SUMMARY TEST DATA
ON
HADA-D2002

Customer:		**Tested By:**	**D. Weinrob**		
SO No:		**Temperature:**	**+25°C**		
Model No:	**HADA-D2002**	**Date:**	**09/27/24**		
Serial No:	**PL47743/2439**	**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 dBm See Plot**	
3	Frequency Flatness:	±1.65 dB Max	**0.52 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)	**0.08 dB / -0.78 dB** **0.46 dB / -1.98 dB See Plot**	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	**0.27 dB / -0.36 dB 0.61 dB / -0.59 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%)	**20 ns See Plot**	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	**155 ns See Plot**	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	**102 mV @ +25°c 61 mV @ -40°c 85 mV @ +85°c See Plot**	

4921 Robert J. Mathews Pkwy Suite 1, El Dorado Hills, CA 95762 USA Phone: (916)542-1401 Fax: (916)265-2597
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SUMMARY TEST DATA ON HADA-D2002

12	Input VSWR:	3.0:1 Max @ +23 dBm	**1.84:1** **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 @ 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. Klumpp **Date:** 9-30-24

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SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob
DATE: 9/26/2024

GRAPH #1

PLANAR MONOLITHICS INDUSTRIES
4921 Robert J. Mathews Parkway Suit 1
El Dorado Hills, CA 95762
TEL: 916-542-1401 FAX: 916-265-2597
EMAIL: SALES@PMI-RF.COM

Output Voltage Offset= 0.102 Volts

Frequency		
2 GHz	INTERCEPT (m	2126
	SLOPE (mV/dB	50
6 GHz	INTERCEPT (m	2143
	SLOPE (mV/dB	49.8
10 GHz	INTERCEPT (m	2137
	SLOPE (mV/dB	50.8
14 GHz	INTERCEPT (m	2147
	SLOPE (mV/dB	49.8
18 GHz	INTERCEPT (m	2171
	SLOPE (mV/dB	50.3

RF Input Power (dBm)									
	-36	-31	-26	-21	-16	-11	-6	-1	4
Measured Value (mV)	326	584	828	1073	1327	1569	1829	2078	2328
Error (mV)	-2	7	1	-4	0	-8	3	2	2
LINEARITY ERROR (dB)	-0.03	0.13	0.01	-0.08	0.00	-0.15	0.05	0.03	0.04
LOGGING ACCURACY (dB)	-0.48	-0.32	-0.44	-0.54	-0.46	-0.62	-0.42	-0.44	-0.44

Error(dB)	
MAX	MIN
0.13	-0.15
-0.32	-0.62

Measured Value (mV)	345	605	852	1094	1344	1585	1845	2093	2346
Error (mV)	-4	7	5	-2	-1	-10	1	0	4
LINEARITY ERROR (dB)	-0.08	0.14	0.09	-0.05	-0.03	-0.19	0.03	0.01	0.08
LOGGING ACCURACY (dB)	-0.10	0.10	0.04	-0.12	-0.12	-0.30	-0.10	-0.14	-0.08

Error(dB)	
MAX	MIN
0.14	-0.19
0.10	-0.30

Measured Value (mV)	314	574	818	1064	1319	1561	1832	2089	2354
Error (mV)	4	11	1	-7	-6	-18	-1	3	14
LINEARITY ERROR (dB)	0.09	0.21	0.01	-0.14	-0.12	-0.35	-0.01	0.05	0.27
LOGGING ACCURACY (dB)	-0.72	-0.52	-0.64	-0.72	-0.62	-0.78	-0.36	-0.22	0.08

Error(dB)	
MAX	MIN
0.27	-0.35
0.08	-0.78

Measured Value (mV)	351	611	860	1100	1348	1589	1850	2098	2350
Error (mV)	-5	7	7	-2	-3	-11	2	1	4
LINEARITY ERROR (dB)	-0.09	0.13	0.14	-0.04	-0.06	-0.21	0.03	0.02	0.08
LOGGING ACCURACY (dB)	0.02	0.22	0.20	0.00	-0.04	-0.22	0.00	-0.04	0.00

Error(dB)	
MAX	MIN
0.14	-0.21
0.22	-0.22

Measured Value (mV)	363	622	869	1108	1354	1600	1873	2129	2380
Error (mV)	2	10	6	-7	-12	-18	4	8	8
LINEARITY ERROR (dB)	0.05	0.20	0.11	-0.14	-0.25	-0.36	0.07	0.16	0.15
LOGGING ACCURACY (dB)	0.26	0.44	0.38	0.16	0.08	0.00	0.46	0.58	0.60

Error(dB)	
MAX	MIN
0.20	-0.36
0.60	0.00

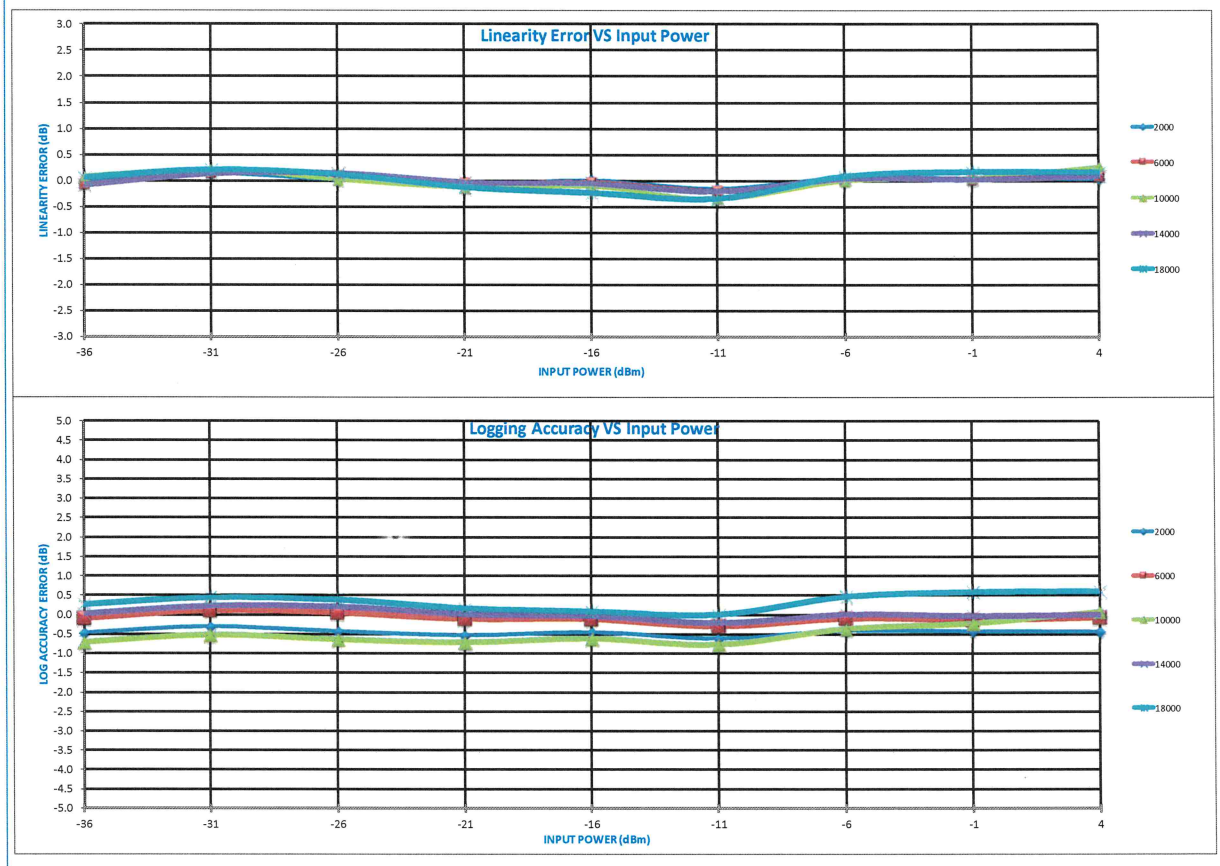
Flatness +/- dB	0.489	0.479	0.509	0.439	0.349	0.389	0.439	0.509	0.519
Max Video Output V	0.363	0.622	0.869	1.108	1.354	1.600	1.873	2.129	2.380
Min Video Output V	0.314	0.574	0.818	1.064	1.319	1.561	1.829	2.078	2.328

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.27	-0.36

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB	0.60	-0.78

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob



4921 Robert J. Mathews Pkwy Suite 1, El Dorado Hills, CA 95762 USA Phone: (916)542-1401 Fax: (916)265-2597
Email: sales@pmi-rf.com

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob
DATE: 9/26/2024

GRAPH #2

PLANAR MONOLITHICS INDUSTRIES
4921 Robert J. Mathews Parkway Suit 1
El Dorado Hills, CA 95762
TEL: 916-542-1401 FAX: 916-265-2597
EMAIL: SALES@PMI-RF.COM

Output Voltage Offset= 0.061 Volts

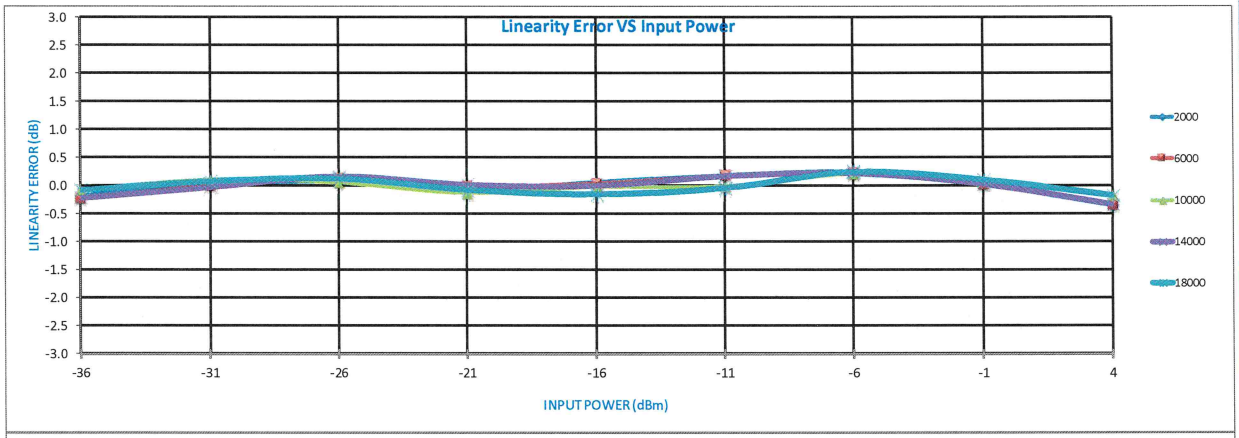
Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2130	322	581	834	1077	1333	1589	1842	2082	2312	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50	-9	0	3	-3	3	9	12	2	-18	Error (mV)	MAX	MIN
			-0.18	0.01	0.07	-0.07	0.06	0.18	0.24	0.04	-0.35	LINEARITY ERROR (dB)	0.24	-0.35
			-0.56	-0.38	-0.32	-0.46	-0.34	-0.22	-0.16	-0.36	-0.76	LOGGING ACCURACY (dB)	-0.16	-0.76
6 GHz	INTERCEPT (m	2142	340	600	855	1097	1348	1604	1855	2093	2324	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.7	-11	0	6	-1	2	9	11	1	-17	Error (mV)	MAX	MIN
			-0.23	0.00	0.12	-0.01	0.04	0.18	0.23	0.01	-0.34	LINEARITY ERROR (dB)	0.23	-0.34
			-0.20	0.00	0.10	-0.06	-0.04	0.08	0.10	-0.14	-0.52	LOGGING ACCURACY (dB)	0.10	-0.52
10 GHz	INTERCEPT (m	2135	306	569	820	1064	1323	1577	1842	2089	2329	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.7	-4	5	3	-7	-1	-1	11	4	-9	Error (mV)	MAX	MIN
			-0.09	0.10	0.05	-0.14	-0.03	-0.02	0.21	0.08	-0.18	LINEARITY ERROR (dB)	0.21	-0.18
			-0.88	-0.62	-0.60	-0.72	-0.54	-0.46	-0.16	-0.22	-0.42	LOGGING ACCURACY (dB)	-0.16	-0.88
14 GHz	INTERCEPT (m	2152	352	610	868	1109	1357	1614	1865	2104	2334	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.7	-11	-2	8	0	0	9	11	2	-17	Error (mV)	MAX	MIN
			-0.22	-0.03	0.16	0.01	0.00	0.17	0.22	0.03	-0.34	LINEARITY ERROR (dB)	0.22	-0.34
			0.04	0.20	0.36	0.18	0.14	0.28	0.30	0.08	-0.32	LOGGING ACCURACY (dB)	0.36	-0.32
18 GHz	INTERCEPT (m	2161	348	607	861	1102	1349	1606	1872	2116	2353	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.2	-4	4	6	-4	-8	-2	12	5	-9	Error (mV)	MAX	MIN
			-0.08	0.07	0.13	-0.08	-0.16	-0.05	0.25	0.10	-0.18	LINEARITY ERROR (dB)	0.25	-0.18
			-0.04	0.14	0.22	0.04	-0.02	0.12	0.44	0.32	0.06	LOGGING ACCURACY (dB)	0.44	-0.04
	Flatness +/- dB		0.459	0.409	0.479	0.449	0.340	0.369	0.300	0.340	0.409			
	Max Video Output V		0.352	0.610	0.868	1.109	1.357	1.614	1.872	2.116	2.353			
	Min Video Output V		0.306	0.569	0.820	1.064	1.323	1.577	1.842	2.082	2.312			

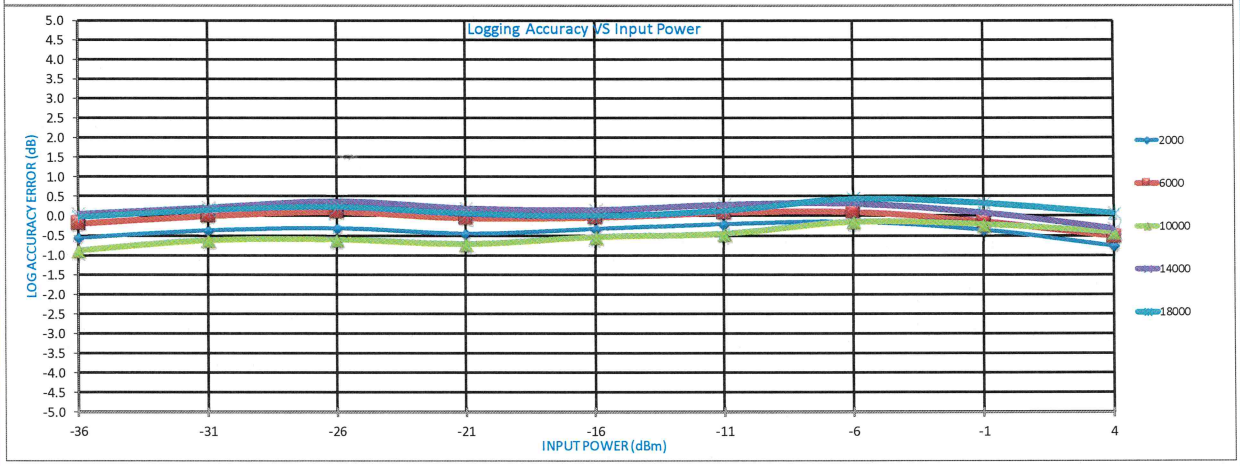
Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.25	-0.35

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	0.44	-0.88

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob





4921 Robert J. Mathews Pkwy Suite 1, El Dorado Hills, CA 95762 USA Phone: (916)542-1401 Fax: (916)265-2597
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SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob
DATE: 9/26/2024

GRAPH #3

PLANAR MONOLITHICS INDUSTRIES
4921 Robert J. Mathews Parkway Suit 1
El Dorado Hills, CA 95762
TEL: 916-542-1401 FAX: 916-265-2597
EMAIL: SALES@PMI-RF.COM

Output Voltage Offset= 0.085 Volts

Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2070	278	535	774	1020	1269	1503	1766	2022	2286	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.9	3	10	0	-3	-4	-19	-5	1	16	Error (mV)	MAX	MIN
			0.06	0.21	0.00	-0.06	-0.07	-0.38	-0.10	0.03	0.32	LINEARITY ERROR (dB)	0.32	-0.38
			-1.44	-1.30	-1.52	-1.60	-1.62	-1.94	-1.68	-1.56	-1.28	LOGGING ACCURACY (dB)	-1.28	-1.94
6 GHz	INTERCEPT (m	2097	303	565	806	1046	1293	1526	1791	2047	2317	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.8	0	13	5	-4	-6	-23	-7	0	21	Error (mV)	MAX	MIN
			0.01	0.27	0.10	-0.08	-0.13	-0.45	-0.14	0.00	0.42	LINEARITY ERROR (dB)	0.42	-0.45
			-0.94	-0.70	-0.88	-1.08	-1.14	-1.48	-1.18	-1.06	-0.66	LOGGING ACCURACY (dB)	-0.66	-1.48
10 GHz	INTERCEPT (m	2089	274	530	770	1016	1265	1501	1775	2041	2323	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.7	12	14	0	-7	-12	-30	-10	3	31	Error (mV)	MAX	MIN
			0.23	0.28	0.00	-0.15	-0.24	-0.59	-0.19	0.05	0.61	LINEARITY ERROR (dB)	0.61	-0.59
			-1.52	-1.40	-1.60	-1.68	-1.70	-1.98	-1.50	-1.18	-0.54	LOGGING ACCURACY (dB)	-0.54	-1.98
14 GHz	INTERCEPT (m	2090	304	565	806	1046	1290	1522	1786	2041	2308	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	49.6	0	13	6	-2	-6	-22	-6	1	20	Error (mV)	MAX	MIN
			-0.01	0.25	0.11	-0.05	-0.13	-0.45	-0.13	0.01	0.39	LINEARITY ERROR (dB)	0.39	-0.45
			-0.92	-0.70	-0.88	-1.08	-1.20	-1.56	-1.28	-1.18	-0.84	LOGGING ACCURACY (dB)	-0.70	-1.56
18 GHz	INTERCEPT (m	2110	311	573	811	1050	1294	1530	1809	2071	2327	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.1	5	16	4	-8	-14	-29	-1	11	16	Error (mV)	MAX	MIN
			0.10	0.32	0.07	-0.16	-0.29	-0.58	-0.01	0.22	0.33	LINEARITY ERROR (dB)	0.33	-0.58
			-0.78	-0.54	-0.78	-1.00	-1.12	-1.40	-0.82	-0.58	-0.46	LOGGING ACCURACY (dB)	-0.46	-1.40
	Flatness +/- dB		0.370	0.430	0.410	0.340	0.290	0.290	0.430	0.490	0.410			
	Max Video Output V		0.311	0.573	0.811	1.050	1.294	1.530	1.809	2.071	2.327			
	Min Video Output V		0.274	0.530	0.770	1.016	1.265	1.501	1.766	2.022	2.286			

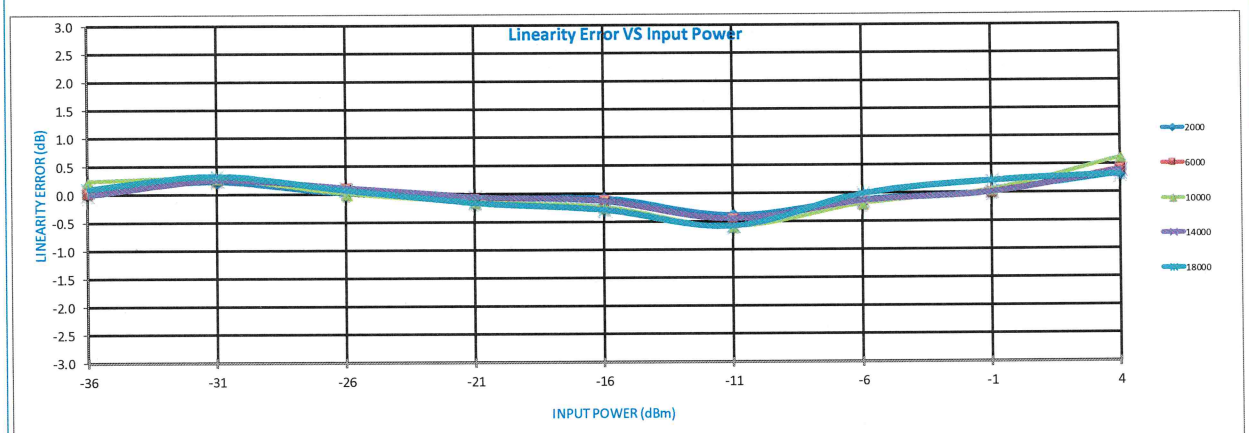
Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.61	-0.59

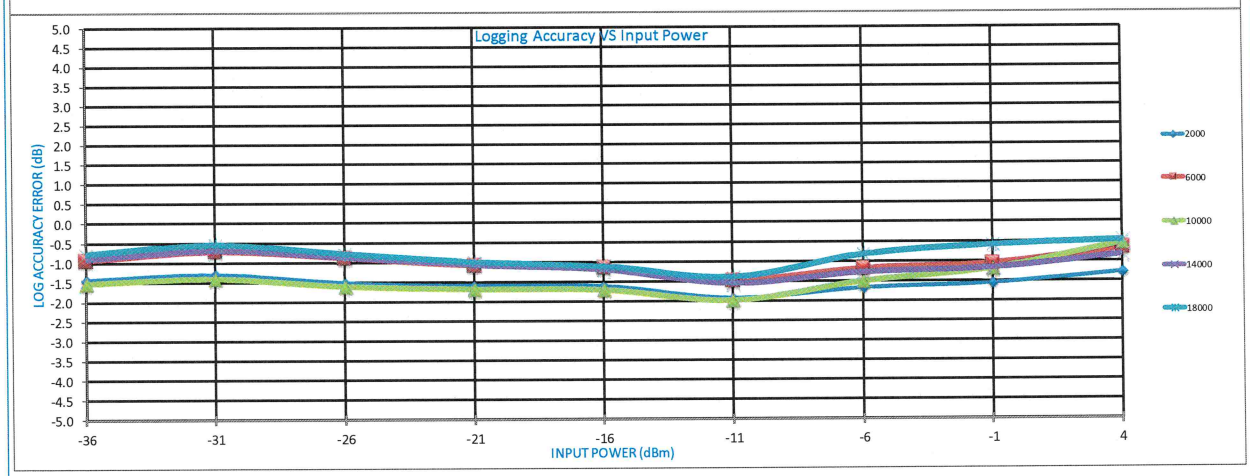
Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB	-0.46	-1.98

4921 Robert J. Mathews Pkwy Suite 1, El Dorado Hills, CA 95762 USA Phone: (916)542-1401 Fax: (916)265-2597
Email: sales@pmi-rf.com

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL47743
TESTED BY: D. Weinrob





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SUMMARY TEST DATA
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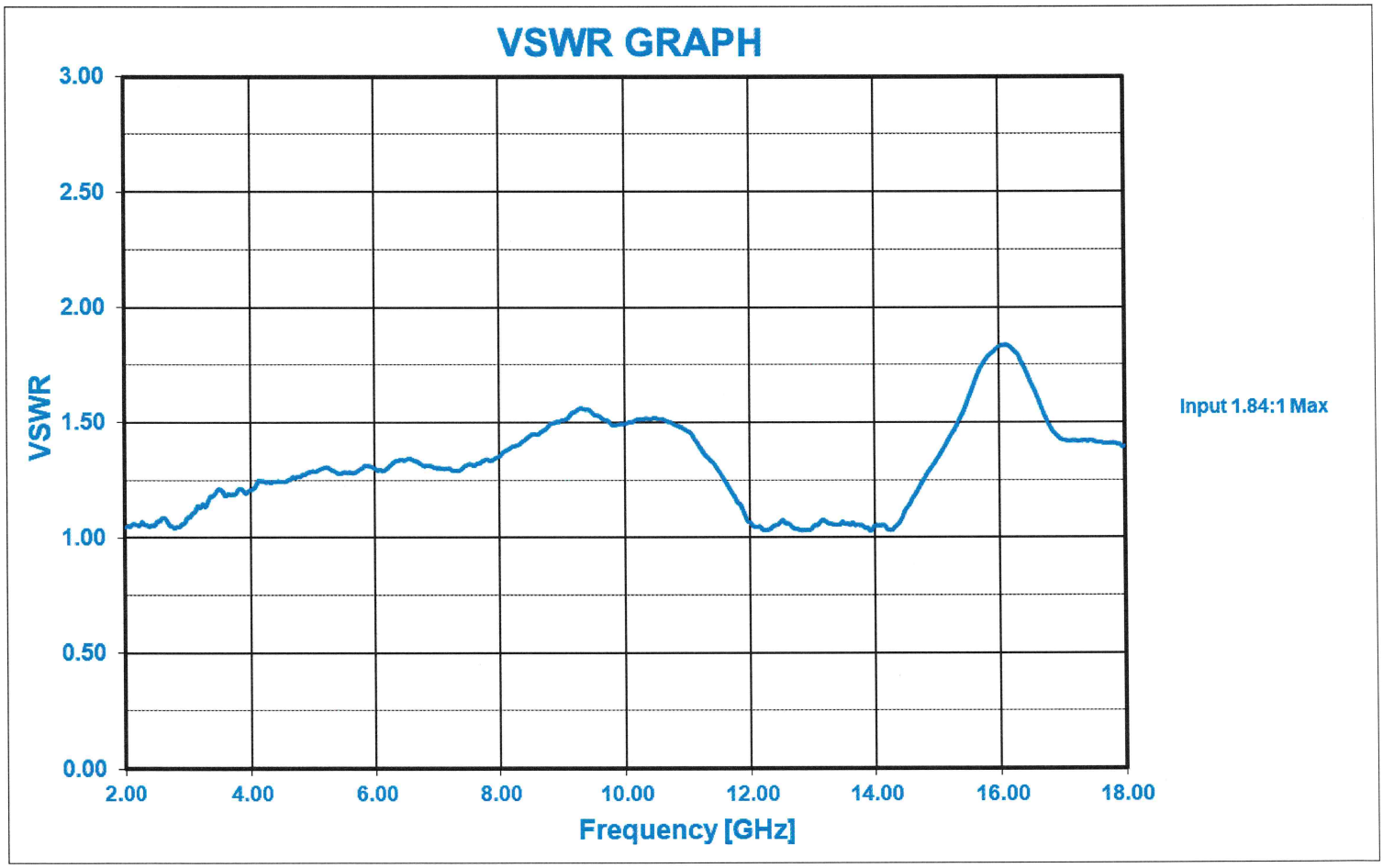
HADA-D2002



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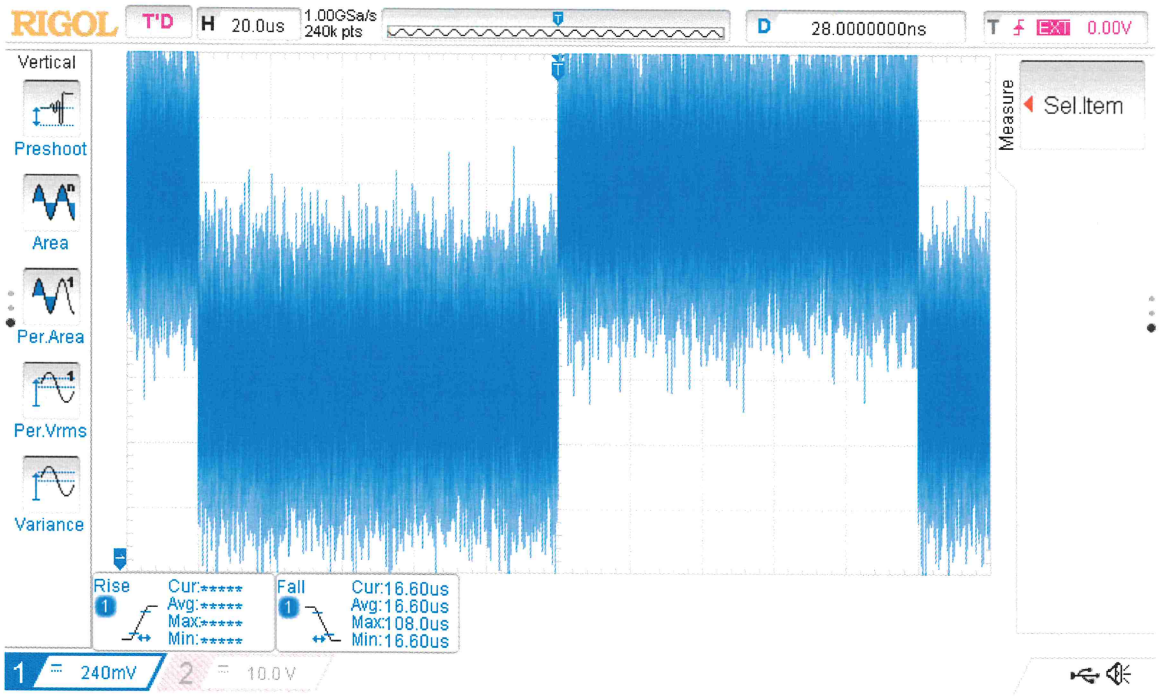
SUMMARY TEST DATA
ON
HADA-D2002

TSS = -41 dBm



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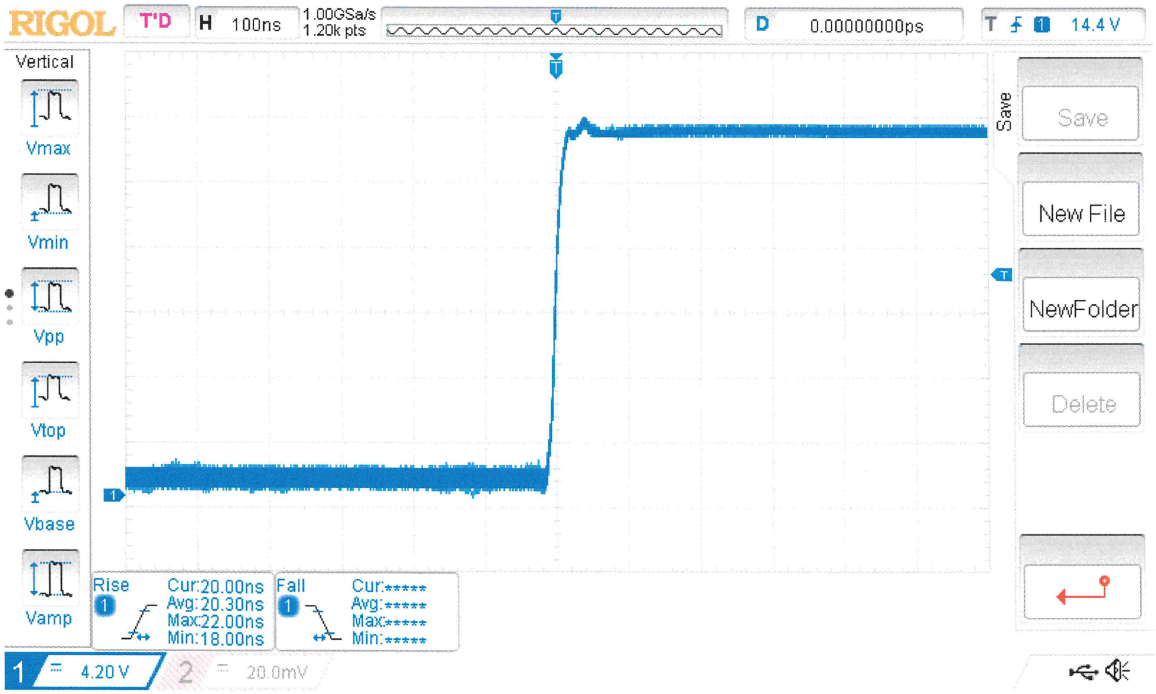
SUMMARY TEST DATA
ON
HADA-D2002

Rise Time = 20 ns



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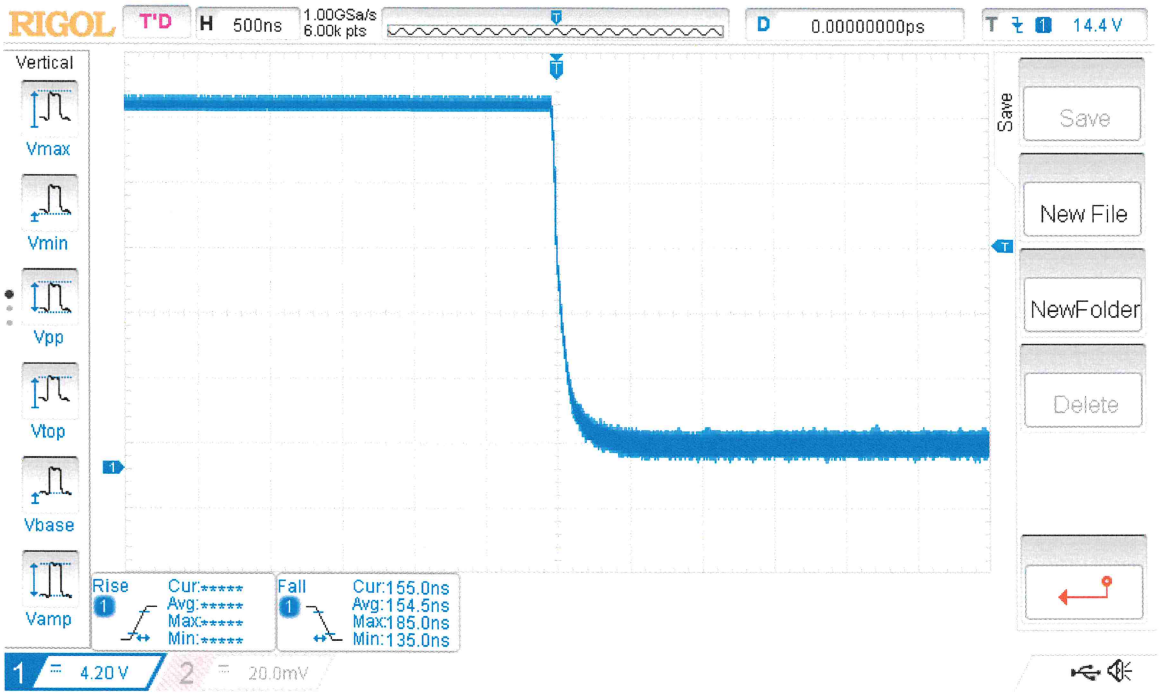
SUMMARY TEST DATA
ON
HADA-D2002

Fall Time = 155 ns



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