SUMMARY TEST DATA ON HADA-D2002

Customer:		**Tested By:**	D. Weinrob
SO No:		**Temperature:**	+25°C
Model No:	HADA-D2002	**Date:**	07/25/2024
Serial No:	PL46538/2430	**Drawing No:**	27620222 **Rev:** A1

TEST. ITEM NO	PARAMETERS	SPECIFIED VALUE	TEST RESULTS	QA QC
1	Frequency Range:	2.0 GHz – 18.0 GHz	**2.0 GHz – 18.0 GHz See Plot**	PMI QA3
2	TSS:	-40 dBm Min @ -40°C to +85°	**-41.5 dBm See Plot**	
3	Frequency Flatness:	±1.65 dB Max	**0.67 dB See Plot**	
4	Input / Output Characteristics: (93 Ω)	Y = 2150 + 50X [X: Input (dBm), Y: Output (mv)]	**Pass**	
5	Logging Accuracy	±1.5 dB Max (@ +25°C, 10 GHz)* [-36 dBm ≤ INPUT ≤ +4 dBm] ±3.1 dB Max (Note)	**0.36 dB / -0.86 dB** **2.22 dB / -0.86 dB See Plot**	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	**0.28 dB / -0.31 dB 0.51 dB / -0.57 dB See Plot**	
7	Maximum Input Power (CW):	+23 dBm	**Pass**	
8	Duty Cycle:	100%	**Pass**	
9	Rise Time:	30 ns Max (10% to 90%)	**21 ns See Plot**	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	**230 ns See Plot**	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	**37 mV @ +25°c 76 mV @ -40°c 102 mV @ +85°c 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 @ 100mA** **-12 ± 1VDC @ 50mA**	
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: H. Lutes **Date:** 7.25.24

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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob
DATE: 7/17/2024

PLANAR MONOLITHICS INDUSTRIES
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GRAPH #1

Output Voltage Offset= 0.037 Volts

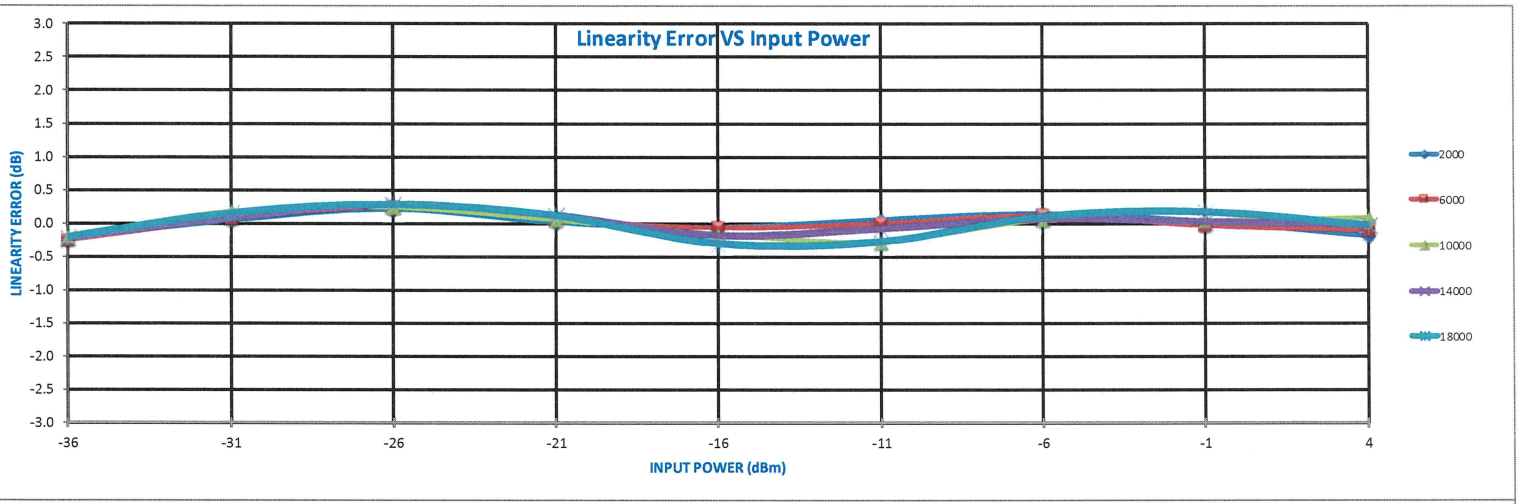
			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
requency														
GHz	INTERCEPT (m	2201	351	620	884	1129	1381	1642	1902	2151	2395	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	51.1	-12	2	11	0	-3	3	8	1	-10	Error (mV)	MAX	MIN
			-0.23	0.04	0.21	0.01	-0.06	0.06	0.15	0.02	-0.20	LINEARITY ERROR (dB)	0.21	-0.23
			0.02	0.40	0.68	0.58	0.62	0.84	1.04	1.02	0.90	LOGGING ACCURACY (dB)	1.04	0.02
GHz	INTERCEPT (m	2188	347	617	880	1124	1372	1629	1889	2135	2385	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.8	-13	3	12	2	-3	0	6	-2	-6	Error (mV)	MAX	MIN
			-0.26	0.06	0.24	0.05	-0.07	0.00	0.12	-0.04	-0.11	LINEARITY ERROR (dB)	0.24	-0.26
			-0.06	0.34	0.60	0.48	0.44	0.58	0.78	0.70	0.70	LOGGING ACCURACY (dB)	0.78	-0.06
0 GHz	INTERCEPT (m	2159	307	582	841	1087	1332	1582	1855	2110	2368	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	51.2	-10	9	12	2	-8	-14	3	2	4	Error (mV)	MAX	MIN
			-0.20	0.18	0.24	0.05	-0.17	-0.28	0.06	0.04	0.08	LINEARITY ERROR (dB)	0.24	-0.28
			-0.86	-0.36	-0.18	-0.26	-0.36	-0.36	0.10	0.20	0.36	LOGGING ACCURACY (dB)	0.36	-0.86
4 GHz	INTERCEPT (m	2189	352	621	885	1130	1368	1627	1888	2139	2390	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.7	-12	4	14	6	-10	-4	3	1	-2	Error (mV)	MAX	MIN
			-0.23	0.07	0.28	0.11	-0.19	-0.08	0.06	0.02	-0.03	LINEARITY ERROR (dB)	0.28	-0.23
			0.04	0.42	0.70	0.60	0.36	0.54	0.76	0.78	0.80	LOGGING ACCURACY (dB)	0.80	0.04
8 GHz	INTERCEPT (m	2166	330	602	862	1107	1339	1594	1867	2124	2367	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.7	-11	8	14	6	-16	-14	5	9	-2	Error (mV)	MAX	MIN
			-0.21	0.16	0.28	0.12	-0.31	-0.28	0.10	0.17	-0.03	LINEARITY ERROR (dB)	0.28	-0.31
			-0.40	0.04	0.24	0.14	-0.22	-0.12	0.34	0.48	0.34	LOGGING ACCURACY (dB)	0.48	-0.40
	Flatness +/- dB		0.442	0.383	0.432	0.423	0.482	0.590	0.462	0.403	0.275			
	Max Video Output V		0.352	0.621	0.885	1.130	1.381	1.642	1.902	2.151	2.395			
	Min Video Output V		0.307	0.582	0.841	1.087	1.332	1.582	1.855	2.110	2.367			

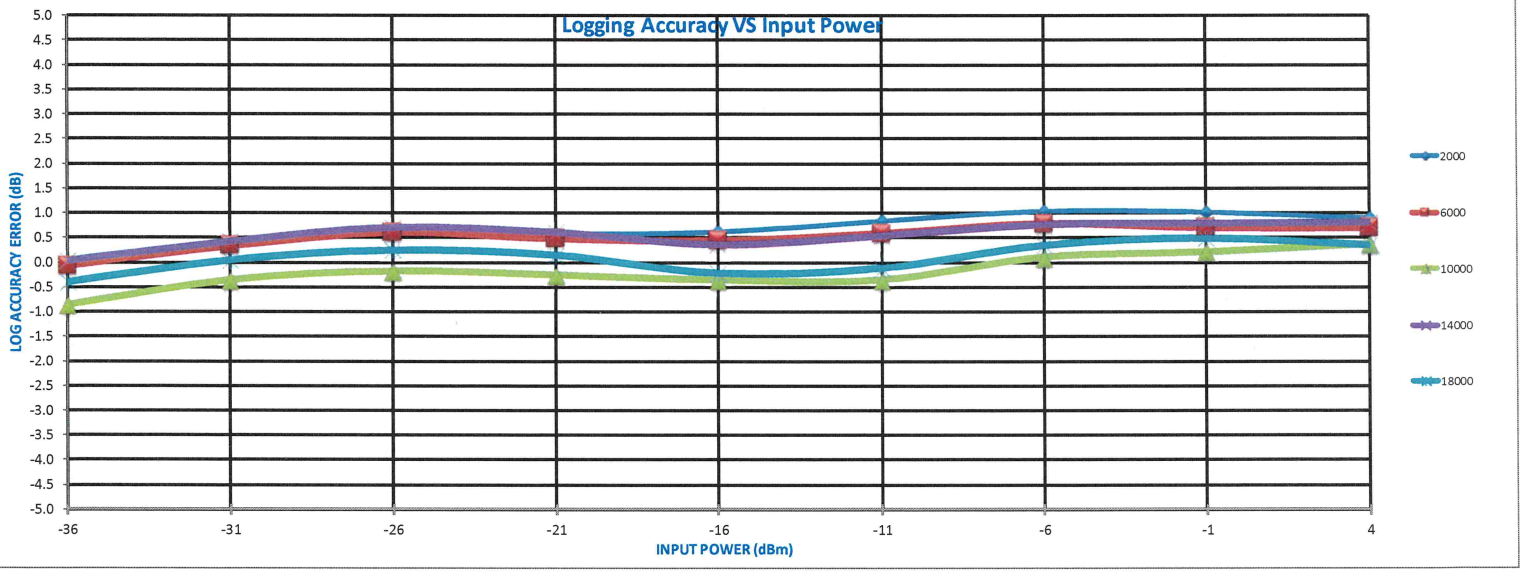
Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.28	-0.31

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB	1.04	-0.86

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob





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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob
DATE: 7/3/2024

GRAPH #2

PLANAR MONOLITHICS INDUSTRIES
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TEL: 916-542-1401 FAX: 916-265-2597
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Output Voltage Offset= 0.076 Volts

Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2243	425	676	941	1190	1437	1711	1959	2188	2423	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.3	-8	-9	5	3	-2	21	17	-5	-22	Error (mV)	MAX	MIN
			-0.16	-0.17	0.10	0.05	-0.04	0.41	0.34	-0.10	-0.43	LINEARITY ERROR (dB)	0.41	-0.43 x
			1.50	1.52	1.82	1.80	1.74	2.22	2.18	1.76	1.46	LOGGING ACCURACY (dB)	2.22	1.46
6 GHz	INTERCEPT (m	2227	418	671	936	1184	1426	1696	1944	2172	2404	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.9	-12	-8	7	6	-2	19	17	-5	-22	Error (mV)	MAX	MIN
			-0.23	-0.16	0.15	0.11	-0.04	0.37	0.34	-0.09	-0.45	LINEARITY ERROR (dB)	0.37	-0.45
			1.36	1.42	1.72	1.68	1.52	1.92	1.88	1.44	1.08	LOGGING ACCURACY (dB)	1.92	1.08
10 GHz	INTERCEPT (m	2195	374	632	894	1139	1382	1644	1908	2147	2382	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.4	-8	-2	9	2	-7	3	15	2	-14	Error (mV)	MAX	MIN
			-0.15	-0.03	0.17	0.03	-0.14	0.06	0.30	0.05	-0.29	LINEARITY ERROR (dB)	0.30	-0.29
			0.48	0.64	0.88	0.78	0.64	0.88	1.16	0.94	0.64	LOGGING ACCURACY (dB)	1.16	0.48
14 GHz	INTERCEPT (m	2205	394	650	915	1161	1398	1665	1919	2154	2388	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50	-11	-5	10	6	-7	10	14	-1	-17	Error (mV)	MAX	MIN
			-0.22	-0.10	0.20	0.12	-0.14	0.20	0.28	-0.02	-0.34	LINEARITY ERROR (dB)	0.28	-0.34
			0.88	1.00	1.30	1.22	0.96	1.30	1.38	1.08	0.76	LOGGING ACCURACY (dB)	1.38	0.76
18 GHz	INTERCEPT (m	2204	389	646	909	1155	1385	1650	1916	2159	2395	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.2	-7	-1	11	6	-15	-2	13	5	-10	Error (mV)	MAX	MIN
			-0.13	-0.02	0.22	0.11	-0.31	-0.03	0.26	0.10	-0.20	LINEARITY ERROR (dB)	0.26	-0.31
			0.78	0.92	1.18	1.10	0.70	1.00	1.32	1.18	0.90	LOGGING ACCURACY (dB)	1.32	0.70
	Flatness +/- dB		0.508	0.439	0.468	0.508	0.548	0.668	0.508	0.409	0.409			
	Max Video Output V		0.425	0.676	0.941	1.190	1.437	1.711	1.959	2.188	2.423			
	Min Video Output V		0.374	0.632	0.894	1.139	1.382	1.644	1.908	2.147	2.382			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.41	-0.45

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	2.22	0.48

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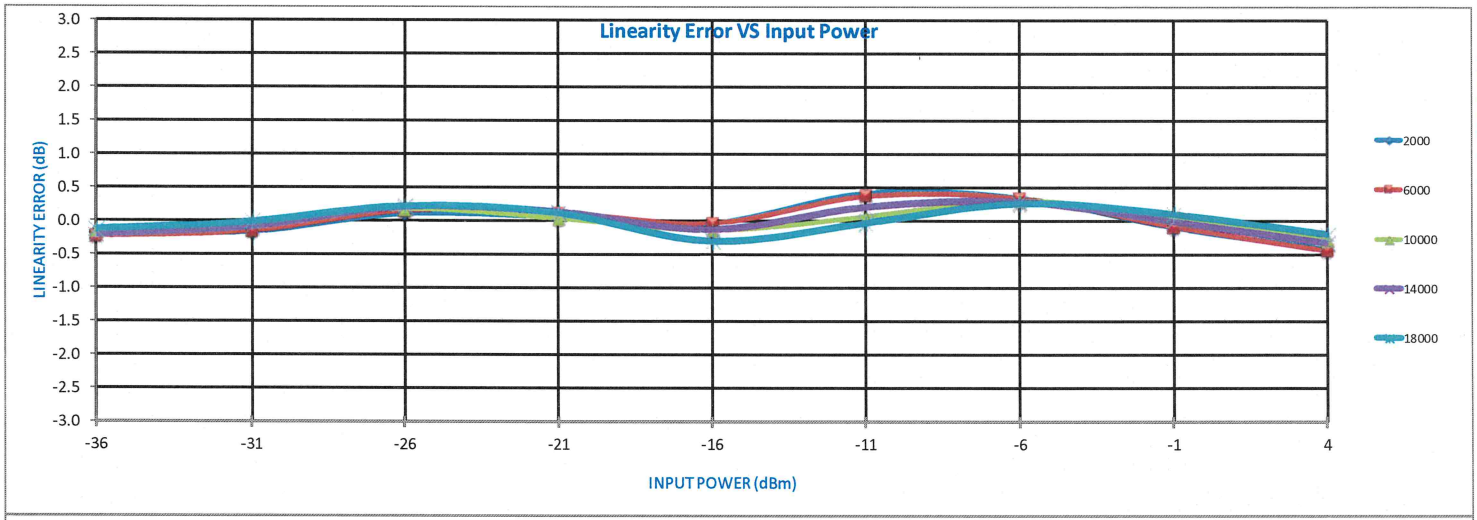
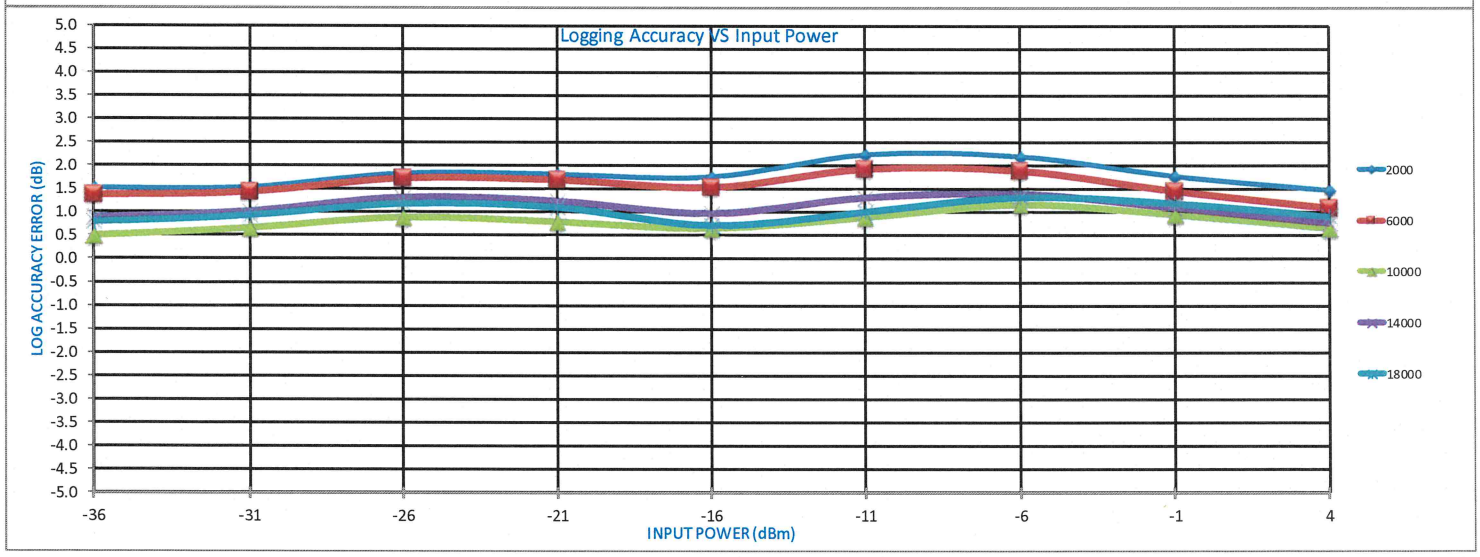
SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob





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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob
DATE: 7/3/2024

GRAPH #3

PLANAR MONOLITHICS INDUSTRIES
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Output Voltage Offset= 0.102 Volts

Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)
2 GHz	INTERCEPT (m	2192	367	616	867	1110	1366	1617	1888	2150	2403	Measured Value (mV)
	SLOPE (mV/dB	51	11	5	1	-11	-10	-14	2	9	7	Error (mV)
			0.21	0.09	0.02	-0.22	-0.20	-0.27	0.04	0.18	0.14	LINEARITY ERROR (dB)
			0.34	0.32	0.34	0.20	0.32	0.34	0.76	1.00	1.06	LOGGING ACCURACY (dB)
6 GHz	INTERCEPT (m	2185	368	618	869	1111	1362	1611	1880	2138	2404	Measured Value (mV)
	SLOPE (mV/dB	50.8	10	6	3	-9	-11	-16	-1	3	15	Error (mV)
			0.19	0.12	0.06	-0.17	-0.23	-0.32	-0.02	0.06	0.31	LINEARITY ERROR (dB)
			0.36	0.36	0.38	0.22	0.24	0.22	0.60	0.76	1.08	LOGGING ACCURACY (dB)
10 GHz	INTERCEPT (m	2158	335	585	830	1074	1322	1567	1848	2115	2389	Measured Value (mV)
	SLOPE (mV/dB	51.1	17	11	1	-11	-19	-29	-4	8	26	Error (mV)
			0.33	0.22	0.01	-0.21	-0.36	-0.57	-0.07	0.15	0.51	LINEARITY ERROR (dB)
			-0.30	-0.30	-0.40	-0.52	-0.56	-0.66	-0.04	0.30	0.78	LOGGING ACCURACY (dB)
14 GHz	INTERCEPT (m	2159	351	601	851	1094	1337	1583	1854	2116	2377	Measured Value (mV)
	SLOPE (mV/dB	50.5	9	7	4	-5	-15	-21	-2	7	16	Error (mV)
			0.18	0.13	0.08	-0.10	-0.29	-0.42	-0.05	0.14	0.31	LINEARITY ERROR (dB)
			0.02	0.02	0.02	-0.12	-0.26	-0.34	0.08	0.32	0.54	LOGGING ACCURACY (dB)
18 GHz	INTERCEPT (m	2162	362	612	861	1103	1338	1586	1867	2132	2365	Measured Value (mV)
	SLOPE (mV/dB	50.2	8	7	5	-4	-20	-24	6	20	2	Error (mV)
			0.16	0.14	0.10	-0.09	-0.41	-0.47	0.13	0.40	0.04	LINEARITY ERROR (dB)
			0.24	0.24	0.22	0.06	-0.24	-0.28	0.34	0.64	0.30	LOGGING ACCURACY (dB)
	Flatness +/- dB		0.325	0.325	0.385	0.365	0.434	0.493	0.394	0.345	0.385	
	Max Video Output V		0.368	0.618	0.869	1.111	1.366	1.617	1.888	2.150	2.404	
	Min Video Output V		0.335	0.585	0.830	1.074	1.322	1.567	1.848	2.115	2.365	

Error(dB)		
	MAX	MIN
LINEARITY ERROR (dB)	0.21	-0.27
LOGGING ACCURACY (dB)	1.06	0.20

Error(dB)		
	MAX	MIN
LINEARITY ERROR (dB)	0.31	-0.32
LOGGING ACCURACY (dB)	1.08	0.22

Error(dB)		
	MAX	MIN
LINEARITY ERROR (dB)	0.51	-0.57
LOGGING ACCURACY (dB)	0.78	-0.66

Error(dB)		
	MAX	MIN
LINEARITY ERROR (dB)	0.31	-0.42
LOGGING ACCURACY (dB)	0.54	-0.34

Error(dB)		
	MAX	MIN
LINEARITY ERROR (dB)	0.40	-0.47
LOGGING ACCURACY (dB)	0.64	-0.28

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.51	-0.57

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB	1.08	-0.66

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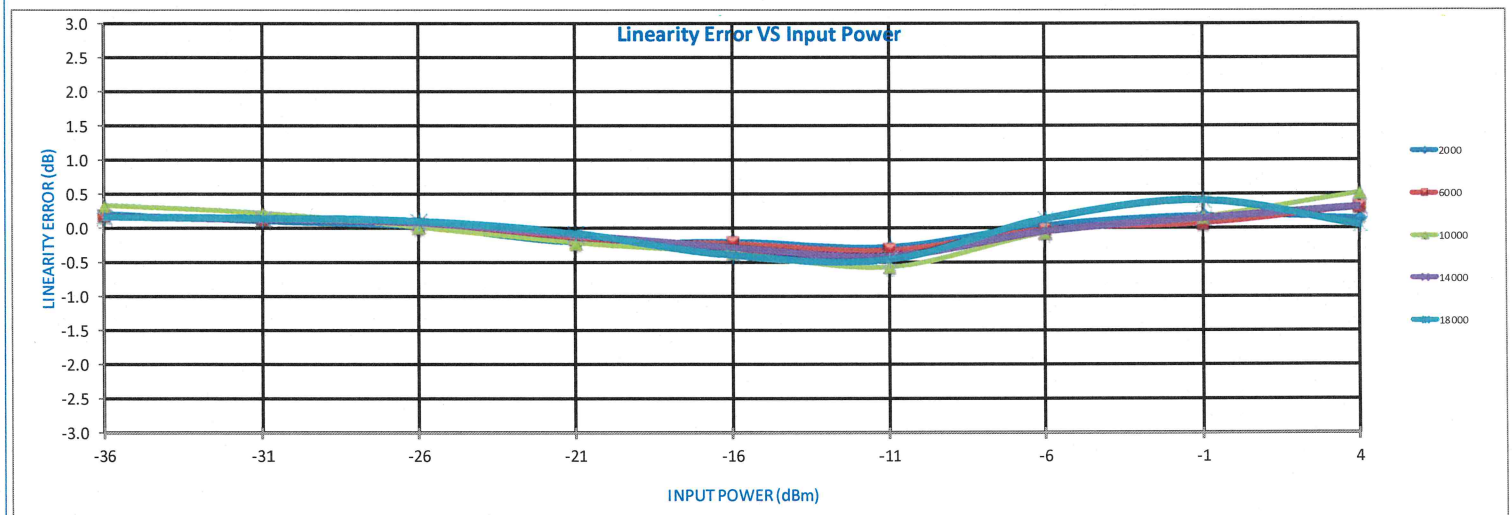
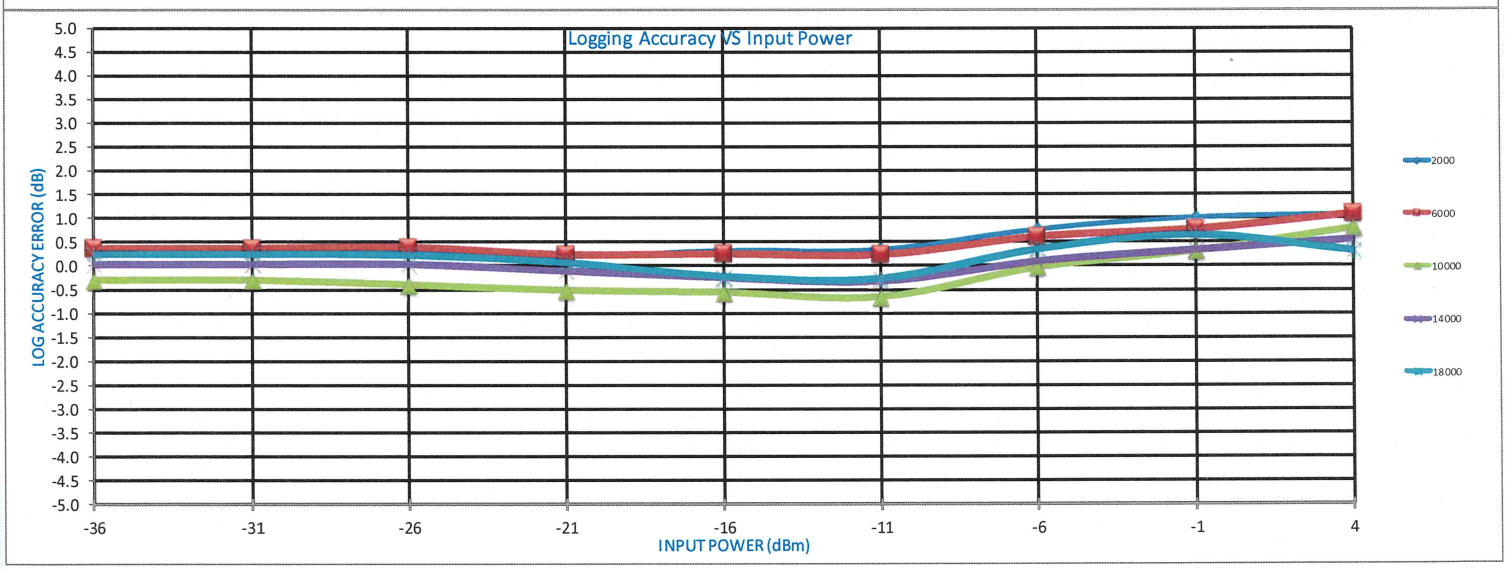
SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL46538
TESTED BY: D. Weinrob





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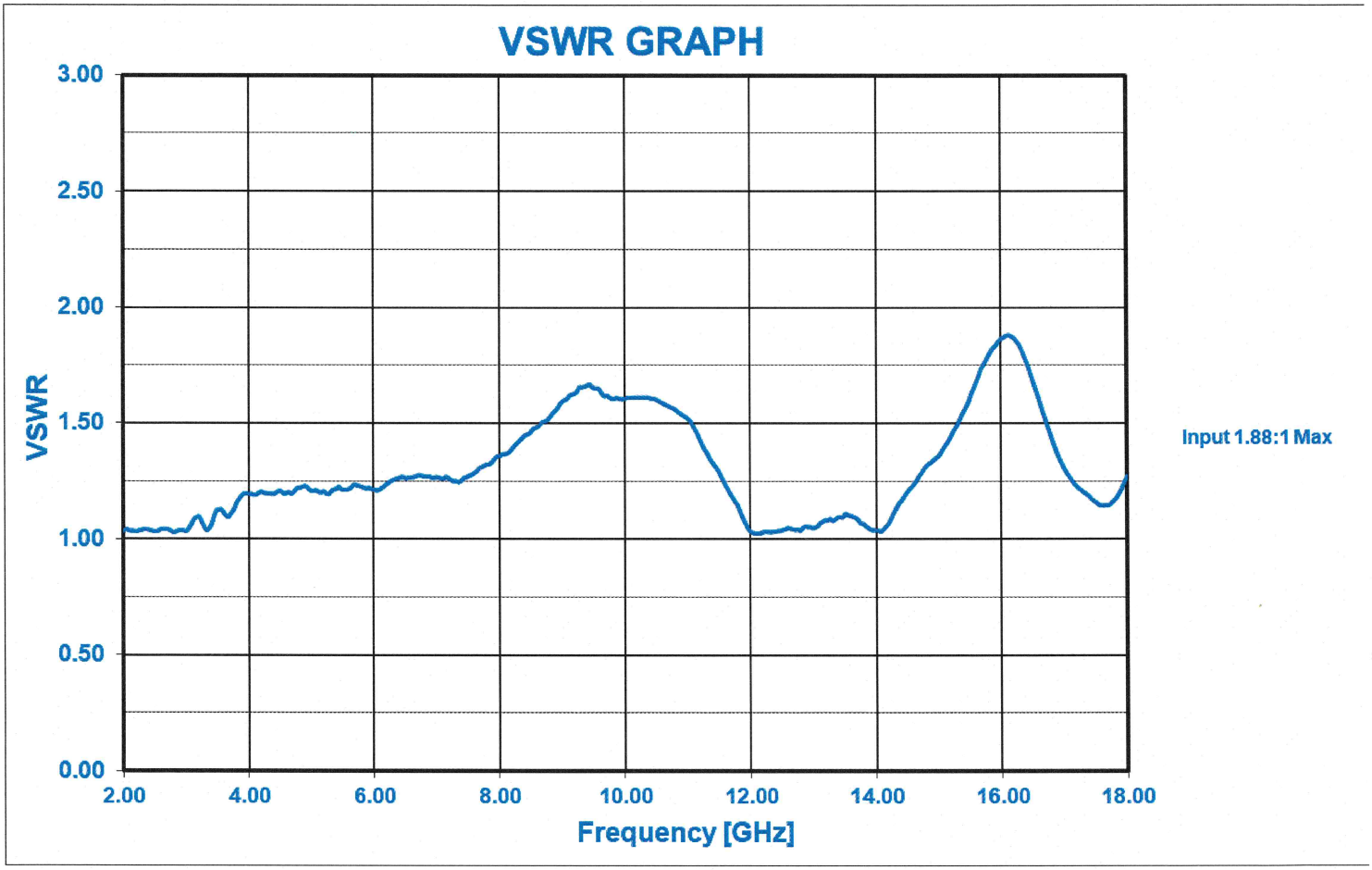
SUMMARY TEST DATA
ON
HADA-D2002



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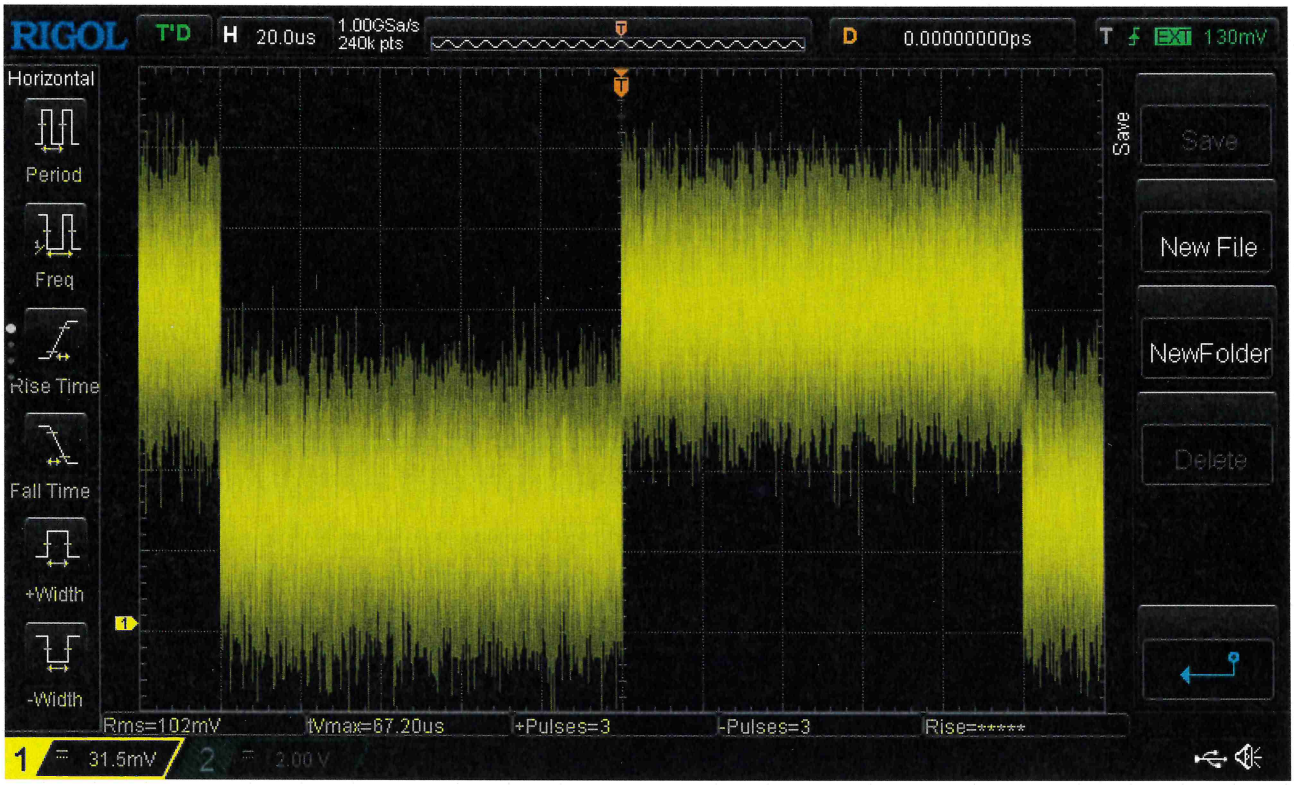
SUMMARY TEST DATA
ON
HADA-D2002

TSS = -41.5 dBm



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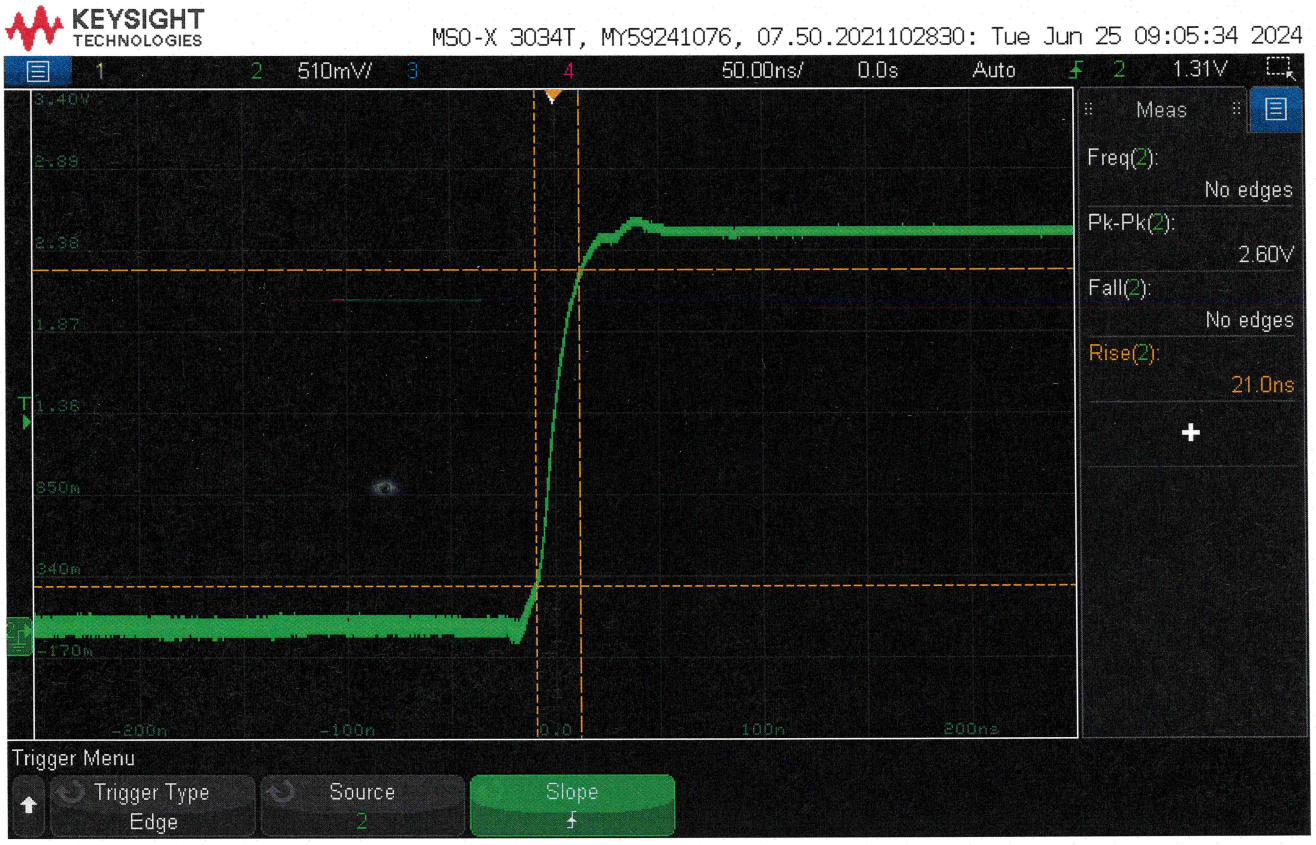
SUMMARY TEST DATA
ON
HADA-D2002

Rise Time = 21 ns



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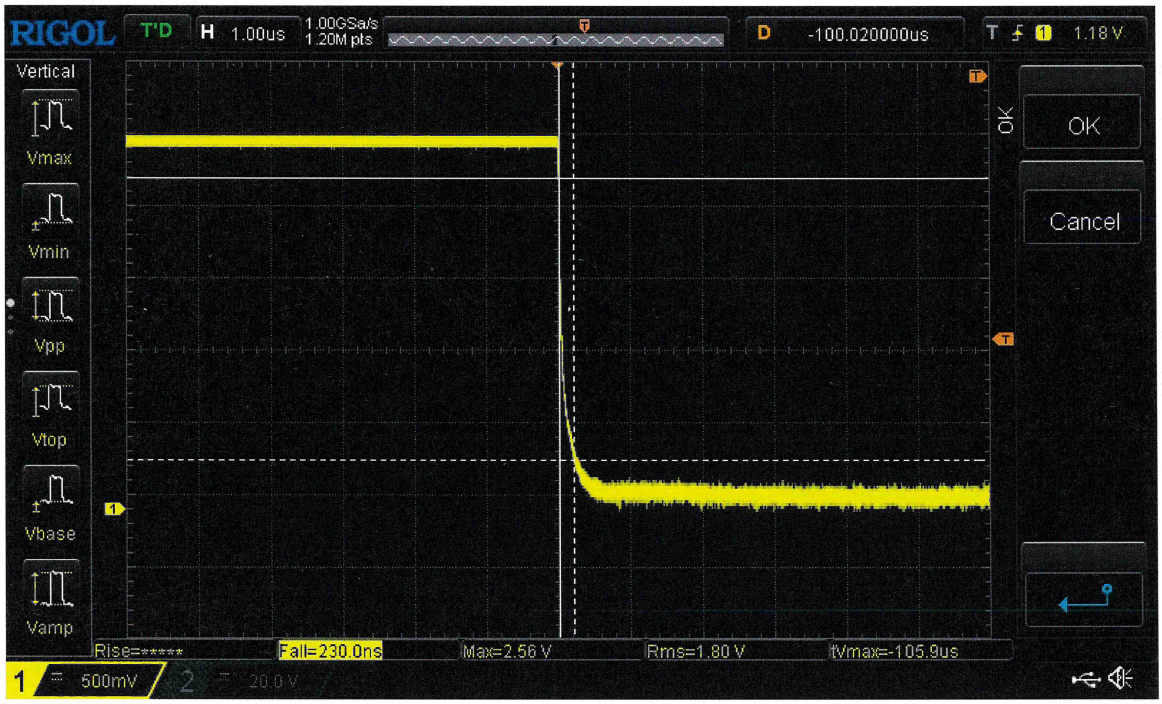
SUMMARY TEST DATA
ON
HADA-D2002

Fall Time = 230 ns



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