



SUMMARY TEST DATA ON HADA-D2002

PL46305/2426

Customer:		Tested By:	Anton L.
SO No:		Temperature:	+25°C -40°C +85°C
Model No:	HADA-D2002	Date:	6/25/24
Serial No:	PL46305/2426	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°	-42.5 dBm See Plot	
3	Frequency Flatness:	±1.65 dB Max	±0.601 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)	+0.06 / -0.44 dB +1.10 / -1.10 dB See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	+0.41 / -0.32 dB +0.54 / -0.48 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%)	24.9 ns See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	142.7 ns See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	82 mV @ +25°C 95 mV @ -40°C 81 mV @ +85°C	
12	Input VSWR:	3.0:1 Max @ +23 dBm	1.69:1 See Plot	

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13	Propagation Delay:	60 ns Max	45 ns	PMI QA3
14	Power Supply:	+12 $\pm$ 1VDC @ 125 mA Max -12 $\pm$ 1VDC @ 75 mA Max	90 mA 40 mA	/
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 $\pm$ 0.5 Ohms terminated.

QA/QC Approval: K. Luter

Date: 6.25.24



SUMMARY TEST DATA ON HADA-D2002

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Log Linearity and Log Accuracy @ +25°C

Output Voltage Offset= 0.082 Volts

Frequency		
2 GHz	INTERCEPT (mV)	2159
	SLOPE (mV/dB)	50.5

6 GHz	INTERCEPT (mV)	2162
	SLOPE (mV/dB)	49.2

10 GHz	INTERCEPT (mV)	2144
	SLOPE (mV/dB)	50

14 GHz	INTERCEPT (mV)	2190
	SLOPE (mV/dB)	50.2

18 GHz	INTERCEPT (mV)	2184
	SLOPE (mV/dB)	49.6

Flatness +/- dB
Max Video Output V
Min Video Output V

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	338	593	842	1087	1363	1622	1847	2102	2359		Measured Value (mV)	Error(dB)
	-2	0	-3	-11	13	19	-9	-6	-2		Error (mV)	MAX MIN
	-0.04	0.01	-0.06	-0.21	0.25	0.38	-0.17	-0.12	-0.03		LINEARITY ERROR (dB)	0.38 -0.21
	-0.24	-0.14	-0.16	-0.26	0.26	0.44	-0.06	0.04	0.18		LOGGING ACCURACY (dB)	0.44 -0.26
	380	631	888	1132	1390	1641	1859	2104	2350		Measured Value (mV)	Error(dB)
	-12	-7	5	3	15	20	-8	-9	-8		Error (mV)	MAX MIN
	-0.24	-0.13	0.09	0.06	0.31	0.41	-0.16	-0.17	-0.17		LINEARITY ERROR (dB)	0.41 -0.24
	0.60	0.62	0.76	0.64	0.80	0.82	0.18	0.08	0.00		LOGGING ACCURACY (dB)	0.82 0.00
	341	597	850	1094	1345	1601	1828	2089	2353		Measured Value (mV)	Error(dB)
	-4	2	5	0	1	7	-16	-5	10		Error (mV)	MAX MIN
	-0.08	0.04	0.11	-0.01	0.02	0.14	-0.32	-0.09	0.19		LINEARITY ERROR (dB)	0.19 -0.32
	-0.18	-0.06	0.00	-0.12	-0.10	0.02	-0.44	-0.22	0.06		LOGGING ACCURACY (dB)	0.06 -0.44
	379	630	889	1133	1400	1652	1877	2133	2390		Measured Value (mV)	Error(dB)
	-5	-5	4	-3	13	14	-12	-6	0		Error (mV)	MAX MIN
	-0.10	-0.09	0.07	-0.06	0.26	0.28	-0.23	-0.13	0.00		LINEARITY ERROR (dB)	0.28 -0.23
	0.58	0.60	0.78	0.66	1.00	1.04	0.54	0.66	0.80		LOGGING ACCURACY (dB)	1.04 0.54
	390	639	895	1139	1405	1655	1877	2130	2375		Measured Value (mV)	Error(dB)
	-7	-6	2	-2	16	17	-9	-4	-7		Error (mV)	MAX MIN
	-0.13	-0.12	0.04	-0.04	0.31	0.35	-0.18	-0.08	-0.15		LINEARITY ERROR (dB)	0.35 -0.18
	0.80	0.78	0.90	0.78	1.10	1.10	0.54	0.60	0.50		LOGGING ACCURACY (dB)	1.10 0.50
	0.521	0.461	0.531	0.521	0.601	0.541	0.491	0.441	0.401			
	0.390	0.639	0.895	1.139	1.405	1.655	1.877	2.133	2.390			
	0.338	0.593	0.842	1.087	1.345	1.601	1.828	2.089	2.350			

Logging Linearity vs Frequency	Error(dB)
	MAX MIN
LOGGING LINEARITY ERROR (dB)	0.41 -0.32

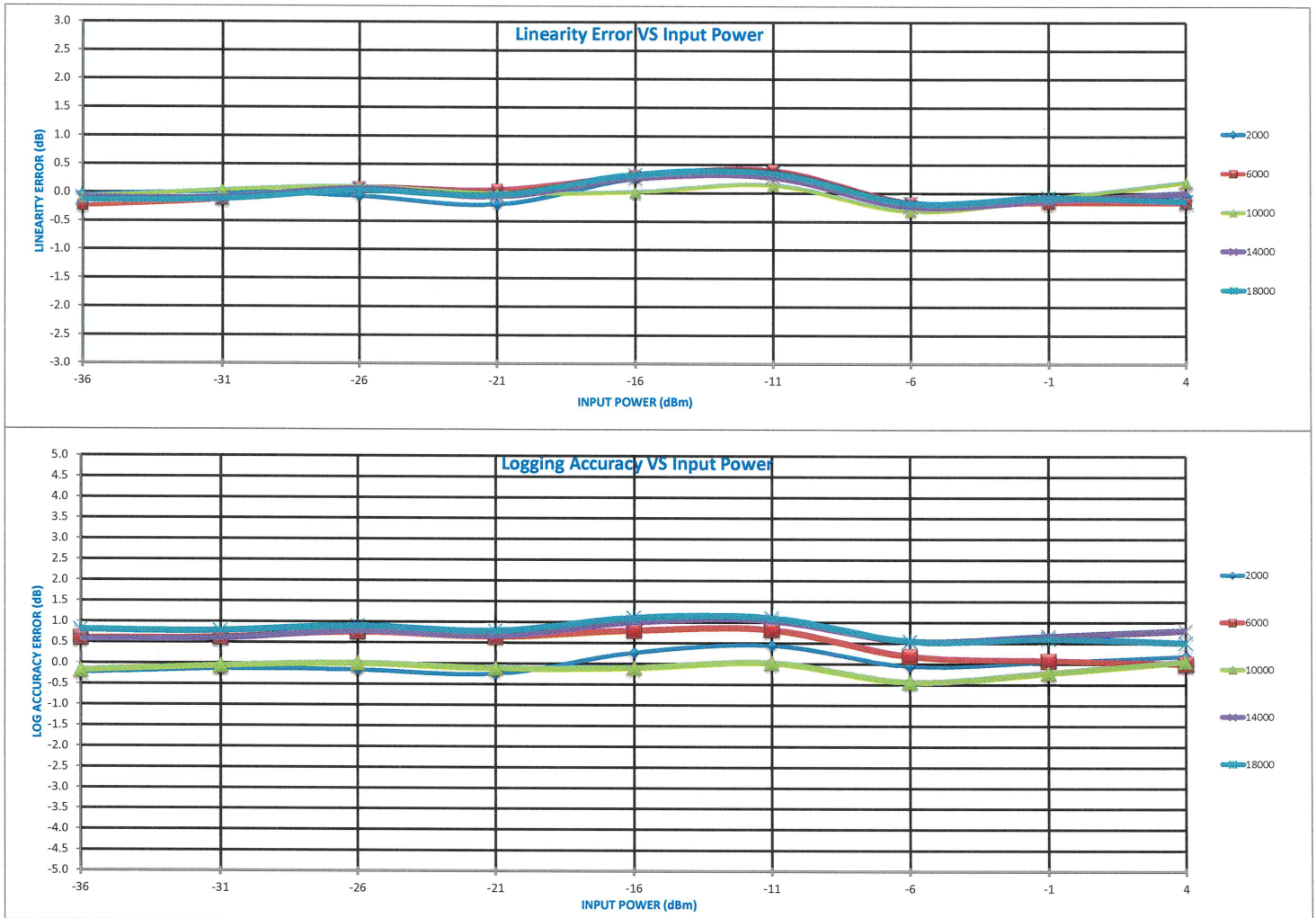
Logging Accuracy vs Frequency	Error(dB)
	MAX MIN
LOGGING ACCURACY ERROR (dB)	1.10 -0.44



SUMMARY TEST DATA
ON
HADA-D2002

PL46305/2426

Log Linearity and Log Accuracy @ +25°C



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SUMMARY TEST DATA ON HADA-D2002

PL46305/2426

Log Linearity and Log Accuracy @ -40°C

Output Voltage Offset= 0.095 Volts

Frequency

2 GHz	INTERCEPT (mV)	2123
	SLOPE (mV/dB)	49.4

6 GHz	INTERCEPT (mV)	2126
	SLOPE (mV/dB)	48.1

10 GHz	INTERCEPT (mV)	2105
	SLOPE (mV/dB)	48.8

14 GHz	INTERCEPT (mV)	2149
	SLOPE (mV/dB)	49

18 GHz	INTERCEPT (mV)	2146
	SLOPE (mV/dB)	48.7

Flatness +/- dB
Max Video Output V
Min Video Output V

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)
Measured Value (mV)	360	579	827	1071	1346	1605	1830	2074	2307	Measured Value (mV)
Error (mV)	14	-14	-12	-15	13	25	3	0	-14	Error (mV)
LINEARITY ERROR (dB)	0.29	-0.27	-0.25	-0.31	0.26	0.50	0.06	0.00	-0.28	LINEARITY ERROR (dB)
LOGGING ACCURACY (dB)	0.20	-0.42	-0.46	-0.58	-0.08	0.10	-0.40	-0.52	-0.86	LOGGING ACCURACY (dB)
Measured Value (mV)	396	616	870	1119	1374	1623	1843	2075	2295	Measured Value (mV)
Error (mV)	1	-20	-6	3	17	26	5	-3	-23	Error (mV)
LINEARITY ERROR (dB)	0.02	-0.41	-0.13	0.05	0.36	0.54	0.11	-0.06	-0.48	LINEARITY ERROR (dB)
LOGGING ACCURACY (dB)	0.92	0.32	0.40	0.38	0.48	0.46	-0.14	-0.50	-1.10	LOGGING ACCURACY (dB)
Measured Value (mV)	360	581	833	1076	1327	1584	1809	2059	2295	Measured Value (mV)
Error (mV)	11	-12	-4	-5	2	15	-4	2	-5	Error (mV)
LINEARITY ERROR (dB)	0.22	-0.25	-0.08	-0.10	0.04	0.31	-0.08	0.05	-0.11	LINEARITY ERROR (dB)
LOGGING ACCURACY (dB)	0.20	-0.38	-0.34	-0.48	-0.46	-0.32	-0.82	-0.82	-1.10	LOGGING ACCURACY (dB)
Measured Value (mV)	392	612	867	1117	1381	1631	1859	2096	2331	Measured Value (mV)
Error (mV)	7	-18	-8	-3	16	21	4	-4	-15	Error (mV)
LINEARITY ERROR (dB)	0.15	-0.36	-0.16	-0.06	0.32	0.42	0.08	-0.09	-0.30	LINEARITY ERROR (dB)
LOGGING ACCURACY (dB)	0.84	0.24	0.34	0.34	0.62	0.62	0.18	-0.08	-0.38	LOGGING ACCURACY (dB)
Measured Value (mV)	400	618	870	1120	1384	1630	1859	2096	2322	Measured Value (mV)
Error (mV)	7	-18	-10	-3	17	20	5	-1	-19	Error (mV)
LINEARITY ERROR (dB)	0.15	-0.37	-0.20	-0.06	0.36	0.41	0.11	-0.02	-0.38	LINEARITY ERROR (dB)
LOGGING ACCURACY (dB)	1.00	0.36	0.40	0.40	0.68	0.60	0.18	-0.08	-0.56	LOGGING ACCURACY (dB)
Flatness +/- dB	0.410	0.400	0.441	0.502	0.584	0.482	0.512	0.379	0.369	Flatness +/- dB
Max Video Output V	0.400	0.618	0.870	1.120	1.384	1.631	1.859	2.096	2.331	Max Video Output V
Min Video Output V	0.360	0.579	0.827	1.071	1.327	1.584	1.809	2.059	2.295	Min Video Output V

Logging Linearity vs Frequency	Error(dB)
	MAX MIN
LOGGING LINEARITY ERROR (dB)	0.54 -0.48

Logging Accuracy vs Frequency	Error(dB)
	MAX MIN
LOGGING ACCURACY ERROR (dB)	1.00 -1.10

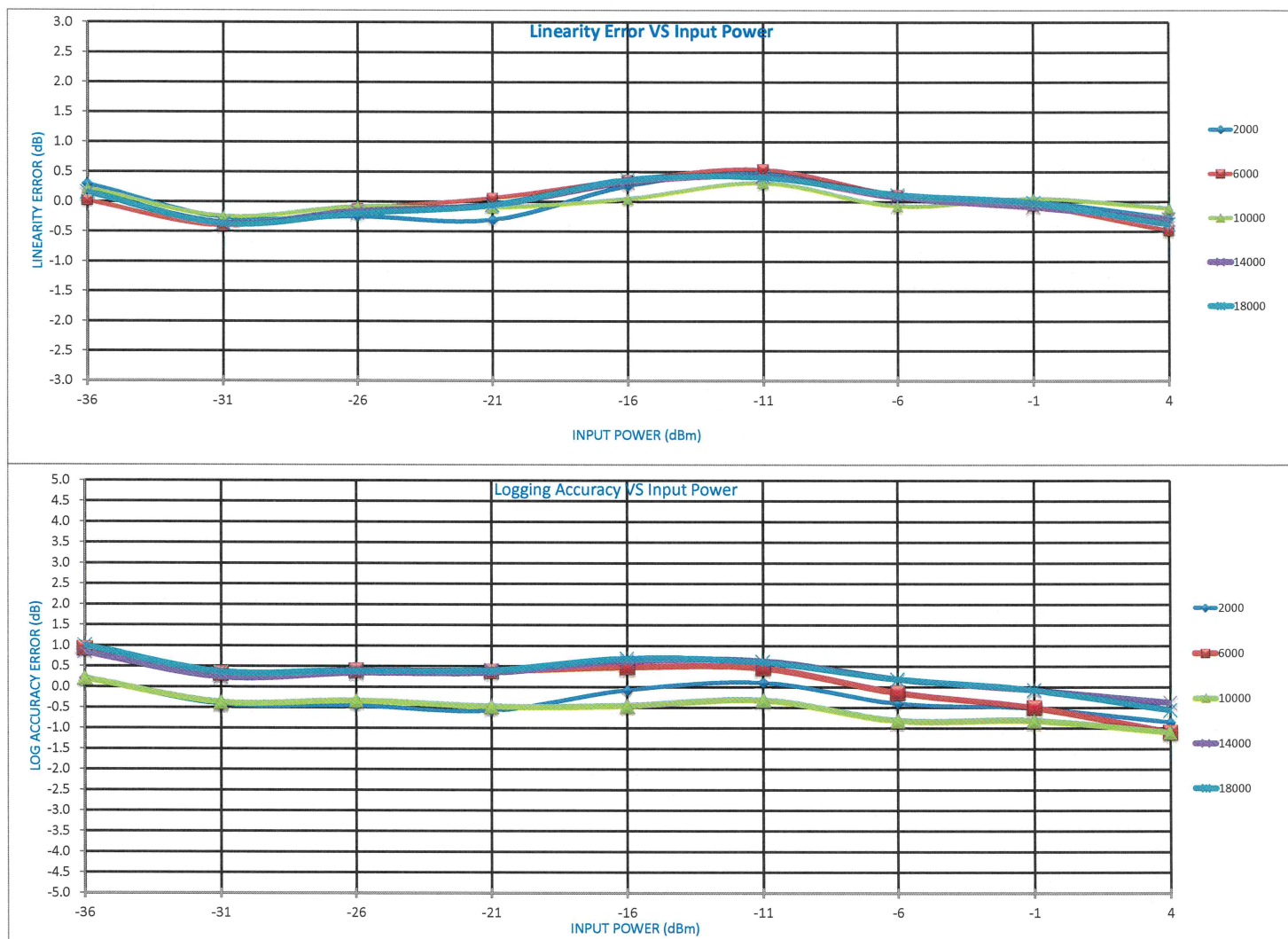
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ON
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Log Linearity and Log Accuracy @ -40°C



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SUMMARY TEST DATA ON HADA-D2002

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Log Linearity and Log Accuracy @ +85°C

Output Voltage Offset= 0.081 Volts

Frequency

2 GHz	INTERCEPT (mV)	2146
	SLOPE (mV/dB)	50.9

6 GHz	INTERCEPT (mV)	2159
	SLOPE (mV/dB)	49.6

10 GHz	INTERCEPT (mV)	2143
	SLOPE (mV/dB)	50.5

14 GHz	INTERCEPT (mV)	2177
	SLOPE (mV/dB)	50.5

18 GHz	INTERCEPT (mV)	2160
	SLOPE (mV/dB)	49.6

Flatness +/- dB
Max Video Output V
Min Video Output V

-36	-31	-26	-21	-16	-11	-6	-1	4
310	576	821	1066	1340	1598	1828	2084	2359
-4	8	-1	-11	9	12	-12	-11	10
-0.07	0.16	-0.03	-0.21	0.17	0.24	-0.24	-0.21	0.20
-0.80	-0.48	-0.58	-0.68	-0.20	-0.04	-0.44	-0.32	0.18
359	623	876	1118	1376	1626	1846	2096	2365
-13	3	7	1	11	13	-15	-14	7
-0.27	0.05	0.15	0.02	0.22	0.26	-0.31	-0.27	0.15
0.18	0.46	0.52	0.36	0.52	0.52	-0.08	-0.08	0.30
321	588	838	1081	1331	1586	1819	2082	2371
-4	10	8	-2	-4	-2	-21	-11	26
-0.08	0.20	0.15	-0.03	-0.08	-0.03	-0.42	-0.21	0.51
-0.58	-0.24	-0.24	-0.38	-0.38	-0.28	-0.62	-0.36	0.42
352	617	870	1112	1379	1631	1857	2116	2389
-8	5	5	-5	10	9	-17	-10	11
-0.16	0.09	0.11	-0.10	0.19	0.19	-0.33	-0.20	0.21
0.04	0.34	0.40	0.24	0.58	0.62	0.14	0.32	0.78
359	623	874	1115	1382	1631	1852	2104	2352
-14	2	4	-3	16	17	-10	-6	-6
-0.29	0.03	0.09	-0.05	0.33	0.34	-0.20	-0.12	-0.13
0.18	0.46	0.48	0.30	0.64	0.62	0.04	0.08	0.04
0.488	0.468	0.548	0.518	0.508	0.448	0.378	0.339	0.368
0.359	0.623	0.876	1.118	1.382	1.631	1.857	2.116	2.389
0.310	0.576	0.821	1.066	1.331	1.586	1.819	2.082	2.352

RF Input Power (dBm)

Measured Value (mV)	Error(dB)
Error (mV)	MAX MIN
LINEARITY ERROR (dB)	0.24 -0.24
LOGGING ACCURACY (dB)	0.18 -0.80

Measured Value (mV)	Error(dB)
Error (mV)	MAX MIN
LINEARITY ERROR (dB)	0.26 -0.31
LOGGING ACCURACY (dB)	0.52 -0.08

Measured Value (mV)	Error(dB)
Error (mV)	MAX MIN
LINEARITY ERROR (dB)	0.51 -0.42
LOGGING ACCURACY (dB)	0.42 -0.62

Measured Value (mV)	Error(dB)
Error (mV)	MAX MIN
LINEARITY ERROR (dB)	0.21 -0.33
LOGGING ACCURACY (dB)	0.78 0.04

Measured Value (mV)	Error(dB)
Error (mV)	MAX MIN
LINEARITY ERROR (dB)	0.34 -0.29
LOGGING ACCURACY (dB)	0.64 0.04

Logging Linearity vs Frequency	Error(dB)
	MAX MIN
LOGGING LINEARITY ERROR (dB)	0.51 -0.42

Logging Accuracy vs Frequency	Error(dB)
	MAX MIN
LOGGING ACCURACY ERROR (dB)	0.78 -0.80

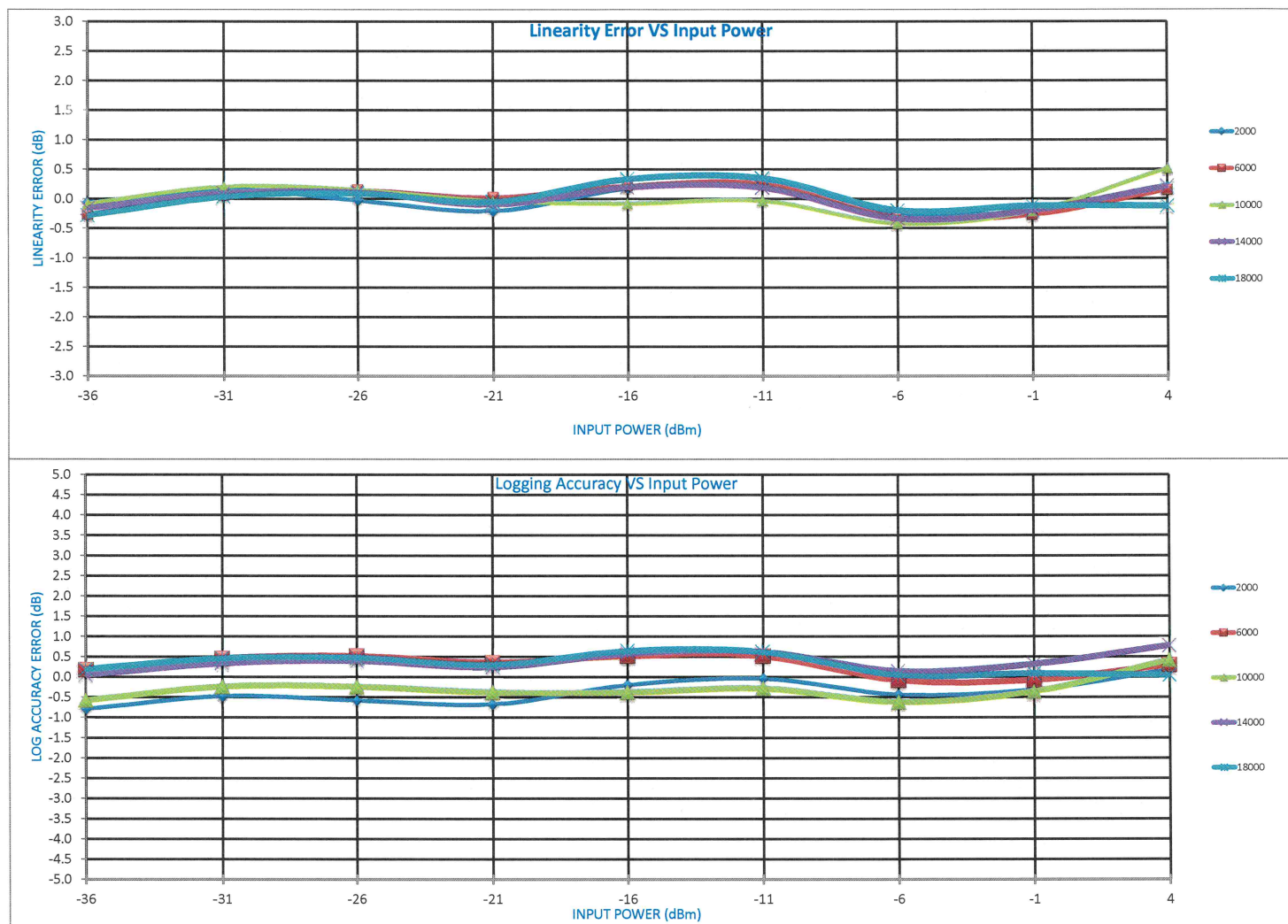
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Log Linearity and Log Accuracy @ +85°C



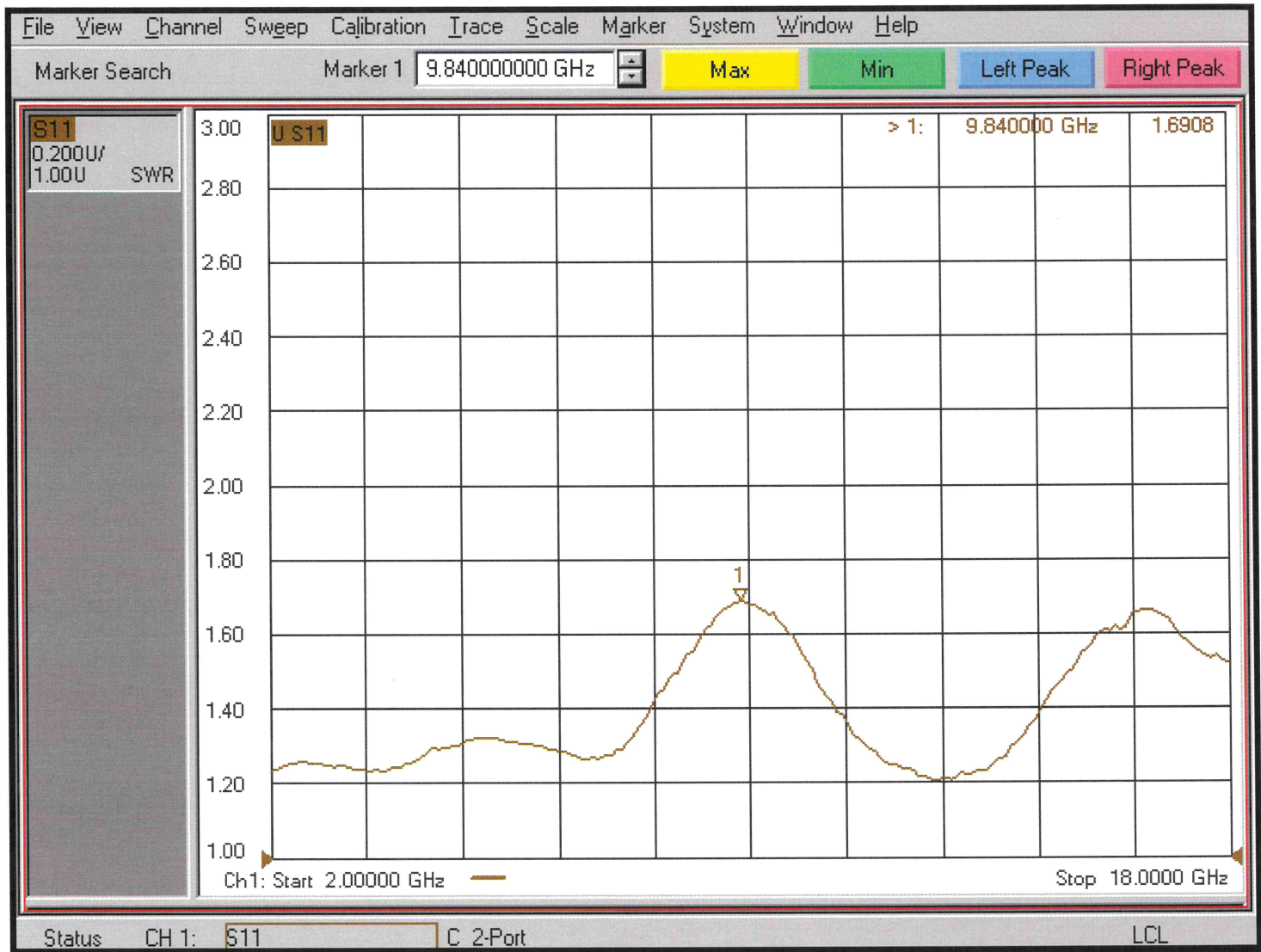
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VSWR 1.69:1



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SUMMARY TEST DATA
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TSS @ -42.5 dBm



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 07:05:10 2024



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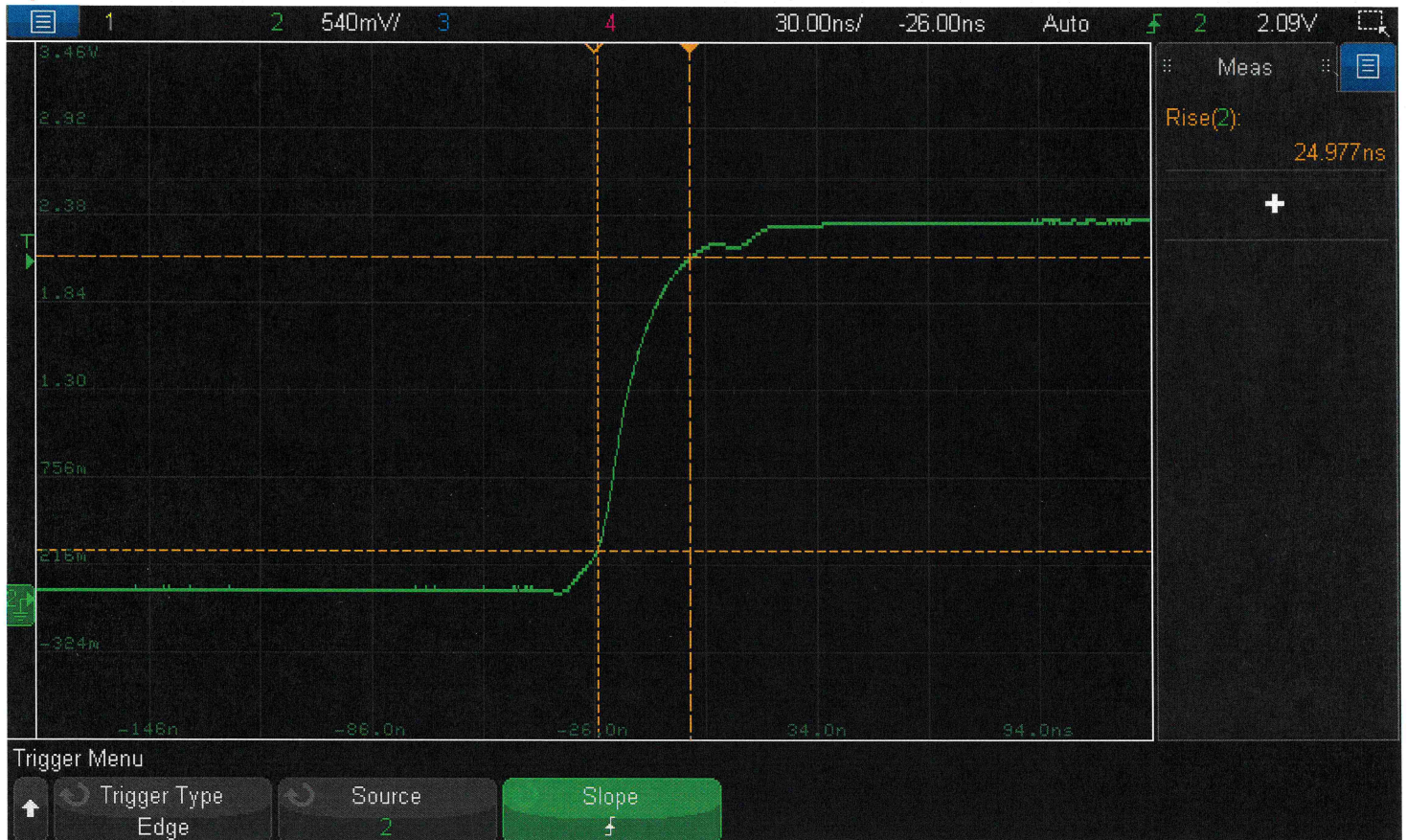
SUMMARY TEST DATA
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PL46305/2426

Rise Time 24.9 ns



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 06:44:51 2024



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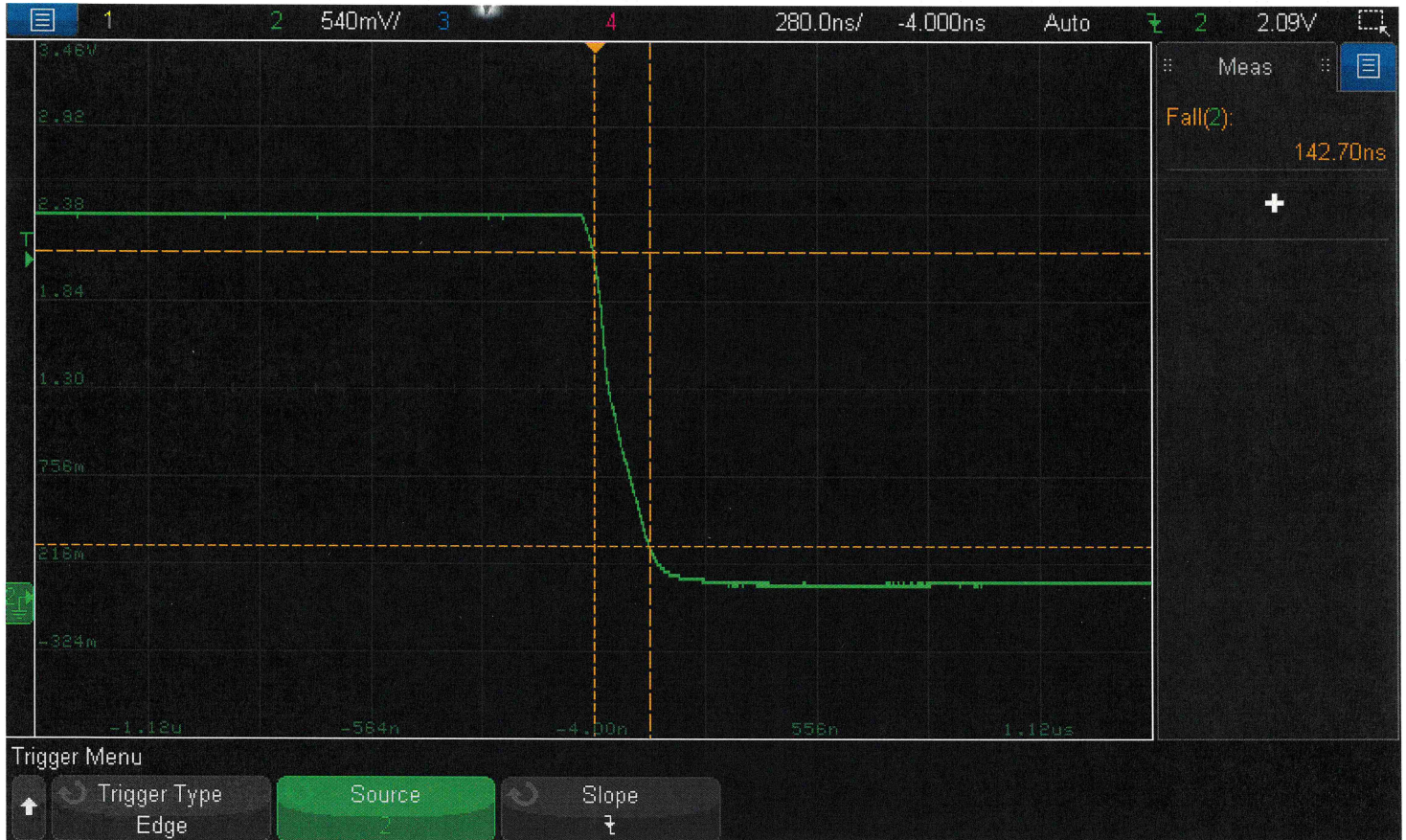
SUMMARY TEST DATA
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Fall Time 142.7 ns



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 06:30:41 2024



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