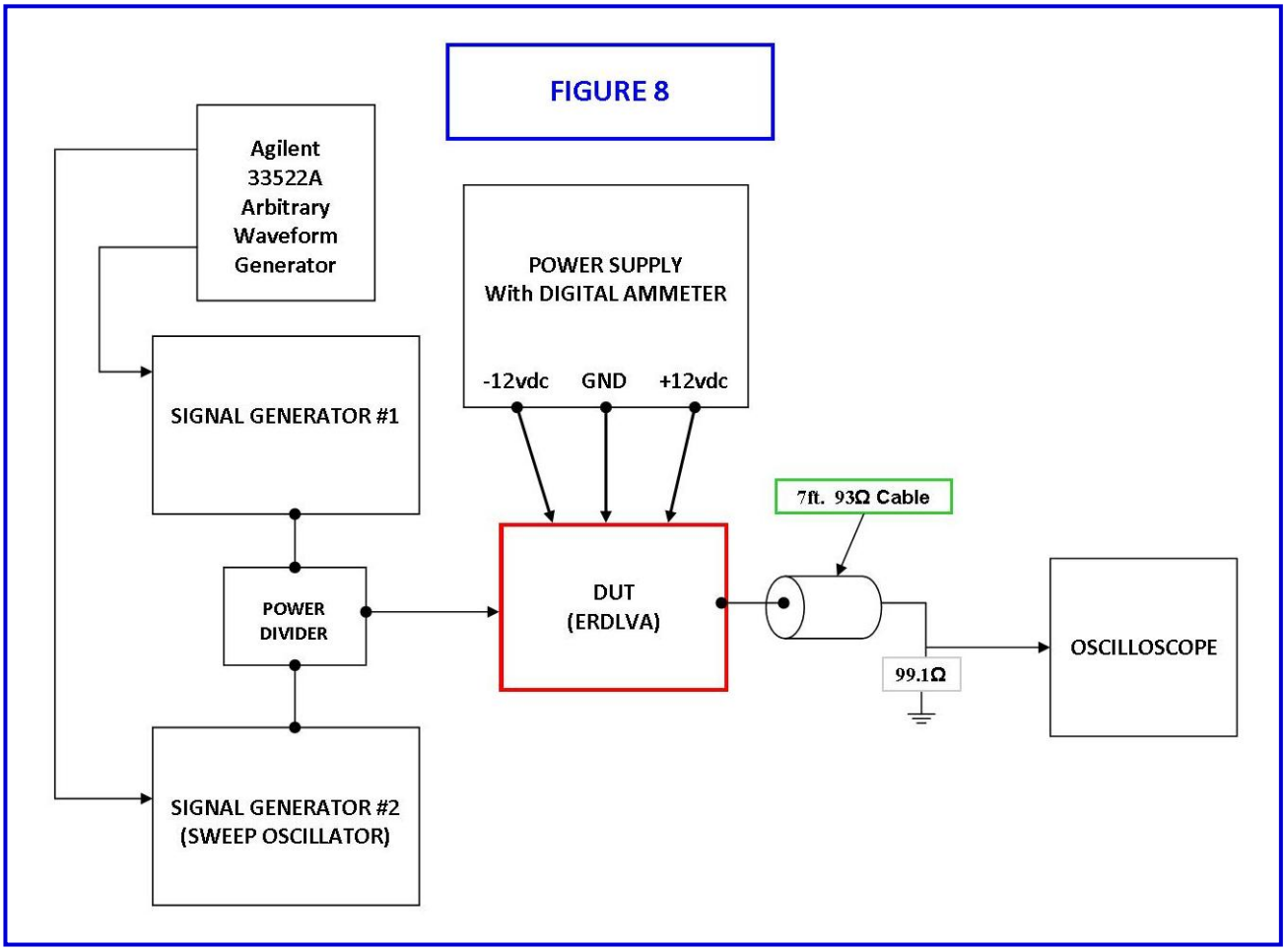
5.8 Figure 8:



6.0 INCLUSIONS

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6.1 SUMMARY DATASHEET TEMPLATE

ERDLVA-218-CW-LPD

Customer: SRC, GA
Job No: SO11-012-P
Model No: ERDLVA-218-CW-LPD
Serial No: PL

Tested By: _____
Temperature: _____
Date: _____

TEST. ITEM NO	PARAMETERS	SPECIFIED VALUE	MEASURED DATA	QA
1	Frequency Range:	2 GHz – 18 GHz	2 GHz – 18 GHz	
2	CW Level Range:	TSS to -40 dBm:	dB	
3	Input Power:	30 dBm CW, 50 dBm Peak Pulse 1% Duty cycle (10us)	Pass By Design	
4	Flatness:	± 2.0 dB Max.	± dB See Plots	Test over Temperature
5	Propagation Delay	30nSec	nSec	
6	Log Linearity	± 1.75 dB Max.	± dB See Plots	Test over Temperature
7	Logging Range:	-60 to +5 dBm	-60 to +5 dBm	
8	Log Slope	77mV/dB (±5)	(Worst Case)mV/dB & See Plot	Test over Temperature
9	VSWR:	2.0:1 Max.	:1	
10	Maximum Noise	100mV RMS	mV	
11	Duty Cycle	80% Max PW / 50% Min. PW	%	
12	Droop	1dB	dB	
13	Rejection Time	1mSec	mSec	
14	Rise Time:	35 nSec Max.	nSec	
15	Pulse Considered CW	900 µSec	µSec	
16	Recovery Time:	500 nSec Max.	nSec	
17	TSS:	-64 dBm Min.	dBm	
18	DC Supply Power:	± 10.8 to ± 12.5V Max Power 3.9W Both supplies	+ 12.5Volts @ mA - 12.5Volts @ mA w	

QA/QC Approval: _____ Date: _____

Planar Monolithics Industries, Inc., 7311-F Grove Road, Frederick, MD 21704
Tel: 301-662-5019 Fax: 301-662-1731 sales@pmi-rf.com www.pmi-rf.com

6.2 SUMMARY DATASHEET TEMPLATE TP1

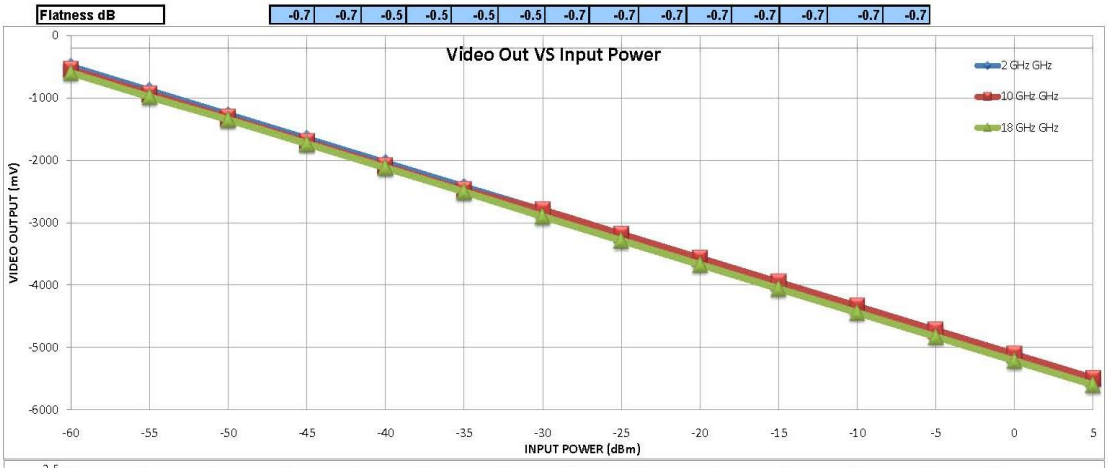
The final version of this datasheet will include all of the frequencies as well as the three temperatures: 25°C, -54°C & 95°C over which the data was taken.

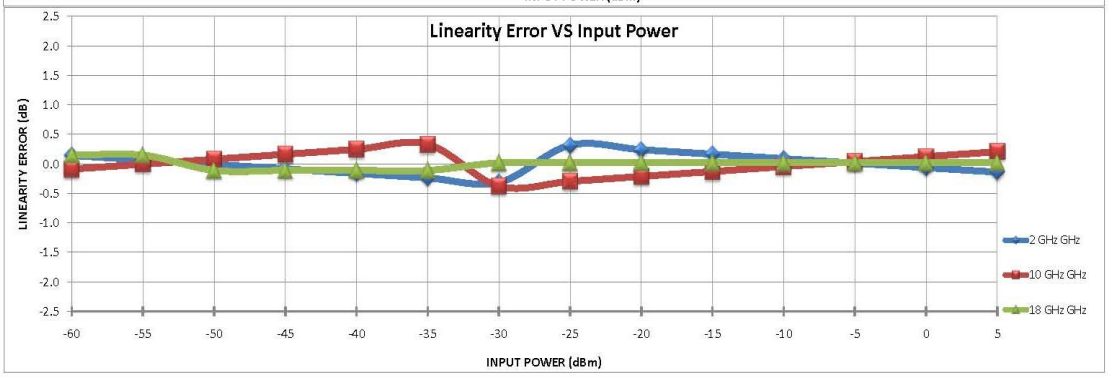
LOG TRANSFER VS FREQUENCY @ 25 °C
MODEL: ERDLVA-218-CW-LPD OPTION :
TESTED BY:
SERIAL No. : PK TEMP 25

Thursday, April 28, 2011
10:46 AM

PLANAR MONOLITHICS INDUSTRIES
7311-F GROVE ROAD, FREDERICK, MD 21704 USA
TEL: 301-662-5019 FAX: 301-662-1731
URL: WWW.PMI-RF.COM
EMAIL: SALES@PMI-RF.COM

Frequency			-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	RF Input Power (dBm)
2 GHz	INTERCEPT (mV)	-5180	-500	-885	-1270	-1655	-2040	-2425	-2810	-3250	-3635	-4020	-4405	-4790	-5175	-5560	Measured Value (mV)
	SLOPE (mV/dB)	-78.18	-11	-5	1	7	13	19	25	-25	-19	-13	-7	-1	5	11	Error (mV)
			0.14	0.06	-0.01	-0.09	-0.16	-0.24	-0.31	0.31	0.24	0.16	0.09	0.01	-0.06	-0.14	LINEARITY ERROR (dB)
10 GHz	INTERCEPT (mV)	-5101	-550	-935	-1320	-1705	-2090	-2475	-2800	-3185	-3570	-3955	-4340	-4725	-5110	-5495	Measured Value (mV)
	SLOPE (mV/dB)	-75.73	7	1	-6	-12	-18	-25	29	23	16	10	4	-3	-9	-15	Error (mV)
			-0.09	-0.01	0.08	0.16	0.24	0.33	-0.38	-0.30	-0.21	-0.13	-0.05	0.04	0.12	0.20	LINEARITY ERROR (dB)
18 GHz	INTERCEPT (mV)	-5209	-600	-985	-1350	-1735	-2120	-2505	-2900	-3285	-3670	-4055	-4440	-4825	-5210	-5595	Measured Value (mV)
	SLOPE (mV/dB)	-77	-11	-11	9	9	9	9	-1	-1	-1	-1	-1	-1	-1	-1	Error (mV)
			0.15	0.15	-0.11	-0.11	-0.11	-0.11	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	LINEARITY ERROR (dB)
	Flatness dB		-0.7	-0.7	-0.5	-0.5	-0.5	-0.5	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	





6.3 PRODUCT FEATURE