



**SUMMARY TEST DATA  
ON  
HADA-D2002**

Customer: _____	Tested By: <u>D. Weinrob</u>
SO No: _____	Temperature: <u>+25°C</u>
Model No: <u>HADA-D2002</u>	Date: <u>09/27/24</u>
Serial No: <u>PL47856/2439</u>	Drawing No: <u>27620222</u> Rev: <u>A1</u>

TEST. ITEM NO	PARAMETERS	SPECIFIED VALUE	TEST RESULTS	QA QC
1	Frequency Range:	2.0 GHz – 18.0 GHz	<b>2.0 GHz – 18.0 GHz</b> See Plot	PMI QA
2	TSS:	-40 dBm Min @ -40°C to +85°	<b>-42.5 dBm</b> See Plot	
3	Frequency Flatness:	±1.65 dB Max	<b>0.87 dB</b> See Plot	
4	Input / Output Characteristics: (93 Ω)	Y = 2150 + 50X [X: Input (dBm), Y: Output (mv)]	<b>Pass</b>	
5	Logging Accuracy	±1.5 dB Max (@ +25°C, 10 GHz)* [-36 dBm ≤ INPUT ≤ +4 dBm] ±3.1 dB Max (Note)	<b>-0.36 dB / -0.74 dB</b>  <b>1.18 dB / 1.50 dB</b> See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	<b>0.33 dB / -0.38 dB</b> <b>0.46 dB / -0.51 dB</b> See Plot	
7	Maximum Input Power (CW):	+23 dBm	<b>Pass</b>	
8	Duty Cycle:	100%	<b>Pass</b>	
9	Rise Time:	30 ns Max (10% to 90%)	<b>18 ns</b> See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	<b>195 ns</b> See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	<b>42 mV @ +25°C</b> <b>68 mV @ -40°C</b> <b>80 mV @ +85°C</b> See Plot	

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12	Input VSWR:	3.0:1 Max @ +23 dBm	1.88:1 See Plot	PMI QA3
13	Propagation Delay:	60 ns Max	45 ns	
14	Power Supply:	+12 ± 1VDC @ 125 mA Max -12 ± 1VDC @ 75 mA Max	+12 ± 1VDC @ 90mA -12 ± 1VDC @ 40mA	
15	Warm Up Time:	2 Minutes Max	2 Minutes	

\*Notes: Includes Frequency Flatness, Input Power, Temperature Deviation and Deviation for DC Offset. The test shall be performed using RG-62 (or equivalent), 5 meter, 93±0.5 Ohms terminated.

QA/QC Approval: K. Klauinger Date: 9-30-24



## SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C  
 MODEL: HADA-D2002  
 SERIAL NO: PL47856  
 TESTED BY: D. Weinrob  
 DATE: 9/30/2024



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GRAPH #1

Output Voltage Offset= 0.042 Volts

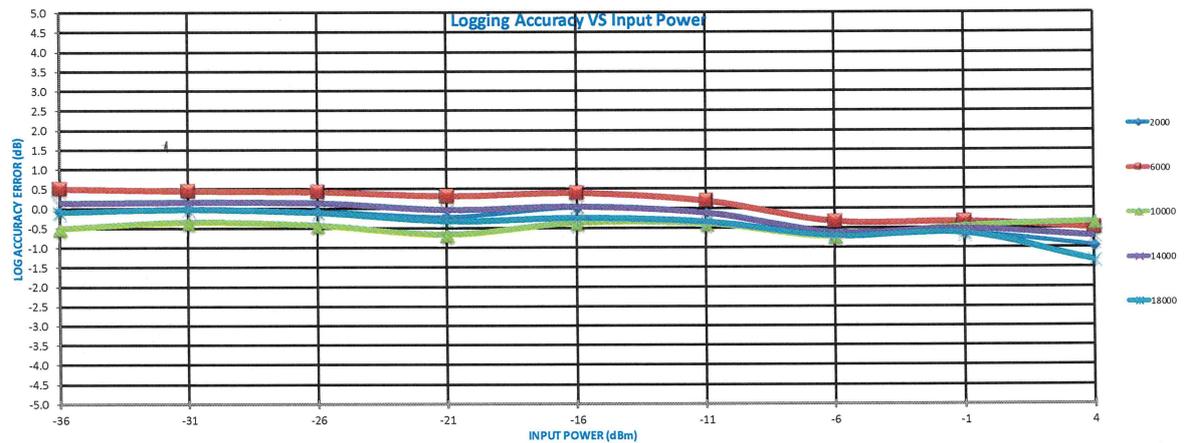
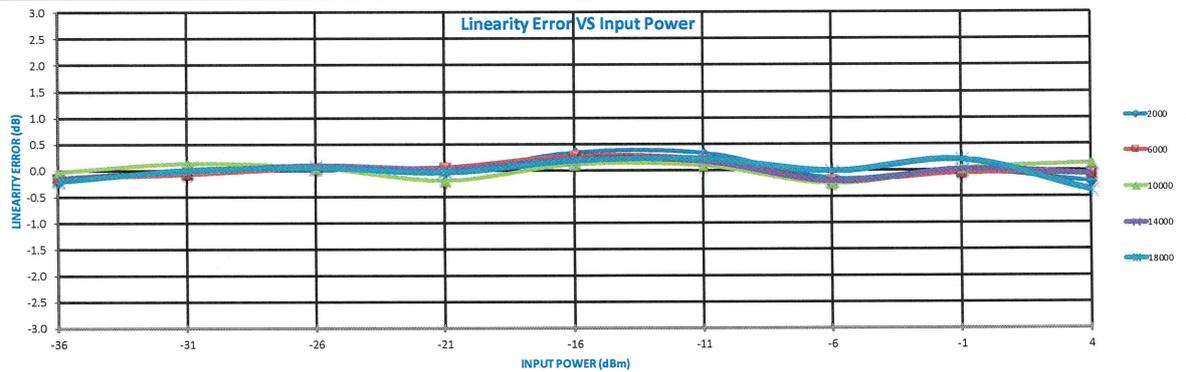
Frequency		-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)	
2 GHz	INTERCEPT (m)	347	600	847	1089	1351	1595	1816	2068	2302	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-10	-2	1	-2	16	16	-8	0	-11	Error (mV)	MAX MIN
		-0.21	-0.03	0.02	-0.03	0.33	0.32	-0.16	-0.01	-0.22	LINEARITY ERROR (dB)	0.33 -0.22
		-0.06	0.00	-0.06	-0.22	0.02	-0.10	-0.68	-0.64	-0.96	LOGGING ACCURACY (dB)	0.02 -0.96
6 GHz	INTERCEPT (m)	375	622	871	1115	1369	1609	1833	2083	2325	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-7	-4	2	3	13	10	-9	-3	-4	Error (mV)	MAX MIN
		-0.15	-0.08	0.04	0.05	0.27	0.20	-0.19	-0.06	-0.09	LINEARITY ERROR (dB)	0.27 -0.19
		0.50	0.44	0.42	0.30	0.38	0.18	-0.34	-0.34	-0.50	LOGGING ACCURACY (dB)	0.50 -0.50
10 GHz	INTERCEPT (m)	324	582	828	1066	1331	1580	1813	2077	2332	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-2	6	2	-10	5	4	-13	1	6	Error (mV)	MAX MIN
		-0.04	0.12	0.04	-0.20	0.10	0.08	-0.26	0.02	0.12	LINEARITY ERROR (dB)	0.12 -0.26
		-0.52	-0.36	-0.44	-0.68	-0.38	-0.40	-0.74	-0.46	-0.36	LOGGING ACCURACY (dB)	-0.36 -0.74
14 GHz	INTERCEPT (m)	357	608	857	1098	1352	1594	1819	2074	2314	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-8	-1	4	1	11	8	-11	0	-4	Error (mV)	MAX MIN
		-0.16	-0.02	0.08	0.01	0.22	0.17	-0.22	0.01	-0.08	LINEARITY ERROR (dB)	0.22 -0.22
		0.14	0.16	0.14	-0.04	0.04	-0.12	-0.62	-0.52	-0.72	LOGGING ACCURACY (dB)	0.16 -0.72
18 GHz	INTERCEPT (m)	345	598	844	1083	1337	1582	1814	2068	2283	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-10	0	2	-2	9	10	-1	10	-19	Error (mV)	MAX MIN
		-0.20	0.00	0.05	-0.04	0.18	0.21	-0.02	0.20	-0.38	LINEARITY ERROR (dB)	0.21 -0.38
		-0.10	-0.04	-0.12	-0.34	-0.26	-0.36	-0.72	-0.64	-1.34	LOGGING ACCURACY (dB)	-0.04 -1.34
Flatness +/- dB		0.520	0.408	0.439	0.500	0.388	0.296	0.204	0.153	0.500		
Max Video Output V		0.375	0.622	0.871	1.115	1.369	1.609	1.833	2.083	2.332		
Min Video Output V		0.324	0.582	0.828	1.066	1.331	1.580	1.813	2.068	2.283		
Logging Linearity vs Frequency											Error(dB)	
											MAX MIN	
											LOGGING LINEARITY ERROR (dB)	0.33 -0.38
Logging Accuracy vs Frequency											Error(dB)	
											MAX MIN	
											LOGGING ACCURACY ERROR (dB)	0.50 -1.34

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## SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C  
MODEL: HADA-D2002  
SERIAL NO: PL47856  
TESTED BY: D. Weinrob



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## SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C  
 MODEL: HADA-D2002  
 SERIAL NO: PL47856  
 TESTED BY: D. Weinrob  
 DATE: 9/30/2024



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GRAPH #2

Output Voltage Offset= 0.068 Volts

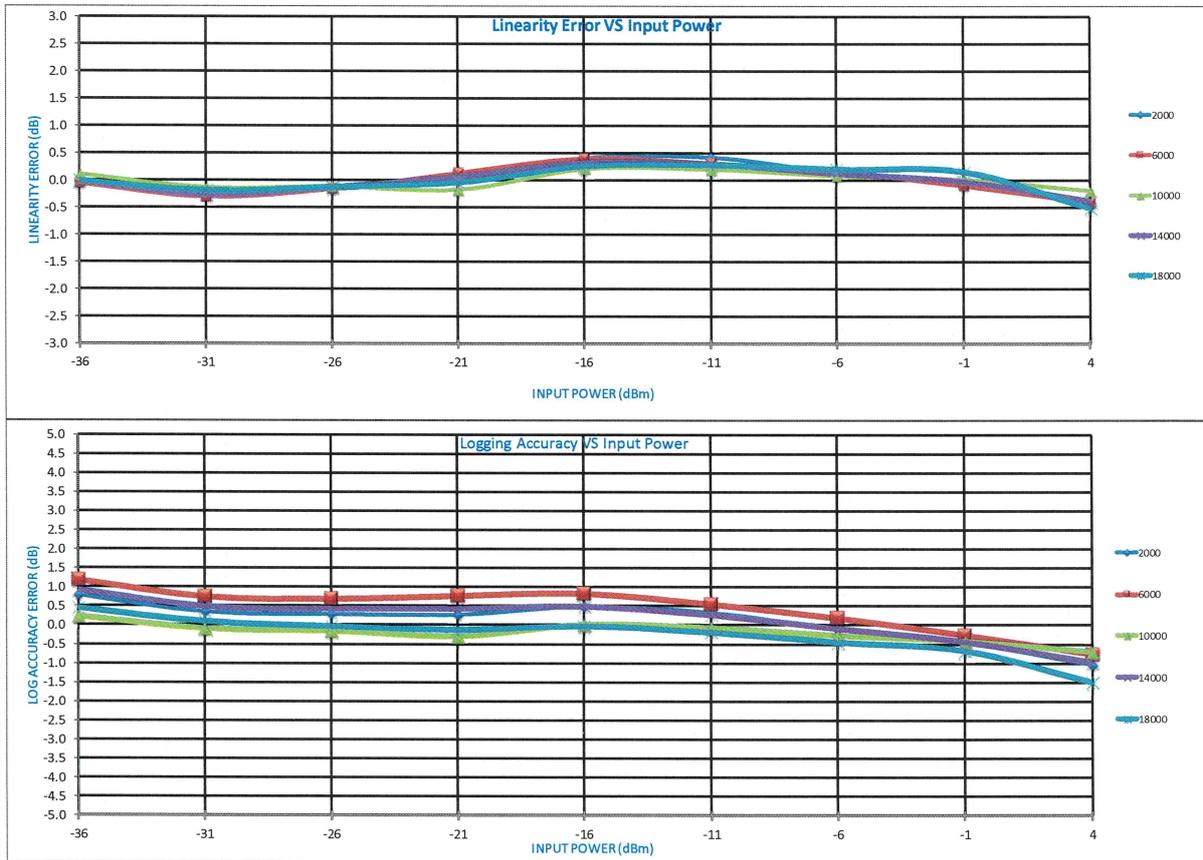
Frequency		-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m)	389 617 864 1113 1374 1616 1844 2077 2298									Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	0 -14 -8 0 19 20 7 -2 -22									Error (mV)	MAX	MIN
		-0.01 -0.28 -0.17 -0.01 0.40 0.41 0.14 -0.03 -0.45									LINEARITY ERROR (dB)	0.41	-0.45
		0.78 0.34 0.28 0.26 0.48 0.32 -0.12 -0.46 -1.04									LOGGING ACCURACY (dB)	0.78	-1.04
6 GHz	INTERCEPT (m)	409 637 884 1138 1391 1627 1859 2087 2312									Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	-2 -15 -8 6 19 15 7 -5 -20									Error (mV)	MAX	MIN
		-0.05 -0.30 -0.16 0.13 0.41 0.32 0.15 -0.10 -0.41									LINEARITY ERROR (dB)	0.41	-0.41
		1.18 0.74 0.68 0.76 0.82 0.54 0.18 -0.26 -0.76									LOGGING ACCURACY (dB)	1.18	-0.76
10 GHz	INTERCEPT (m)	361 595 842 1085 1350 1596 1836 2079 2315									Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	6 -7 -6 -9 10 10 4 1 -9									Error (mV)	MAX	MIN
		0.11 -0.13 -0.11 -0.18 0.21 0.20 0.08 0.02 -0.19									LINEARITY ERROR (dB)	0.21	-0.19
		0.22 -0.10 -0.16 -0.30 0.00 -0.08 -0.28 -0.42 -0.70									LOGGING ACCURACY (dB)	0.22	-0.70
14 GHz	INTERCEPT (m)	396 624 871 1121 1374 1613 1845 2078 2301									Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	-1 -13 -6 3 16 15 6 -1 -19									Error (mV)	MAX	MIN
		-0.01 -0.27 -0.13 0.07 0.33 0.30 0.13 -0.03 -0.39									LINEARITY ERROR (dB)	0.33	-0.39
		0.92 0.48 0.42 0.42 0.48 0.26 -0.10 -0.44 -0.98									LOGGING ACCURACY (dB)	0.92	-0.98
18 GHz	INTERCEPT (m)	372 604 848 1093 1348 1590 1827 2066 2275									Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	0 -9 -6 -2 12 13 9 7 -24									Error (mV)	MAX	MIN
		-0.01 -0.19 -0.13 -0.04 0.25 0.27 0.19 0.15 -0.51									LINEARITY ERROR (dB)	0.27	-0.51
		0.44 0.08 -0.04 -0.14 -0.04 -0.20 -0.46 -0.68 -1.50									LOGGING ACCURACY (dB)	0.44	-1.50
Flatness +/- dB		0.496	0.434	0.434	0.548	0.445	0.383	0.331	0.217	0.414			
Max Video Output V		0.409	0.637	0.884	1.138	1.391	1.627	1.859	2.087	2.315			
Min Video Output V		0.361	0.595	0.842	1.085	1.348	1.590	1.827	2.066	2.275			
Logging Linearity vs Frequency											Error(dB)		
											MAX	MIN	
LOGGING LINEARITY ERROR (dB)											0.41	-0.51	
Logging Accuracy vs Frequency											Error(dB)		
											MAX	MIN	
LOGGING ACCURACY ERROR (dB)											1.18	-1.50	

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## SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C  
MODEL: HADA-D2002  
SERIAL NO: PL47856  
TESTED BY: D. Weinrob





## SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C  
 MODEL: HADA-D2002  
 SERIAL NO: PL47856  
 TESTED BY: D. Weinrob  
 DATE: 9/30/2024



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GRAPH #3

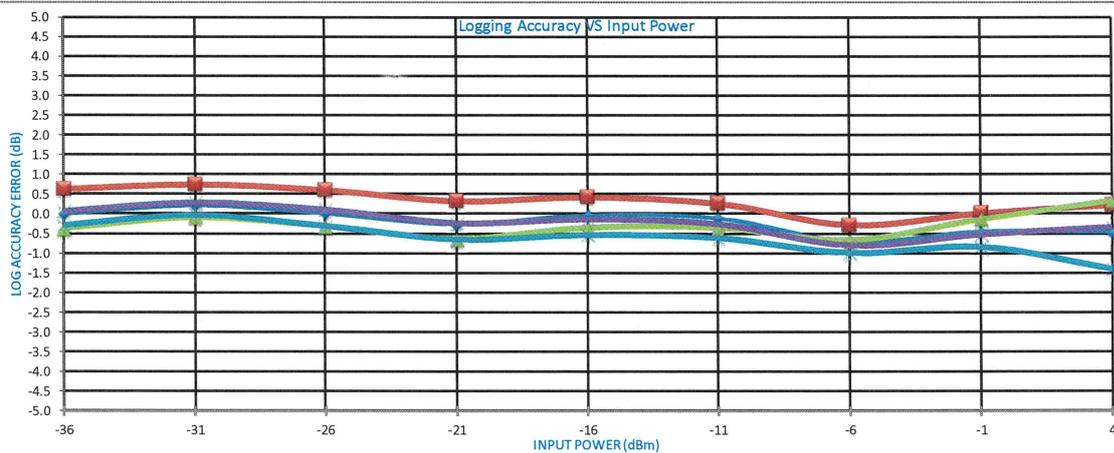
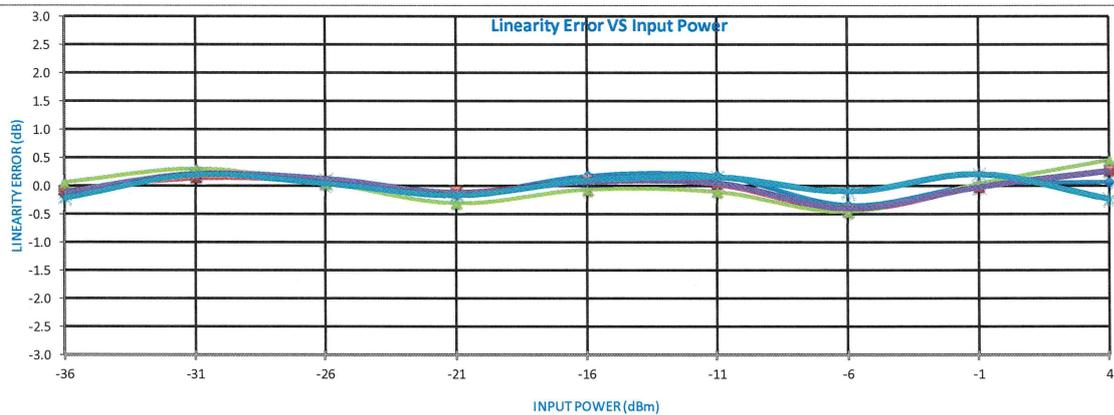
Output Voltage Offset= 0.08 Volts

Frequency		-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)	
2 GHz	INTERCEPT (m)	349	610	850	1086	1348	1594	1814	2077	2326	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-7	8	2	-8	9	9	-17	0	4	Error (mV)	MAX MIN
		-0.15	0.16	0.04	-0.15	0.18	0.18	-0.34	0.01	0.07	LINEARITY ERROR (dB)	0.18 -0.34
		-0.02	0.20	0.00	-0.28	-0.04	-0.12	-0.72	-0.46	-0.48	LOGGING ACCURACY (dB)	0.20 -0.72
6 GHz	INTERCEPT (m)	381	637	880	1116	1371	1613	1836	2101	2361	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-4	7	4	-5	5	1	-21	-1	13	Error (mV)	MAX MIN
		-0.08	0.14	0.09	-0.10	0.10	0.03	-0.43	-0.03	0.27	LINEARITY ERROR (dB)	0.27 -0.43
		0.62	0.74	0.60	0.32	0.42	0.26	-0.28	0.02	0.22	LOGGING ACCURACY (dB)	0.74 -0.28
10 GHz	INTERCEPT (m)	331	595	834	1068	1332	1582	1816	2093	2366	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	3	15	3	-15	-3	-5	-23	2	23	Error (mV)	MAX MIN
		0.06	0.31	0.05	-0.30	-0.06	-0.10	-0.46	0.04	0.46	LINEARITY ERROR (dB)	0.46 -0.46
		-0.38	-0.10	-0.32	-0.64	-0.36	-0.36	-0.68	-0.14	0.32	LOGGING ACCURACY (dB)	0.32 -0.68
14 GHz	INTERCEPT (m)	353	614	855	1088	1343	1587	1810	2074	2333	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-6	10	6	-7	3	2	-20	-1	13	Error (mV)	MAX MIN
		-0.12	0.20	0.11	-0.13	0.07	0.04	-0.41	-0.02	0.26	LINEARITY ERROR (dB)	0.26 -0.41
		0.06	0.28	0.10	-0.24	-0.14	-0.26	-0.80	-0.52	-0.34	LOGGING ACCURACY (dB)	0.28 -0.80
18 GHz	INTERCEPT (m)	335	598	834	1067	1323	1569	1800	2058	2280	Measured Value (mV)	Error(dB)
	SLOPE (mV/dB)	-10	9	2	-8	5	8	-5	10	-11	Error (mV)	MAX MIN
		-0.21	0.19	0.05	-0.16	0.10	0.16	-0.10	0.21	-0.23	LINEARITY ERROR (dB)	0.21 -0.23
		-0.30	-0.04	-0.32	-0.66	-0.54	-0.62	-1.00	-0.84	-1.40	LOGGING ACCURACY (dB)	-0.04 -1.40
Flatness +/- dB		0.508	0.426	0.467	0.497	0.487	0.447	0.365	0.437	0.873		
Max Video Output V		0.381	0.637	0.880	1.116	1.371	1.613	1.836	2.101	2.366		
Min Video Output V		0.331	0.595	0.834	1.067	1.323	1.569	1.800	2.058	2.280		
Logging Linearity vs Frequency											Error(dB)	
											MAX MIN	
											LOGGING LINEARITY ERROR (dB)	0.46 -0.46
Logging Accuracy vs Frequency											Error(dB)	
											MAX MIN	
											LOGGING ACCURACY ERROR (dB)	0.74 -1.40



## SUMMARY TEST DATA ON HADA-D2002

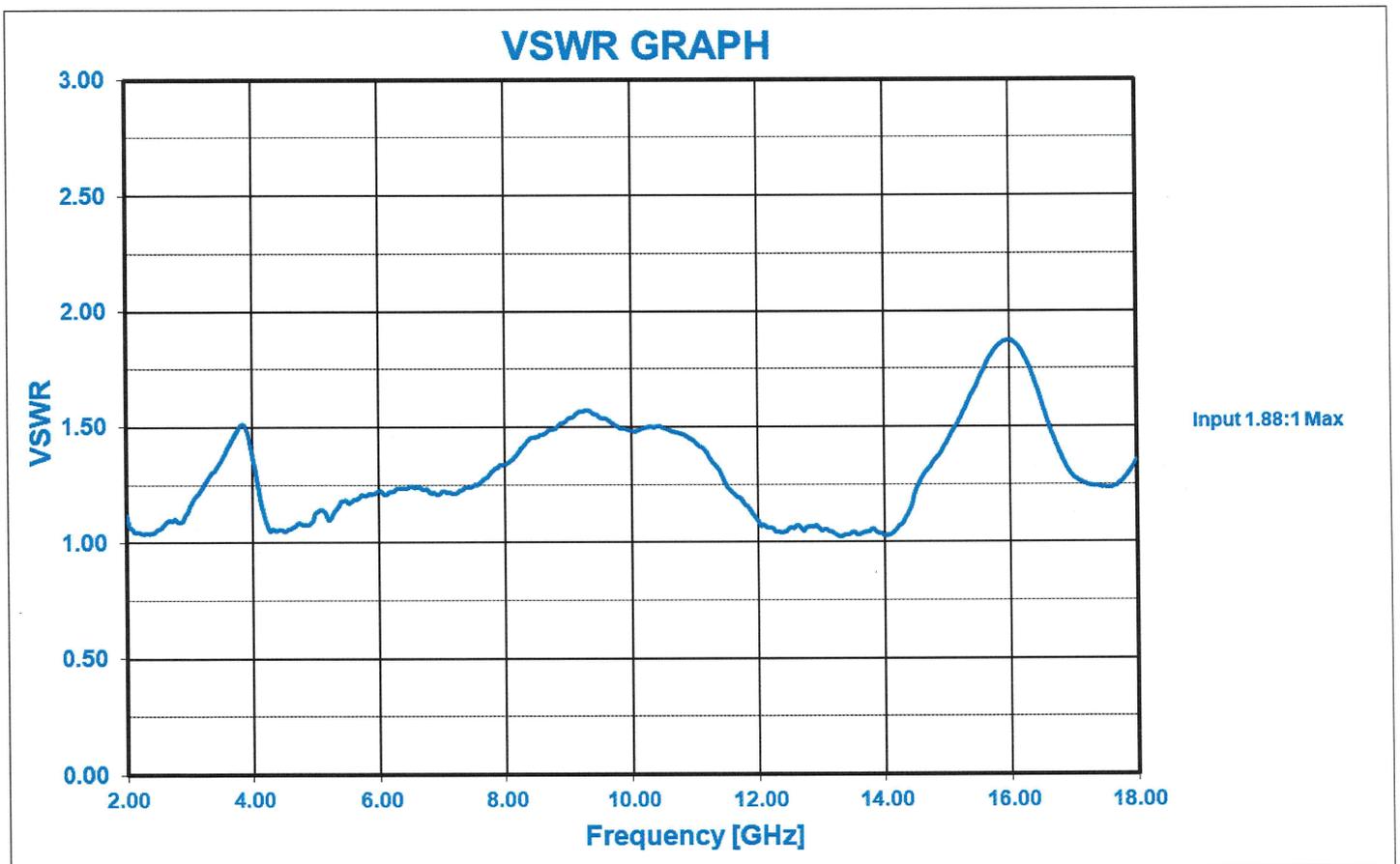
LOG TRANSFER WITH FREQUENCY @ +85C  
MODEL: HADA-D2002  
SERIAL NO: PL47856  
TESTED BY: D. Weinrob



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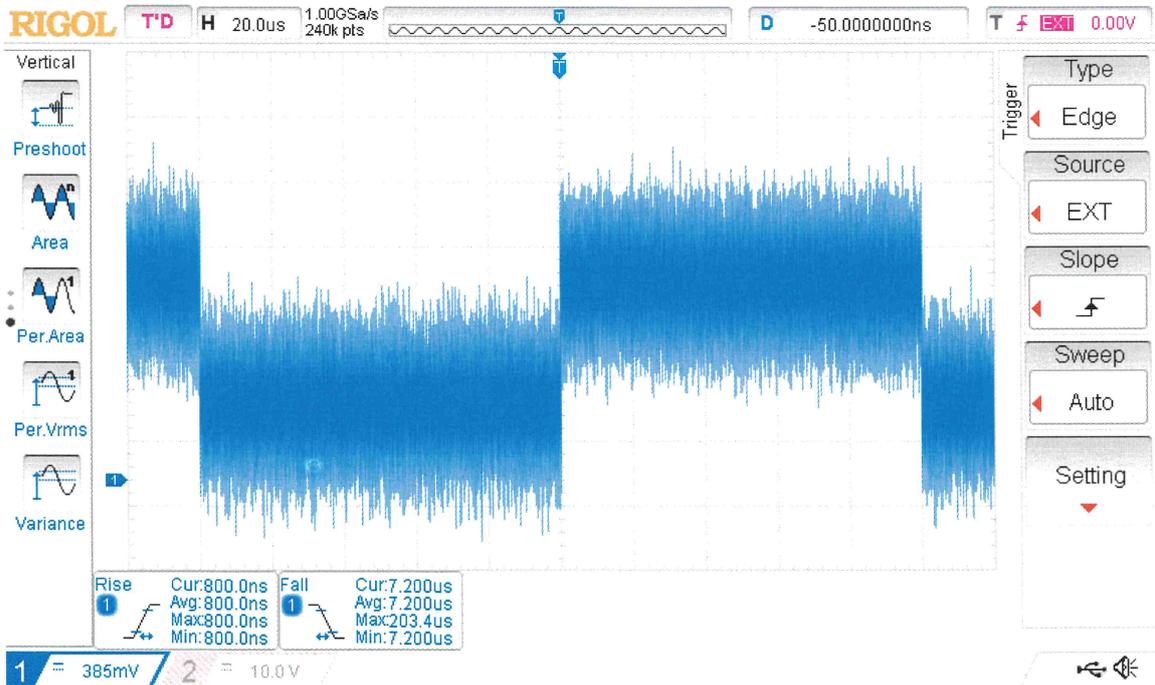


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HADA-D2002**

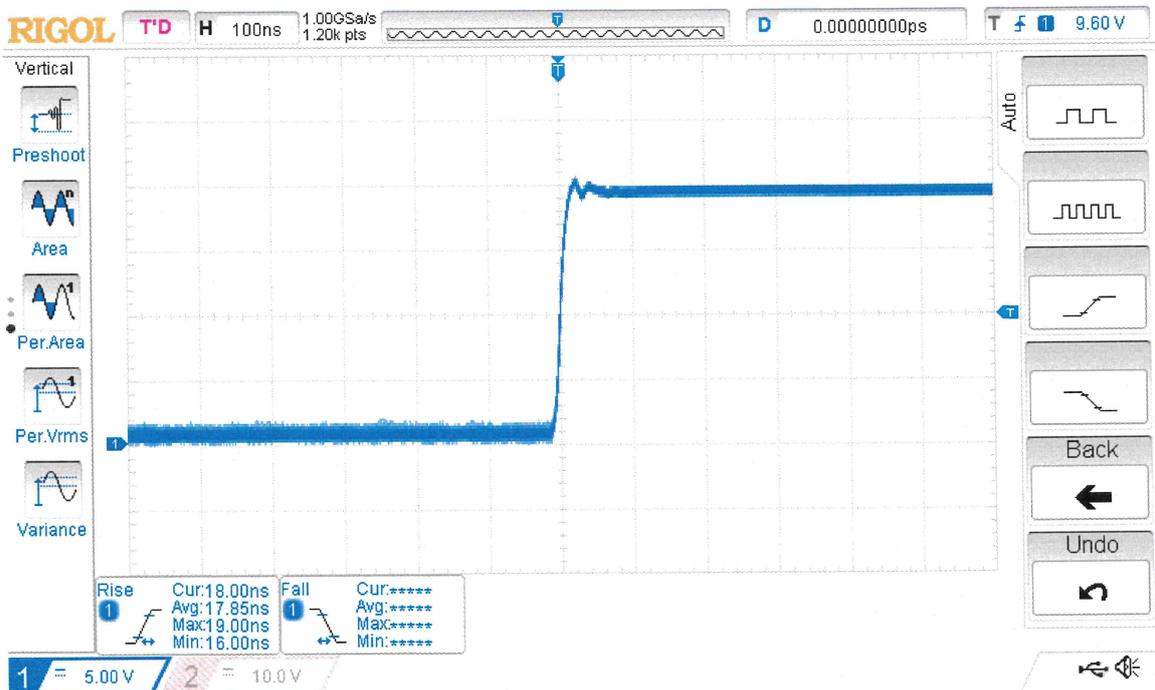
**TSS = -42.5 dBm**





**SUMMARY TEST DATA  
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HADA-D2002**

Rise Time = 18 ns





**SUMMARY TEST DATA  
ON  
HADA-D2002**

**Fall Time = 195 ns**

