DASH NO.	APPLICATION		REVISIONS			
	NEXT ASSY	USED ON	REV	DESCRIPTION	DATE	APPROVED
			A	INITIAL RELEASE	4-10-13	JM
			B1	ECN # 13-0195	11-7-13	JS
			C1	ECN # 22-0033	3-14-22	JRP

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

CONTRACT NO.	**ACCEPTANCE TEST PROCEDURE** **MODEL: DLVA-6G-18G-50-HERM** **PART No. 27318000**
DRAWN: JM 4-10-13	
CHECKED JM 4-10-13	
PROJ ENGR JM 4-10-13	
PROG MGR AC 4-10-13	
MFG.ENGR	
QA ENGR AC 4-10-13	
RELIABILITY:	
CUSTOMER	

PMI	SIZE **A**	CAGE CODE **O5XQO**	DWG. NO. **28018019**	REVISION C1
	SCALE			SHEET 1 OF 15

REVISION PAGE

DESCRIPTION	DATE	PARA	PAGES	PMI	
INITIAL RELEASE	4-10-13				
ECN # 13-0195	11-7-13				
ECN # 22-0033	3-14-22				

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TABLE OF TESTS

The following tests may be performed in any convenient order except 3.3.7, 3.3.8, 3.3.9, and 3.3.10.2 shall be subsets of 3.3.10.

SPEC PARAGRAPH	PARAMETER	PARAGRAPH
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3.2.2	Weight	4.2
3.3.2	Max Input Voltage And Current (60 seconds after application of input voltage)	4.3
3.3.4	Input VSWR (6-18GHz)	4.4
3.3.5	Output VSWR (Video output impedance)	4.5
3.3.6	Tangential Signal Sensitivity (TSS) (6-18GHz) @-72dBm	4.6
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3.3.8	Maximum Video Output (6-18GHz)	4.7
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3.3.12	Pulse Rise Time	4.9
3.3.13	Pulse Overshoot	4.10
3.3.14	Pulse Fall Time	4.11
3.3.15	Recovery Time	4.12
3.3.16	Propagation Delay Time	4.13
3.3.18	Out Of Band Return Loss	4.14

1.0 SCOPE

This procedure defines the tests required for the acceptance of a PMI Model DLVA-6G18G-50-HERM

2.0 TEST EQUIPMENT

Test equipment shall be inspected for current calibration and serviceability. Test connectors shall be cleaned and inspected prior to test set connection. Coaxial test cables shall be inspected for proper impedance (i.e. 50 ohm coax for video, 50 ohm coax for RF).

2.1 TEST EQUIPMENT SUBSTITUTION

Test Equipment with equivalent or better specifications than the equipment defined in table 1 may be substituted.

Table-1

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	DIGITAL MULTIMETER	AGILENT	34410A
6	AMMETER	FLUKE	8050A
7	SWEEP OSCILLATOR	HEWLETT PACKARD	8350B
8	POWER DIVIDER	ANAREN	44100 (2-18 GHz)
9	CRYSTAL DETECTOR	HEWLETT PACKARD	423A
10	POWER METER	HEWLETT PACKARD	EPM442A

3.0 GENERAL REQUIREMENTS

Evidence supporting successful completion of in-process testing (including Burn-in & Temperature Cycling) shall be verified prior to formal acceptance testing. The UUT shall be laser welded prior to formal acceptance test to provide a tamper proof seal.

3.1 TEST CONDITIONS

Unless specified otherwise, testing shall be performed at an ambient temperature of 25 +/-3 degrees C and a relative humidity level not exceeding 85%. The UUT shall be conductively cooled in a manner that maintains the UUT case temperature within the specified ambient temperature window.

3.1.1 ENVIRONMENTAL TEST CONDITIONS

When specified in this procedure, the UUT shall be conductively cooled to a case temperature of –35 degrees C. Testing shall be performed after **30** minutes of temperature stabilization. Upon completion of test(s), the unit shall be conductively heated to a case temperature of 90 degrees C with DC power applied. Testing shall be performed after **30** minutes of temperature stabilization.

3.2 TEST FAILURE

If test failure is indicated, the test program for the UUT shall stop. Notify the cognizant engineering and quality representatives. The engineering and quality representatives shall assess the failure to assign cause. A written course of action shall be developed by engineering and quality to determine the root cause of the failure.

4.0 TEST PROCEDURE

In order to verify that the design of the UUT 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:

4.1 FORM FACTOR

a) On a sample of 10% or 1 UUT per lot, whichever is greater, measure the physical dimensions to verify compliance with outline drawing
b) Record PASS/FAIL on test summary data sheet.

4.2 WEIGHT

a) Weigh the UUT and record the weight in ounces on the summary test data sheet.

4.3 MAXIMUM INPUT VOLTAGE AND CURRENT

a) Apply +/- 12.72VDC and -12.84VDC to the power terminals of the UUT per figure 3.
b) Wait 60 seconds.
c) Apply a CW signal level of 0dBm @ 12GHz to the RF input.
d) Measure and record the plus and minus DC currents in the test summary test data sheet.
e) Repeat a-c at -35^0C
f) Repeat a-c at $+90^0$C

4.4 INPUT VSWR

a) Set up the test equipment according to figure 1.
b) Set the frequency sweep for 6-18GHz with 402 increments.
c) Perform a one-port S11 calibration on the PNA with the power level set for -23dBm.

d) Connect the UUT to the PNA.
e) Apply DC power (+/-12VDC) to the UUT.
f) Set a function marker to search/maximum.
g) Print the display and identify the results as “Graph 1 - Input VSWR”.
h) Identify the print with the Part and Serial Number.
i) Stamp (or initial) the print and date it.
j) Attach Graph 1 to the test report.

4.5 VIDEO OUTPUT IMPEDANCE (Zv)

a) Apply +/- 12VDC to the power terminals of the UUT per figure 3.
b) Set the CW Power level on the signal source such that the Video output voltage is 1.0V.
c) Remove the 50 ohm termination from the video output.
d) Re-measure the video output voltage without the 50 ohm termination.
e) Calculate the Video output Impedance using the formula: (Vopen-Vloaded) x 50 = Zv.

4.6 TANGENTIAL SIGNAL SENSITIVITY

a) Set up equipment as in Figure 2.
b) Set power level at the UUT input to -72dBm CW.
c) Apply +/-12VDC to the UUT.
d) Measure the peak signal referred to ground with a DMM.
e) Adjust the frequency for the lowest output voltage within the pass-band (6-18GHz).
f) Turn the RF power off, and measure the no signal DC offset.
g) Subtract the DC offset from the peak signal measured in step (e).
h) Measure the RMS noise voltage with the Digital Oscilloscope (AC coupled).
i) Divide the result of step (g) by the RMS noise measured in step (h).
j) Verify that the minimum ratio is 2.51.
k) For ratios greater than 2.51 calculate the TSS using the formula: 20log (measured ratio/2.51) +8 = TSS.
l) Record the result in the summary data sheet.
m) Repeat steps a thru l at -35^{0}C
n) Repeat steps a thru l at +90^{0}C

4.7 LOGGING ACCURACY

a) Set up the equipment as in Figure 3.
b) Set the frequency on the signal generator to 6GHz.
c) Apply DC power (+/-12VDC) to the UUT.
d) Step the power level at the UUT input from -70 to 0dBm in 5dB steps.
e) Record the voltage at each power level and enter into an Excel data template to calculate log accuracy, and produce a logging accuracy graph having a log slope intercept point of 350mV (Nominal) @ -70dBm RF input, and a log slope of 25mV / dB
f) Step the frequency in 1GHz increments, and repeat steps (d - e) at each increment up to 18GHz.
g) Repeat steps (d - f) at -35, and +90 ^{0} C, and label the graphs 2A, 2B, and 2C.
h) Attach the graphs of logging accuracy to the summary data sheet.

i) Record the maximum video output voltage obtained from the logging accuracy graphs in the test data sheet.

4.8 LOG OFFSET

a) Connect the UUT per figure 3.
b) Turn off the RF power.
c) Apply DC power (+/-12VDC) to the UUT.
d) Record the (No RF) log video output voltage on the summary data sheet.
e) Perform steps a) thru d) after the UUT has stabilized at the temperature extremes of -35^{0}C and +90^{0}C.

4.9 RISE TIME

a) Set up equipment as in Figure 2.
b) Set the Frequency on the Signal Generator to 10GHz.
c) Set the power level at the UUT input to 0dBm.
d) Set the pulse Modulation to 100nS PW and 1mS rep rate.
e) Apply DC power (+/-12VDC) to the UUT.
f) Measure the time from 10% to 90% on the pulse leading edge.
g) Record the rise time in the summary data sheet.
h) Repeat steps (a-g) at -35 and +90^{0}C.

4.10 PULSE OVERSHOOT

a) Set up equipment as in Figure 2.
b) Set the Frequency on the Signal Generator to 10GHz.
c) Set the power level at the UUT input to 0dBm.
d) Set the pulse Modulation to 1µS PW and 1mS rep rate.
e) Apply DC power (+/-12VDC) to the UUT.
f) Measure difference in voltage between overshoot on the pulse, and the final settled value.
g) Record the pulse overshoot voltage in the summary data sheet.
h) Repeat steps (a-g) at -35 and +90^{0}C.

4.11 PULSE FALL TIME

a) Set up equipment as in Figure 2.
b) Set the Frequency on the Signal Generator to 10GHz.
c) Set the power level at the UUT input to 0dBm.
d) Set the pulse Modulation to 1µS PW and 1mS rep rate.
e) Apply DC power (+/-12VDC) to the UUT.
f) Measure the time from 90% to 10% on the pulse falling edge.
g) Record the fall time in the summary data sheet.
h) Repeat steps (a-g) at -35 and +90^{0}C.

4.12 RECOVERY TIME

a) Set up equipment as in Figure 2.
b) Set the Frequency on the Signal Generator to 10GHz.
c) Set the power level at the UUT input to -70dBm.
d) Set the pulse Modulation to 10µS PW and 1mS rep rate.
e) Apply DC power (+/-12VDC) to the UUT.
f) Set a marker line on the pulse peak.
g) Set the power level at the UUT input to -10dBm.
h) Measure the time from 90% on the pulse falling edge to the point where the falling edge intersects the marker line set in step (f).
i) Record the recovery time in the summary data sheet.
j) Repeat steps (f-i) at -35 and +90^{0}C.

4.13 PROPAGATION DELAY TIME

a) Set the Signal Generator and Digital Storage Oscilloscope according to figure 4.
b) Set the Time Base Delay of the Digital Storage Oscilloscope to zero.
c) Temporarily replace the UUT with a Crystal Detector.
d) Enable CH. 4 display.
e) Enable the Delay Time Measurement (CH. 4 to CH.1).
f) Note the delay measurement (to 0.1nsec) for subsequent calculation.
g) Remove the Crystal Detector and connect the UUT per figure 4.
h) Apply DC power (+/-12VDC) to the UUT.
i) Enable the Rise Time Measurement on CH.1.
j) Enable the $\Delta V/ \Delta T$ menu.
k) Note the start marker time for subsequent calculation.
l) Subtract the delay time measured with the Crystal Detector from the Rise Time start marker (10%) time measured with the UUT.
m) Enter the result on the summary test data sheet.
n) Repeat steps (a-m) at -35 and +90^{0}C.

4.14 OUT OF BAND INPUT RETURN LOSS

a) Set up the test equipment according to figure 1.
b) Set the frequency sweep for 18-30GHz.
c) Perform a one-port S11 calibration on the PNA.
d) Connect the UUT to the PNA.
e) Apply DC power (+/-12VDC) to the UUT.
f) Set a function marker to search/maximum.
g) Print the display and identify the results as “Graph 3 – Out of band return loss”.
h) Identify the print with the Part and Serial Number.
i) Stamp (or initial) the print and date it.
j) Attach Graph 3 to the test report.

5.0 TEST DIAGRAMS

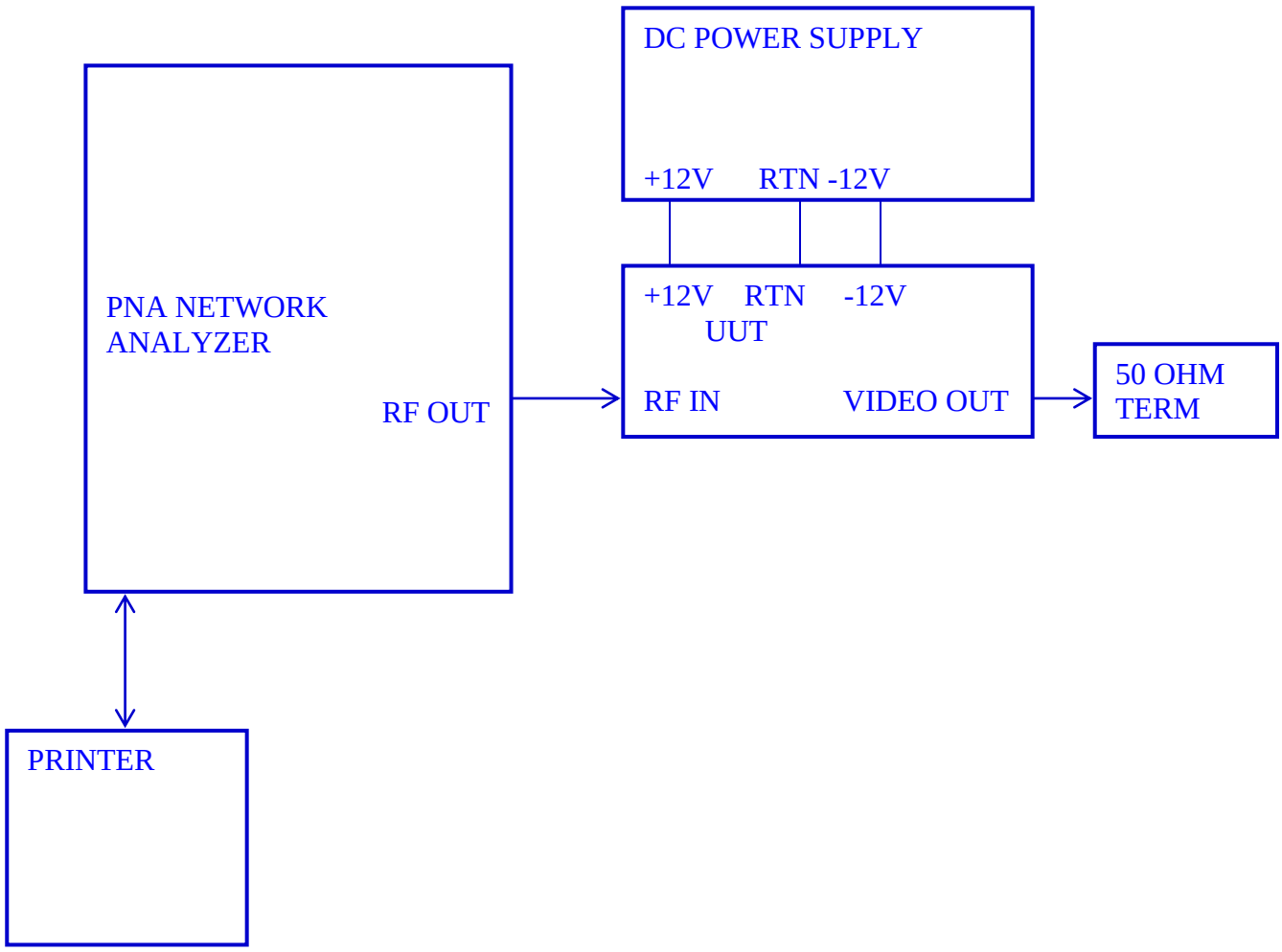

FIGURE 1
VSWR SET-UP

PMI	SIZE **A**	CAGE CODE **O5XQO**	DWG. NO. **28018019**	REVISION C1
	SCALE			SHEET 11 OF 15

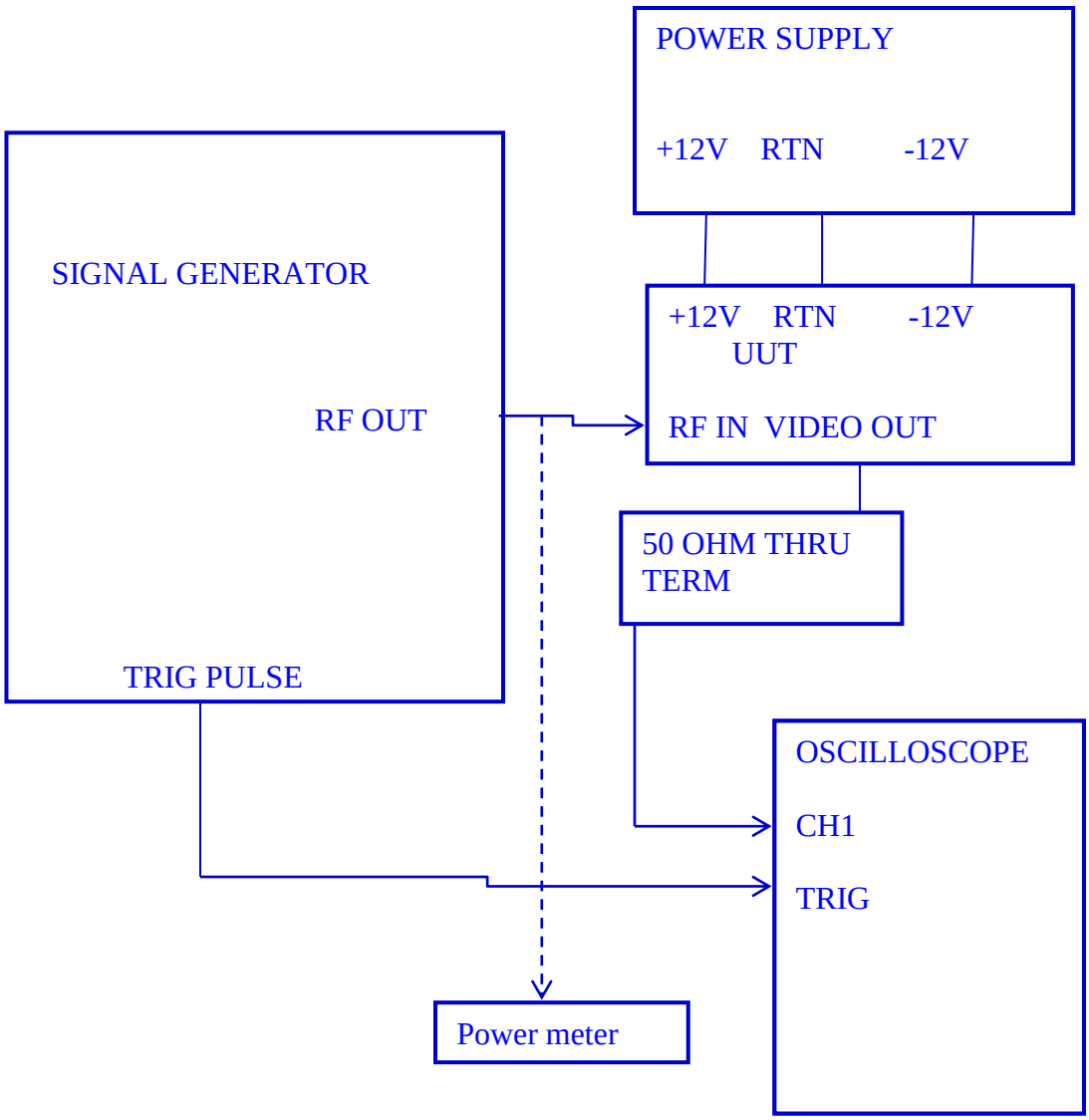

FIGURE 2

PULSE SET UP

PMI	SIZE **A**	CAGE CODE **O5XQO**	DWG. NO. **28018019**	REVISION C1
	SCALE			SHEET 12 OF 15

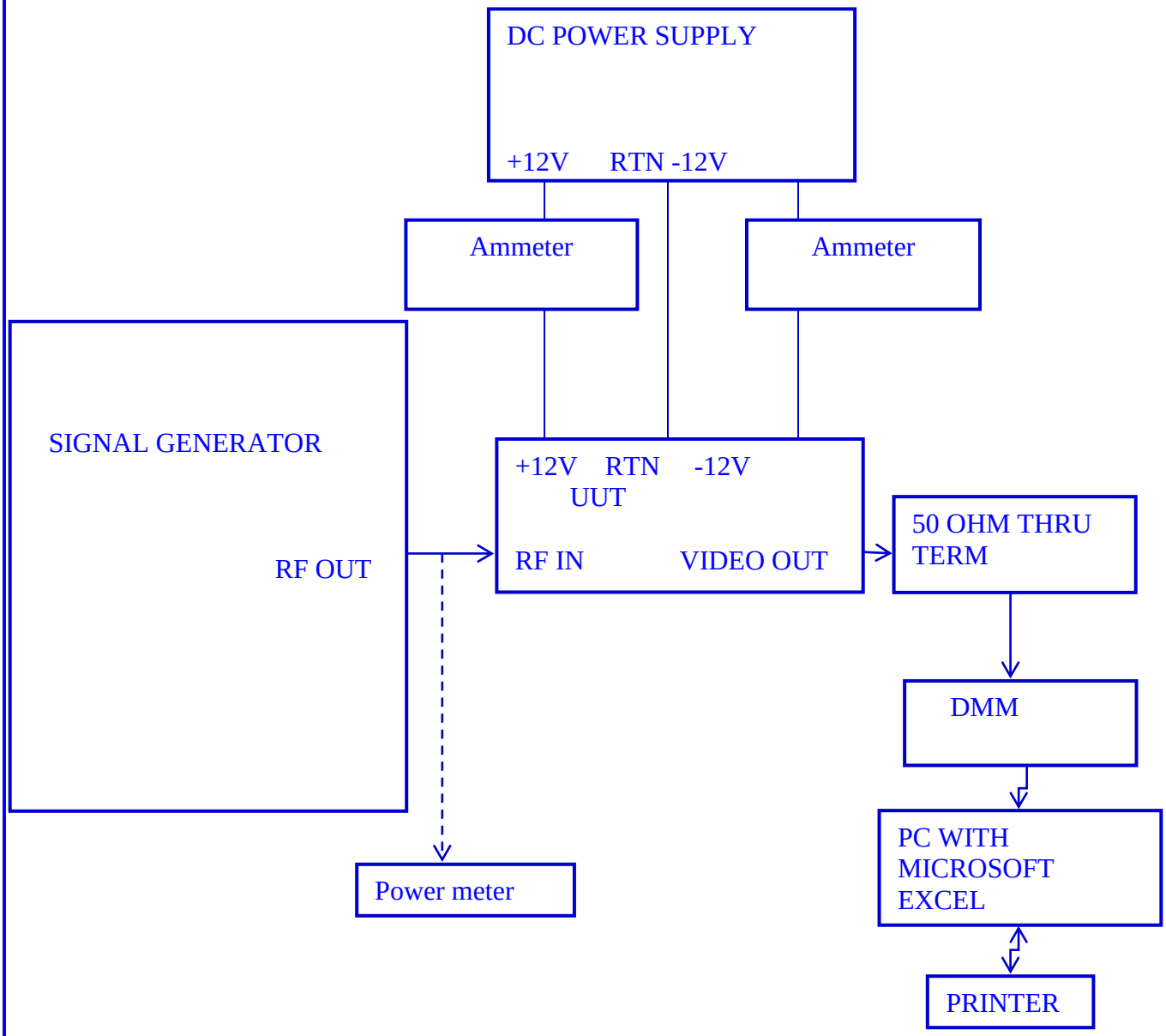

FIGURE 3
LOGGING ACCURACY
SET-UP

PMI	SIZE **A**	CAGE CODE **O5XQO**	DWG. NO. **28018019**	REVISION C1
	SCALE			SHEET 13 OF 15

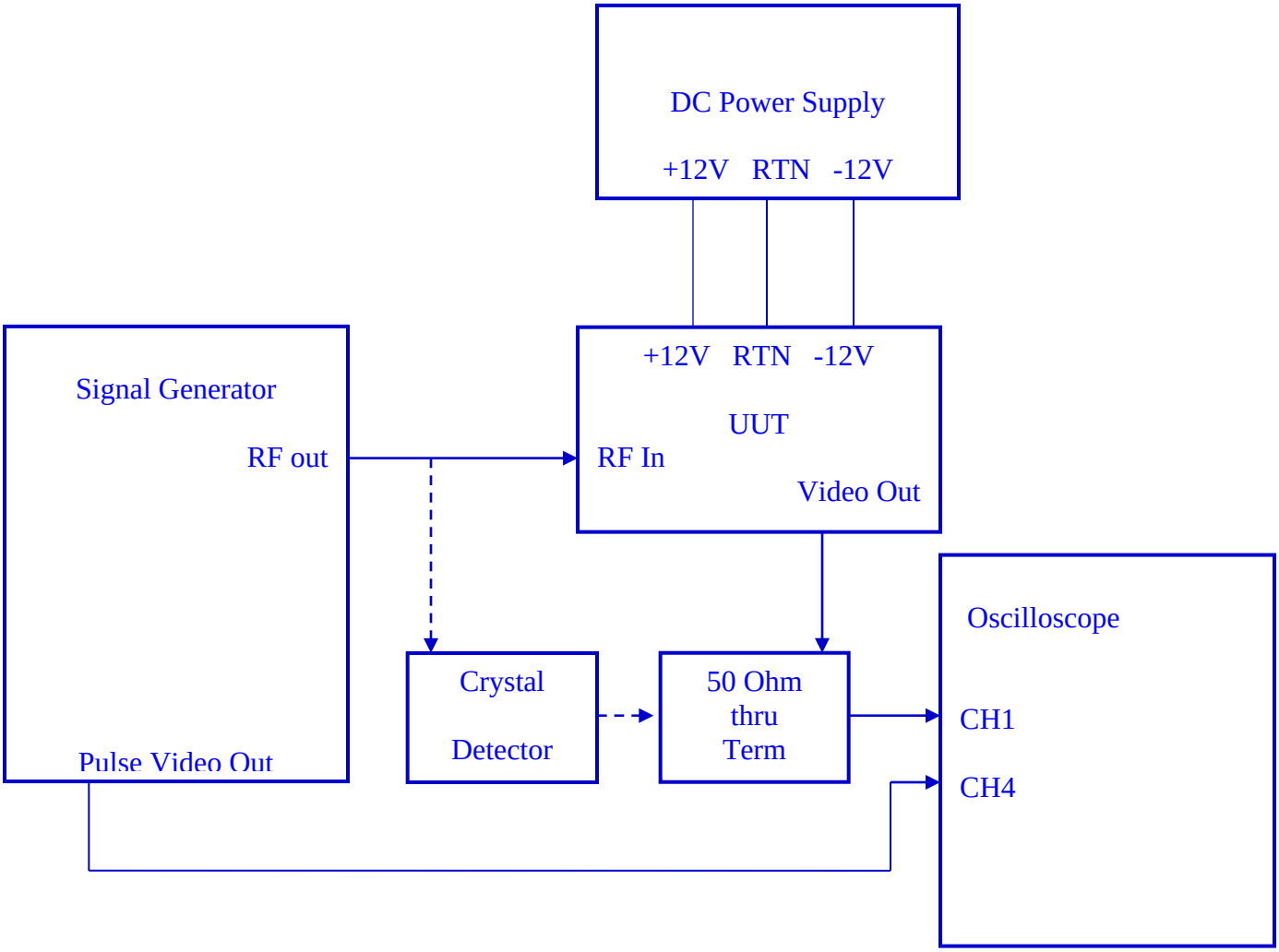

FIGURE 4
PROPAGATION DELAY TIME
SET UP

SERIAL #_____ DATE_____

REF.	NOMENCLATURE	VALUE	TOL	UNITS	+25^0 C	-35^0 C	+90^0 C
3.2.1	Form Factor	N/A	N/A	N/A	PASS / FAIL	N/A	N/A
3.2.2	Weight	4.0	MAX	OZ		N/A	N/A
3.3.2	Max Input Voltage And Current	+12V ±6% 400	MAX	mA			
		-12v ±7% 167		mA			
3.3.4	Input VSWR (6-18GHz)	3.0:1	MAX		GRAPH 1	N/A	N/A
3.3.5	Video Output Impedance	50	+/-5	Ohms		N/A	N/A
3.3.6	Tangential Signal Sensitivity	-72	MAX	dBm			
3.3.7	Output Voltage Range	0-2.2	NOM	VOLTS			
3.3.8	Maximum Video Output	2.4	MAX	VOLTS			
3.3.9	Logging Range	-70 to 0		dBm			
3.3.10	Logging Accuracy	+/- 4.0	MAX	dB	GRAPH 2A	GRAPH 2B	GRAPH 2C
3.3.10.1	DC Output Offset Voltage	0	MIN	VOLTS			
3.3.12	Pulse Rise Time	50	MAX	ns			
3.3.13	Pulse Overshoot	25	MAX	mV			
3.3.14	Pulse Fall Time	70	MAX	ns			
3.3.15	Recovery Time	70	MAX	ns			
3.3.16	Propagation Delay Time	15	MAX	ns			
3.3.18	Out Of Band Return Loss	-2	MAX	dB	GRAPH 3	N/A	N/A

TESTED BY_____ QA_____