SUMMARY TEST DATA ON HADA-D2002

Customer:		**Tested By:**	D. Weinrob
SO No:		**Temperature:**	+25 C
Model No:	HADA-D2002	**Date:**	07/ 25/ 24
Serial No:	PL46949/ 2430	**Drawing No:**	276202 2 **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 QA13
2	TSS:	-40 dBm Min @ -40°C to +85°	**-41.6 dBm See Plot**	
3	Frequency Flatness:	±1.65 dB Max	**0.66 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)	**0.58 dB / -0.02 dB** **1.18 dB / -0.78 dB See Plot**	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	**0.34 dB / -0.36 dB 0.58 dB / -0.56 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%)	**18.07 ns See Plot**	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	**270.8 ns See Plot**	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	**114 mV @ +25°c 107 mV @ -40°c 91 mV @ +85°c See Plot**	

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SUMMARY TEST DATA ON HADA-D2002

12	Input VSWR:	3.0:1 Max @ +23 dBm	**1.65:1** **See Plot**	PMI QA3
13	Propagation Delay:	60 ns Max	**45 ns** **See Plot**	
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: K. 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: PL46949
TESTED BY: D. Weinrob
DATE: 7/1/2024

PLANAR MONOLITHICS INDUSTRIES
4921 Robert J. Mathews Parkway Suit 1
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GRAPH #1

Output Voltage Offset= 0.114 Volts

Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2182	359	614	857	1099	1374	1642	1888	2136	2370	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.7	2	4	-7	-18	3	17	10	4	-15	Error (mV)	MAX	MIN
			0.05	0.07	-0.13	-0.36	0.06	0.34	0.19	0.08	-0.30	LINEARITY ERROR (dB)	0.34	-0.36
			0.18	0.28	0.14	-0.02	0.48	0.84	0.76	0.72	0.40	LOGGING ACCURACY (dB)	0.84	-0.02
6 GHz	INTERCEPT (m	2155	349	606	846	1088	1355	1617	1862	2107	2343	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.1	-1	5	-5	-14	2	14	8	2	-12	Error (mV)	MAX	MIN
			-0.02	0.11	-0.10	-0.28	0.05	0.27	0.16	0.05	-0.24	LINEARITY ERROR (dB)	0.27	-0.28
			-0.02	0.12	-0.08	-0.24	0.10	0.34	0.24	0.14	-0.14	LOGGING ACCURACY (dB)	0.34	-0.24
10 GHz	INTERCEPT (m	2174	358	615	858	1099	1357	1622	1874	2129	2376	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.6	4	8	-2	-14	-8	4	3	5	-1	Error (mV)	MAX	MIN
			0.08	0.16	-0.03	-0.27	-0.16	0.08	0.06	0.10	-0.01	LINEARITY ERROR (dB)	0.16	-0.27
			0.16	0.30	0.16	-0.02	0.14	0.44	0.48	0.58	0.52	LOGGING ACCURACY (dB)	0.58	-0.02
14 GHz	INTERCEPT (m	2186	383	637	884	1124	1380	1646	1889	2140	2379	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.1	0	4	0	-10	-5	11	4	4	-7	Error (mV)	MAX	MIN
			0.00	0.07	0.00	-0.20	-0.09	0.22	0.07	0.08	-0.15	LINEARITY ERROR (dB)	0.22	-0.20
			0.66	0.74	0.68	0.48	0.60	0.92	0.78	0.80	0.58	LOGGING ACCURACY (dB)	0.92	0.48
18 GHz	INTERCEPT (m	2195	399	651	896	1137	1381	1648	1900	2155	2391	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50	4	6	1	-8	-14	3	5	10	-4	Error (mV)	MAX	MIN
			0.07	0.11	0.01	-0.17	-0.29	0.05	0.09	0.19	-0.09	LINEARITY ERROR (dB)	0.19	-0.29
			0.98	1.02	0.92	0.74	0.62	0.96	1.00	1.10	0.82	LOGGING ACCURACY (dB)	1.10	0.62
	Flatness +/- dB		0.497	0.447	0.497	0.487	0.258	0.308	0.378	0.477	0.477			
	Max Video Output V		0.399	0.651	0.896	1.137	1.381	1.648	1.900	2.155	2.391			
	Min Video Output V		0.349	0.606	0.846	1.088	1.355	1.617	1.862	2.107	2.343			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.34	-0.36

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB	1.10	-0.24

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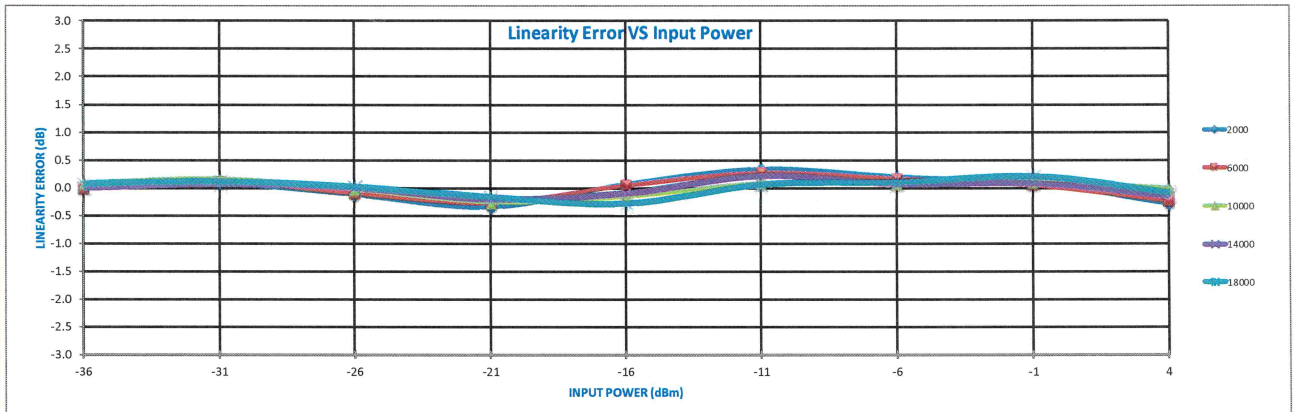
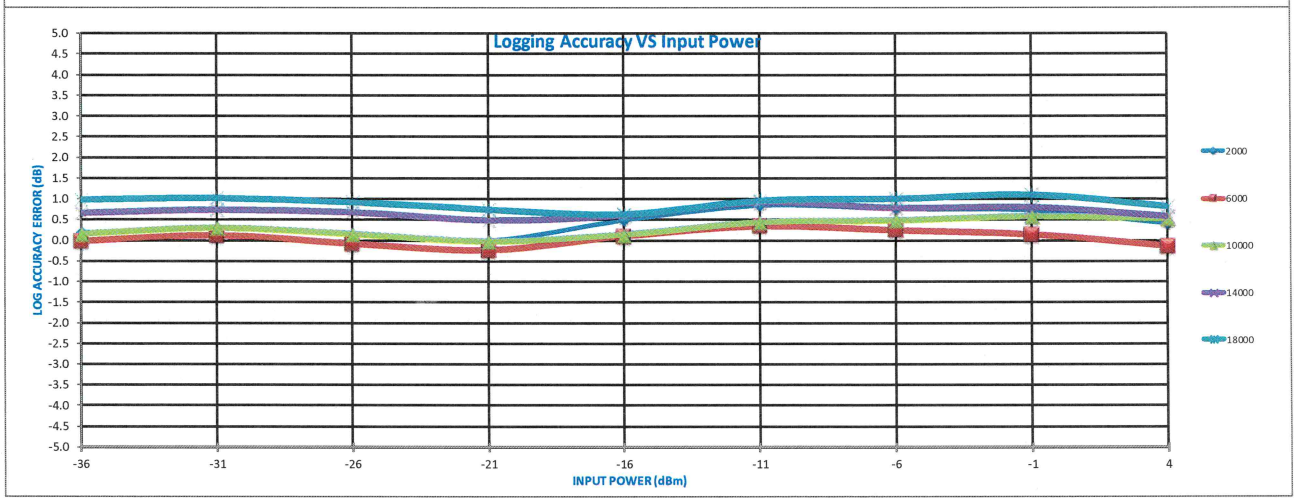
SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL46949
TESTED BY: D. Weinrob





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SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL46949
TESTED BY: D. Weinrob
DATE: 7/23/2024

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= 0.107 Volts

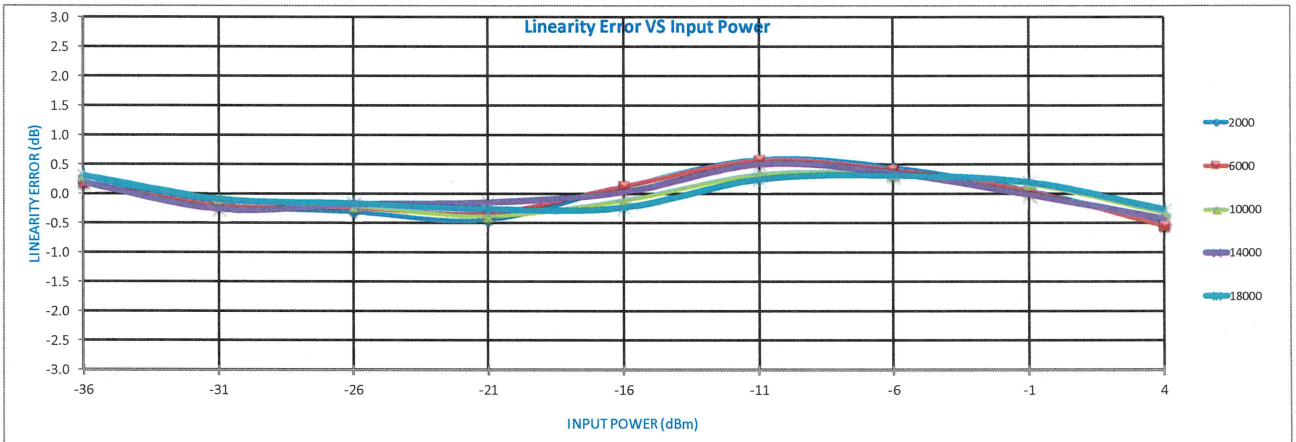
Frequency		-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2149											
	SLOPE (mV/dB	49.9											
		366	592	835	1078	1356	1629	1872	2102	2323	Measured Value (mV)	Error(dB)	
		15	-9	-16	-23	6	29	22	3	-26	Error (mV)	MAX	MIN
		0.29	-0.18	-0.32	-0.45	0.11	0.58	0.45	0.05	-0.52	LINEARITY ERROR (dB)	0.58	-0.52
		0.32	-0.16	-0.30	-0.44	0.12	0.58	0.44	0.04	-0.54	LOGGING ACCURACY (dB)	0.58	-0.54
6 GHz	INTERCEPT (m	2141											
	SLOPE (mV/dB	49.4											
		372	600	845	1087	1357	1626	1865	2094	2311	Measured Value (mV)	Error(dB)	
		9	-10	-12	-17	6	28	20	2	-28	Error (mV)	MAX	MIN
		0.18	-0.20	-0.24	-0.34	0.13	0.57	0.41	0.05	-0.56	LINEARITY ERROR (dB)	0.57	-0.56
		0.44	0.00	-0.10	-0.26	0.14	0.52	0.30	-0.12	-0.78	LOGGING ACCURACY (dB)	0.52	-0.78
10 GHz	INTERCEPT (m	2130											
	SLOPE (mV/dB	49.7											
		355	584	826	1066	1328	1599	1848	2088	2312	Measured Value (mV)	Error(dB)	
		15	-4	-11	-19	-6	16	17	8	-16	Error (mV)	MAX	MIN
		0.31	-0.08	-0.22	-0.39	-0.12	0.33	0.34	0.16	-0.33	LINEARITY ERROR (dB)	0.34	-0.39
		0.10	-0.32	-0.48	-0.68	-0.44	-0.02	-0.04	-0.24	-0.76	LOGGING ACCURACY (dB)	0.10	-0.76
14 GHz	INTERCEPT (m	2173											
	SLOPE (mV/dB	49.3											
		409	633	883	1131	1386	1656	1895	2123	2349	Measured Value (mV)	Error(dB)	
		9	-13	-9	-8	1	25	17	-1	-21	Error (mV)	MAX	MIN
		0.19	-0.26	-0.19	-0.16	0.02	0.50	0.35	-0.02	-0.43	LINEARITY ERROR (dB)	0.50	-0.43
		1.18	0.66	0.66	0.62	0.72	1.12	0.90	0.46	-0.02	LOGGING ACCURACY (dB)	1.18	-0.02
18 GHz	INTERCEPT (m	2138											
	SLOPE (mV/dB	49.4											
		376	603	846	1088	1336	1607	1857	2098	2322	Measured Value (mV)	Error(dB)	
		15	-5	-8	-13	-12	12	15	9	-13	Error (mV)	MAX	MIN
		0.31	-0.09	-0.17	-0.27	-0.25	0.24	0.31	0.19	-0.27	LINEARITY ERROR (dB)	0.31	-0.27
		0.52	0.06	-0.08	-0.24	-0.28	0.14	0.14	-0.04	-0.56	LOGGING ACCURACY (dB)	0.52	-0.56
	Flatness +/- dB		0.545	0.495	0.575	0.656	0.585	0.575	0.474	0.353	0.384		
	Max Video Output V		0.409	0.633	0.883	1.131	1.386	1.656	1.895	2.123	2.349		
	Min Video Output V		0.355	0.584	0.826	1.066	1.328	1.599	1.848	2.088	2.311		

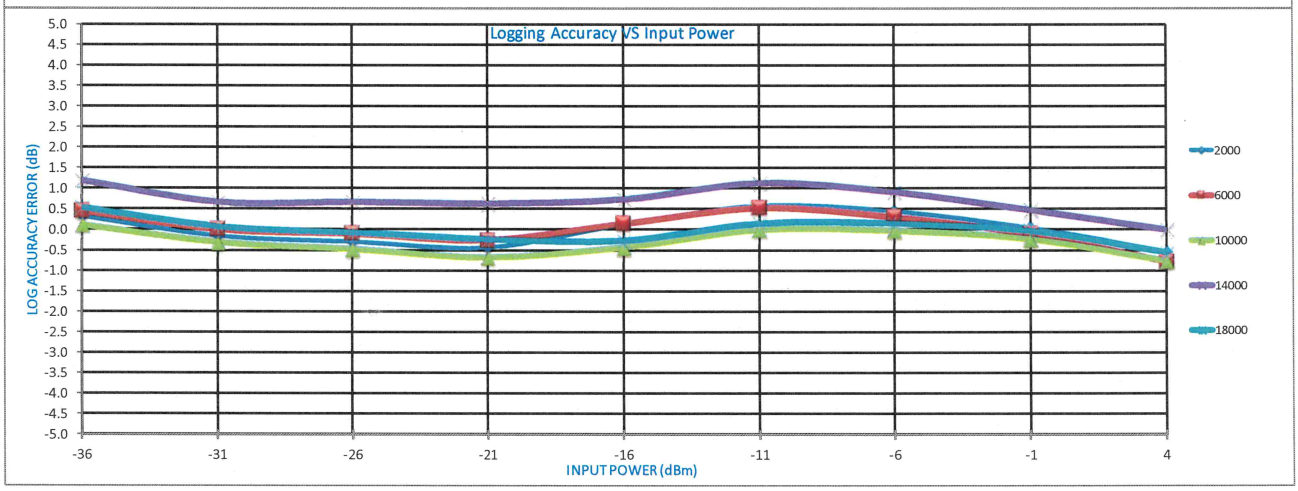
Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.58	-0.56

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	1.18	-0.78

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL46949
TESTED BY: D. Weinrob





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SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL46949
TESTED BY: D. Weinrob
DATE: 7/1/2024

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= 0.091 Volts

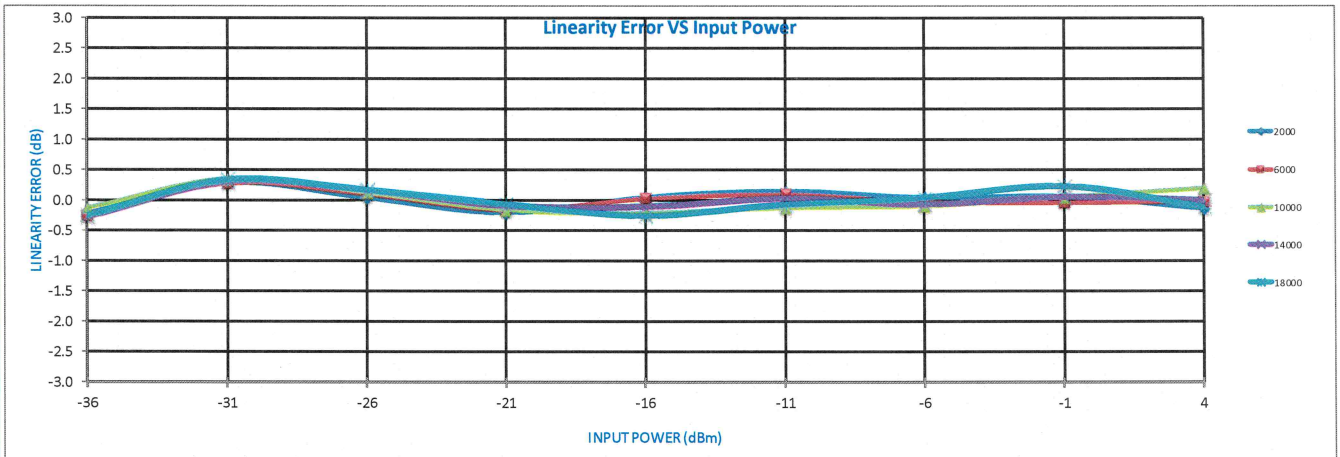
Frequency			-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m	2184	318	601	846	1091	1362	1625	1877	2136	2383	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	51.5	-11	14	1	-11	2	7	2	3	-8	Error (mV)	MAX	MIN
			-0.22	0.27	0.03	-0.22	0.04	0.14	0.03	0.06	-0.15	LINEARITY ERROR (dB)	0.27	-0.22
			-0.64	0.02	-0.08	-0.18	0.24	0.50	0.54	0.72	0.66	LOGGING ACCURACY (dB)	0.72	-0.64
6 GHz	INTERCEPT (m	2181	329	612	858	1100	1365	1624	1873	2128	2384	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	51.1	-13	14	5	-8	1	5	-1	-2	-1	Error (mV)	MAX	MIN
			-0.26	0.28	0.10	-0.16	0.03	0.10	-0.03	-0.03	-0.02	LINEARITY ERROR (dB)	0.28	-0.26
			-0.42	0.24	0.16	0.00	0.30	0.48	0.46	0.56	0.68	LOGGING ACCURACY (dB)	0.68	-0.42
10 GHz	INTERCEPT (m	2178	317	599	845	1088	1343	1605	1864	2129	2394	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	51.5	-7	18	6	-8	-11	-6	-5	3	10	Error (mV)	MAX	MIN
			-0.13	0.35	0.12	-0.16	-0.21	-0.12	-0.09	0.05	0.19	LINEARITY ERROR (dB)	0.35	-0.21
			-0.66	-0.02	-0.10	-0.24	-0.14	0.10	0.28	0.58	0.88	LOGGING ACCURACY (dB)	0.88	-0.66
14 GHz	INTERCEPT (m	2178	336	619	866	1107	1360	1621	1870	2130	2381	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.8	-14	15	8	-5	-6	2	-3	3	0	Error (mV)	MAX	MIN
			-0.27	0.30	0.16	-0.09	-0.11	0.03	-0.07	0.05	0.00	LINEARITY ERROR (dB)	0.30	-0.27
			-0.28	0.38	0.32	0.14	0.20	0.42	0.40	0.60	0.62	LOGGING ACCURACY (dB)	0.62	-0.28
18 GHz	INTERCEPT (m	2179	348	630	874	1115	1358	1620	1878	2140	2376	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB	50.5	-13	17	8	-3	-13	-4	2	11	-5	Error (mV)	MAX	MIN
			-0.25	0.33	0.16	-0.07	-0.26	-0.07	0.04	0.22	-0.11	LINEARITY ERROR (dB)	0.33	-0.26
			-0.04	0.60	0.48	0.30	0.16	0.40	0.56	0.80	0.52	LOGGING ACCURACY (dB)	0.80	-0.04
	Flatness +/- dB		0.303	0.303	0.284	0.264	0.215	0.196	0.137	0.117	0.176			
	Max Video Output V		0.348	0.630	0.874	1.115	1.365	1.625	1.878	2.140	2.394			
	Min Video Output V		0.317	0.599	0.845	1.088	1.343	1.605	1.864	2.128	2.376			

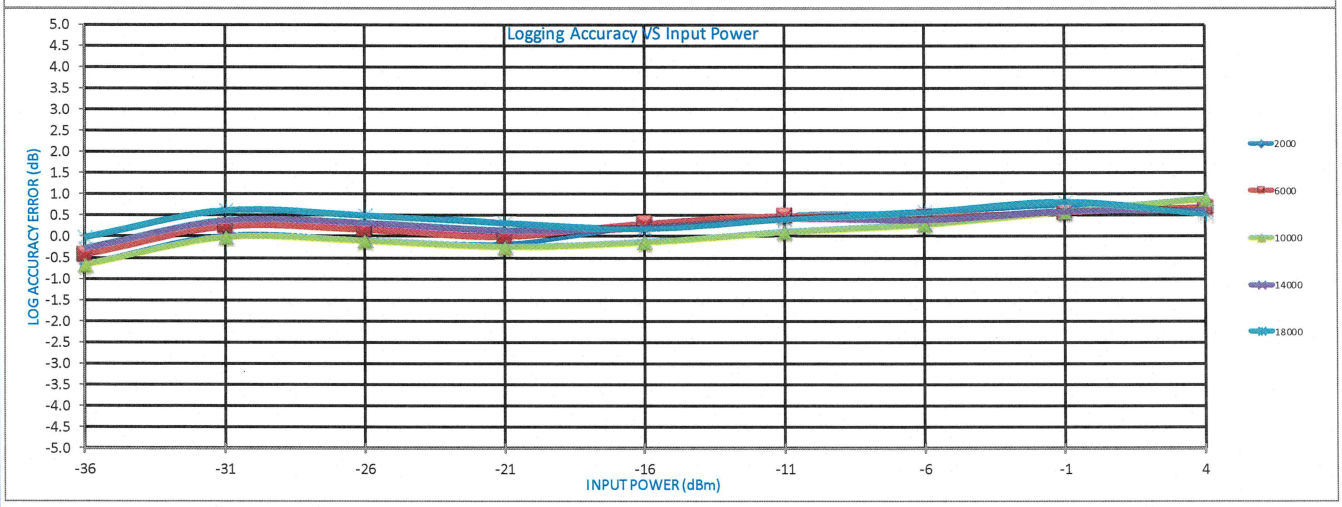
Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.35	-0.27

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	0.88	-0.66

SUMMARY TEST DATA
ON
HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL46949
TESTED BY: D. Weinrob





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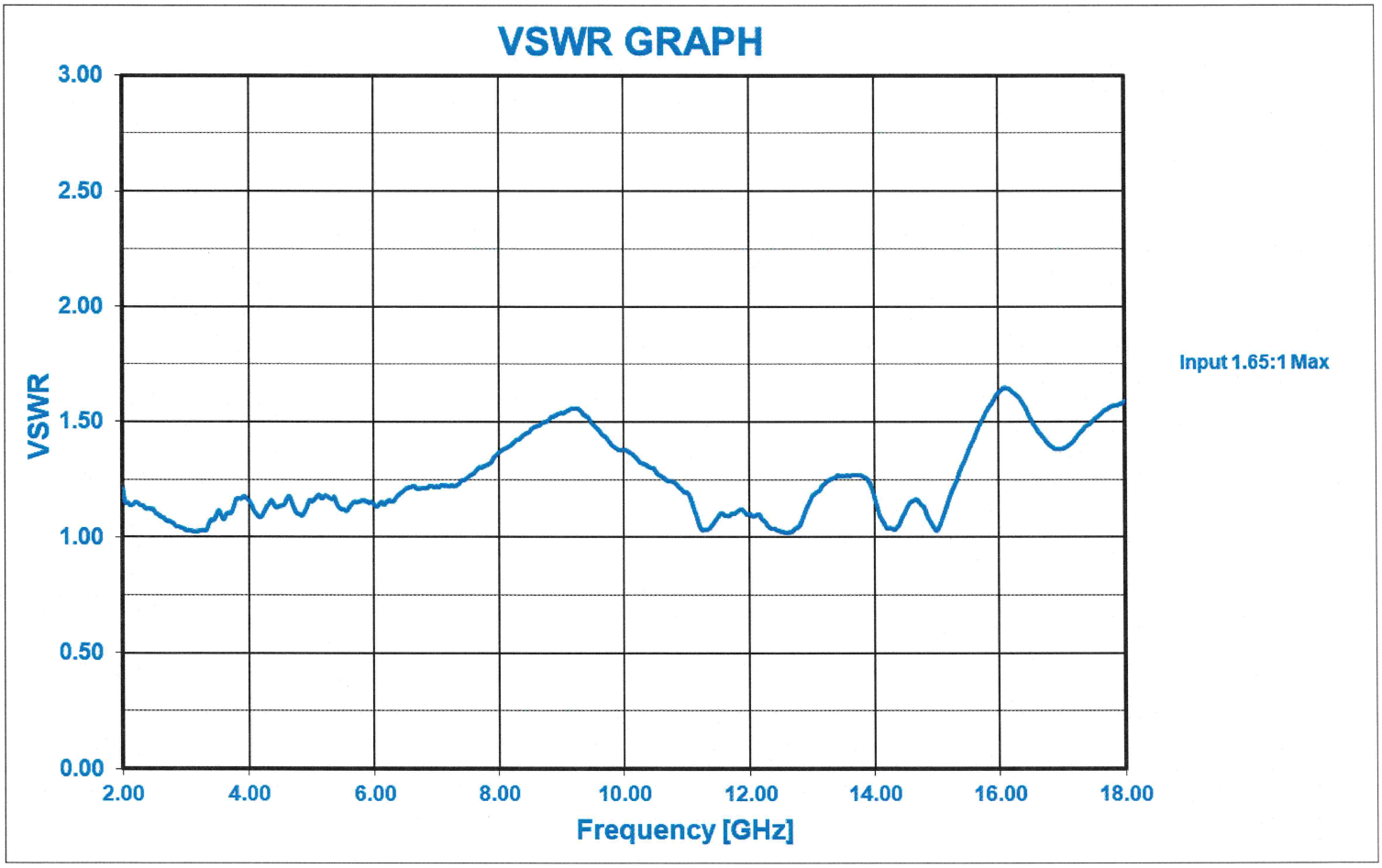
SUMMARY TEST DATA
ON
HADA-D2002



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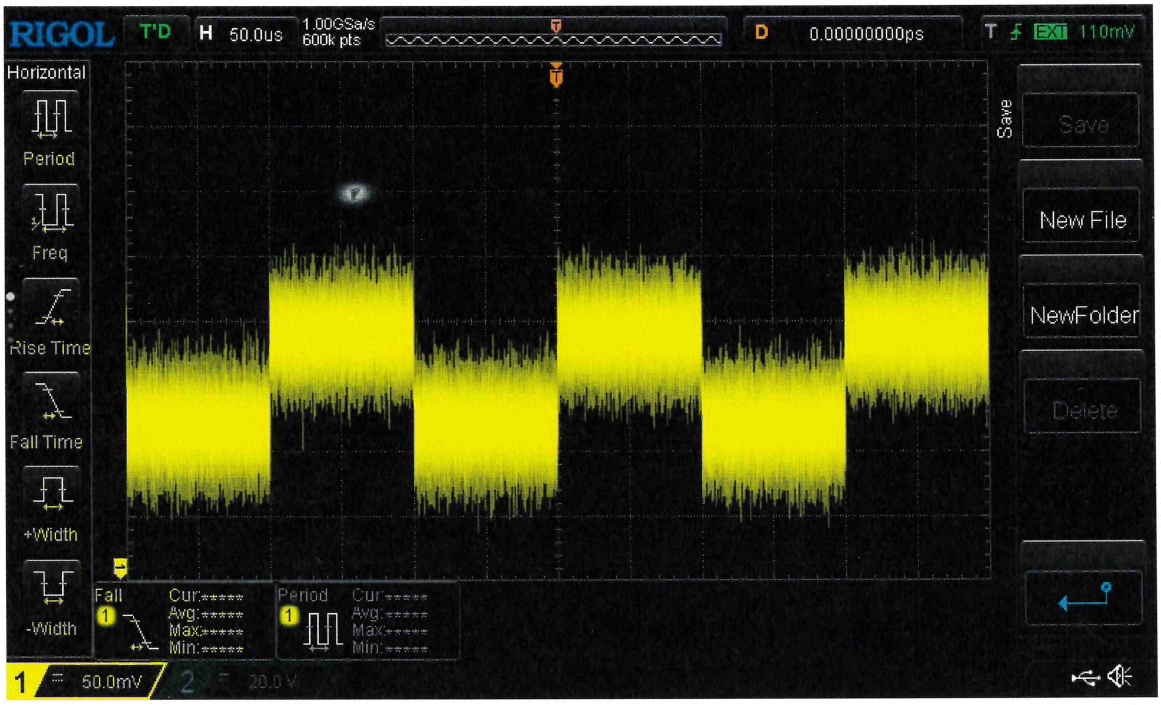
SUMMARY TEST DATA
ON
HADA-D2002

TSS = -41.6 dBm



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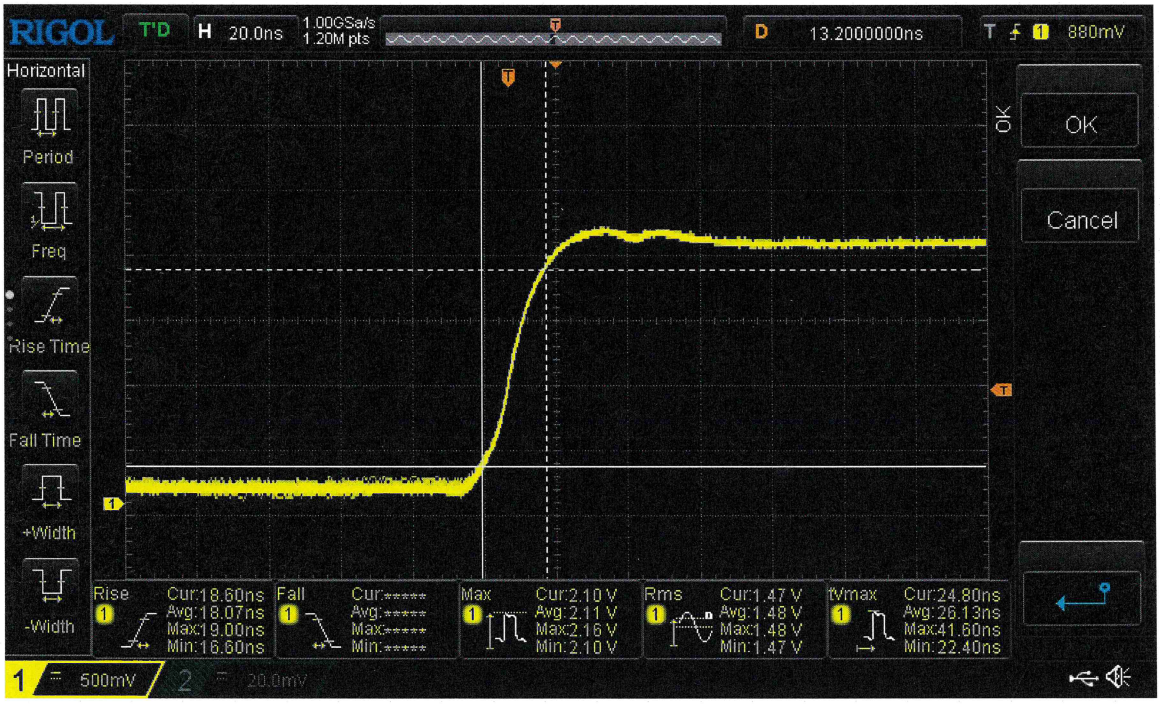
SUMMARY TEST DATA
ON
HADA-D2002

Rise Time = 18.07 ns



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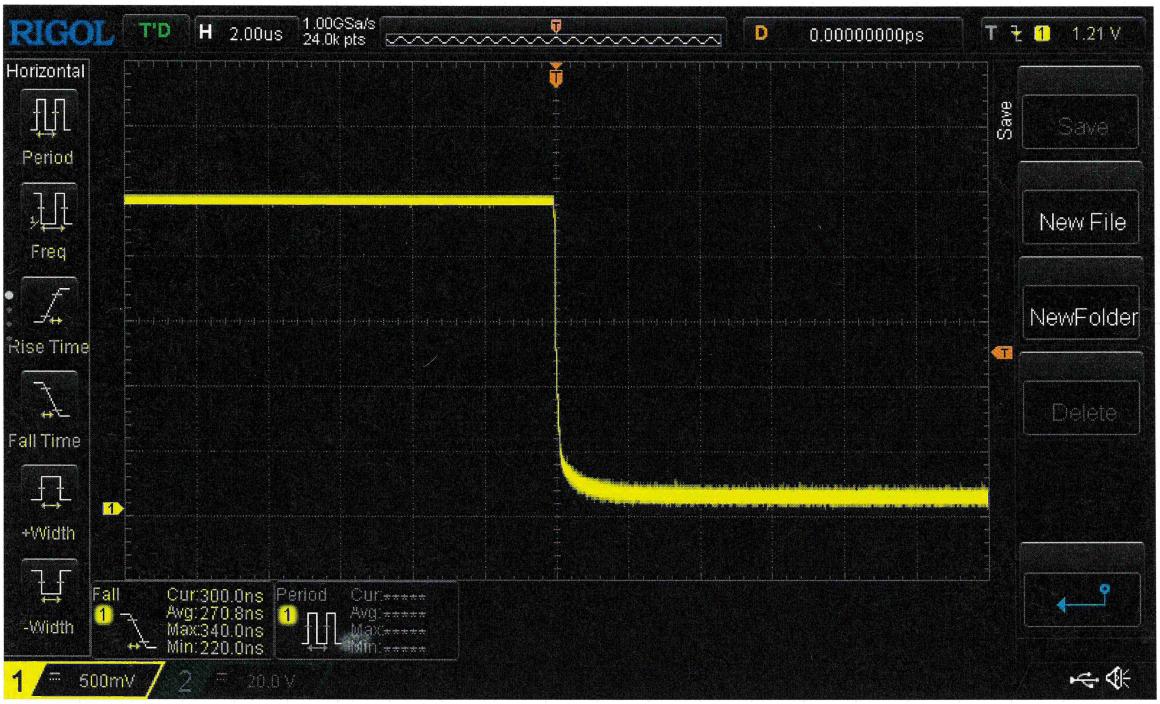
SUMMARY TEST DATA
ON
HADA-D2002

Fall Time = 270.8 ns



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