



**SUMMARY TEST DATA
ON
HADA-D2002**

PL46302/2426

Customer: _____	Tested By: <u>Anton L.</u>
SO No: _____	Temperature: <u>+25°C -40°C +85°C</u>
Model No: <u>HADA-D2002</u>	Date: <u>6/25/24</u>
Serial No: <u>PL46302/2426</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	2.0 GHz – 18.0 GHz See Plot	PMI QA3
2	TSS:	-40 dBm Min @ -40°C to +85°	-43.0 dBm See Plot	
3	Frequency Flatness:	±1.65 dB Max	±0.731 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)	-0.02 / -0.70 dB +1.42 / -0.94 dB See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	+0.31 / -0.37 dB +0.66 / -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%)	25.6 ns See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	157.2 ns See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	59 mV @ +25°C 19 mV @ -40°C 84 mV @ +85°C	
12	Input VSWR:	3.0:1 Max @ +23 dBm	1.78:1 See Plot	

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13	Propagation Delay:	60 ns Max	45 ns	PMI QA3
14	Power Supply:	+12 ± 1VDC @ 125 mA Max -12 ± 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±0.5 Ohms terminated.

QA/QC Approval: *K. Luter* Date: 6-25-24



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Log Linearity and Log Accuracy @ +25°C

Output Voltage Offset= 0.059 Volts

Frequency		
2 GHz	INTERCEPT (mV)	2164
	SLOPE (mV/dB)	50.3

6 GHz	INTERCEPT (mV)	2165
	SLOPE (mV/dB)	49.4

10 GHz	INTERCEPT (mV)	2133
	SLOPE (mV/dB)	50

14 GHz	INTERCEPT (mV)	2200
	SLOPE (mV/dB)	50.4

18 GHz	INTERCEPT (mV)	2177
	SLOPE (mV/dB)	49.4

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)
	351	607	860	1101	1367	1624	1853	2110	2367	Measured Value (mV)
	-4	1	3	-8	7	13	-10	-4	2	Error (mV)
	-0.07	0.02	0.05	-0.15	0.14	0.25	-0.19	-0.08	0.03	MAX
	0.02	0.14	0.20	0.02	0.34	0.48	0.06	0.20	0.34	MIN
										LINEARITY ERROR (dB)
										0.25
										-0.19
										LOGGING ACCURACY (dB)
										0.48
										0.02
	377	631	887	1129	1380	1632	1858	2111	2363	Measured Value (mV)
	-9	-2	7	2	6	11	-11	-5	0	Error (mV)
	-0.17	-0.04	0.14	0.04	0.12	0.22	-0.21	-0.09	0.00	MAX
	0.54	0.62	0.74	0.58	0.60	0.64	0.16	0.22	0.26	MIN
										LINEARITY ERROR (dB)
										0.22
										-0.21
										LOGGING ACCURACY (dB)
										0.74
										0.16
	330	590	843	1082	1327	1584	1815	2082	2349	Measured Value (mV)
	-4	6	9	-2	-7	0	-18	-1	16	Error (mV)
	-0.07	0.13	0.19	-0.03	-0.13	0.01	-0.37	-0.03	0.31	MAX
	-0.40	-0.20	-0.14	-0.36	-0.46	-0.32	-0.70	-0.36	-0.02	MIN
										LINEARITY ERROR (dB)
										0.31
										-0.37
										LOGGING ACCURACY (dB)
										-0.02
										-0.70
	386	637	896	1138	1397	1650	1885	2144	2413	Measured Value (mV)
	0	-1	6	-4	3	4	-13	-6	11	Error (mV)
	0.00	-0.02	0.12	-0.08	0.06	0.08	-0.26	-0.12	0.22	MAX
	0.72	0.74	0.92	0.76	0.94	1.00	0.70	0.88	1.26	MIN
										LINEARITY ERROR (dB)
										0.22
										-0.26
										LOGGING ACCURACY (dB)
										1.26
										0.70
	393	643	899	1140	1399	1648	1872	2125	2370	Measured Value (mV)
	-7	-4	5	-1	11	14	-9	-3	-5	Error (mV)
	-0.15	-0.09	0.10	-0.02	0.23	0.27	-0.19	-0.06	-0.10	MAX
	0.86	0.86	0.98	0.80	0.98	0.96	0.44	0.50	0.40	MIN
										LINEARITY ERROR (dB)
										0.27
										-0.19
										LOGGING ACCURACY (dB)
										0.98
										0.40
	0.631	0.531	0.561	0.581	0.722	0.661	0.702	0.621	0.641	
	0.393	0.643	0.899	1.140	1.399	1.650	1.885	2.144	2.413	
	0.330	0.590	0.843	1.082	1.327	1.584	1.815	2.082	2.349	

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.31	-0.37

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	1.26	-0.70

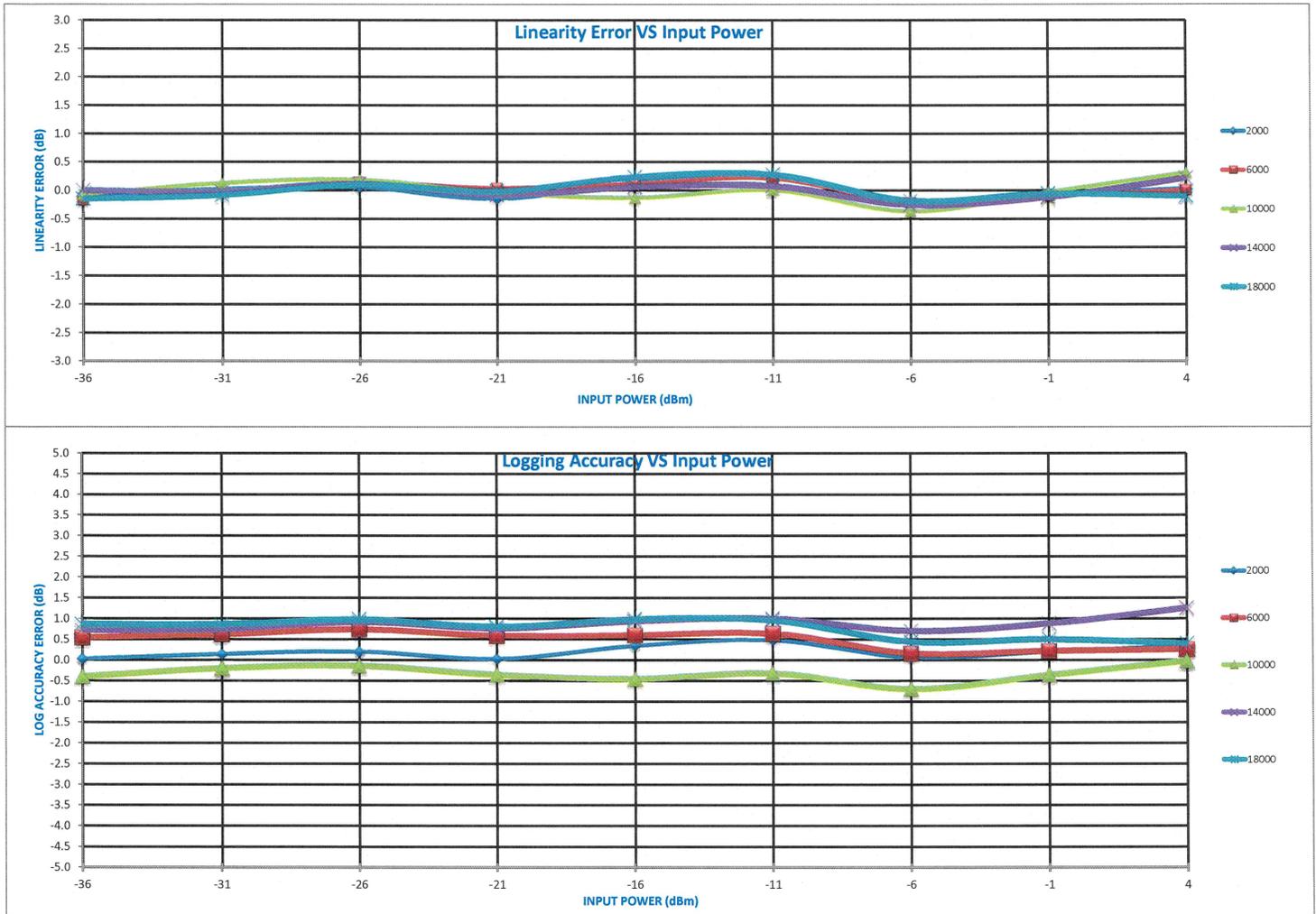
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**SUMMARY TEST DATA
ON
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Log Linearity and Log Accuracy @ +25°C



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**SUMMARY TEST DATA
ON
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Log Linearity and Log Accuracy @ -40°C

Output Voltage Offset= 0.019 Volts

Frequency		
2 GHz	INTERCEPT (mV)	2146
	SLOPE (mV/dB)	49.6

6 GHz	INTERCEPT (mV)	2144
	SLOPE (mV/dB)	48.7

10 GHz	INTERCEPT (mV)	2113
	SLOPE (mV/dB)	49.3

14 GHz	INTERCEPT (mV)	2180
	SLOPE (mV/dB)	49.7

18 GHz	INTERCEPT (mV)	2155
	SLOPE (mV/dB)	48.9

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	354	599	856	1103	1367	1620	1854	2087	2327	Measured Value (mV)	Error(dB)	
	-7	-9	0	-1	15	20	6	-8	-16	Error (mV)	MAX	MIN
	-0.13	-0.19	-0.01	-0.02	0.30	0.41	0.13	-0.17	-0.33	LINEARITY ERROR (dB)	0.41	-0.33
	0.08	-0.02	0.12	0.06	0.34	0.40	0.08	-0.26	-0.46	LOGGING ACCURACY (dB)	0.40	-0.46
	377	621	880	1130	1379	1626	1858	2087	2320	Measured Value (mV)	Error(dB)	
	-12	-12	3	9	15	18	6	-8	-19	Error (mV)	MAX	MIN
	-0.25	-0.25	0.07	0.19	0.30	0.37	0.13	-0.17	-0.39	LINEARITY ERROR (dB)	0.37	-0.39
	0.54	0.42	0.60	0.60	0.58	0.52	0.16	-0.26	-0.60	LOGGING ACCURACY (dB)	0.60	-0.60
	327	579	838	1082	1326	1581	1813	2062	2303	Measured Value (mV)	Error(dB)	
	-10	-4	8	5	3	11	-4	-2	-7	Error (mV)	MAX	MIN
	-0.20	-0.09	0.16	0.11	0.05	0.22	-0.08	-0.03	-0.15	LINEARITY ERROR (dB)	0.22	-0.20
	-0.46	-0.42	-0.24	-0.36	-0.48	-0.38	-0.74	-0.76	-0.94	LOGGING ACCURACY (dB)	-0.24	-0.94
	385	628	887	1140	1397	1643	1885	2116	2374	Measured Value (mV)	Error(dB)	
	-4	-10	0	5	13	10	4	-14	-4	Error (mV)	MAX	MIN
	-0.09	-0.20	0.01	0.10	0.26	0.21	0.08	-0.28	-0.09	LINEARITY ERROR (dB)	0.26	-0.28
	0.70	0.56	0.74	0.80	0.94	0.86	0.70	0.32	0.48	LOGGING ACCURACY (dB)	0.94	0.32
	385	627	884	1135	1392	1635	1869	2097	2331	Measured Value (mV)	Error(dB)	
	-10	-13	0	7	19	18	7	-9	-19	Error (mV)	MAX	MIN
	-0.21	-0.26	0.00	0.14	0.39	0.36	0.15	-0.18	-0.40	LINEARITY ERROR (dB)	0.39	-0.40
	0.70	0.54	0.68	0.70	0.84	0.70	0.38	-0.06	-0.38	LOGGING ACCURACY (dB)	0.84	-0.38
	0.589	0.497	0.497	0.589	0.721	0.629	0.731	0.548	0.721			
	0.385	0.628	0.887	1.140	1.397	1.643	1.885	2.116	2.374			
	0.327	0.579	0.838	1.082	1.326	1.581	1.813	2.062	2.303			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.41	-0.40

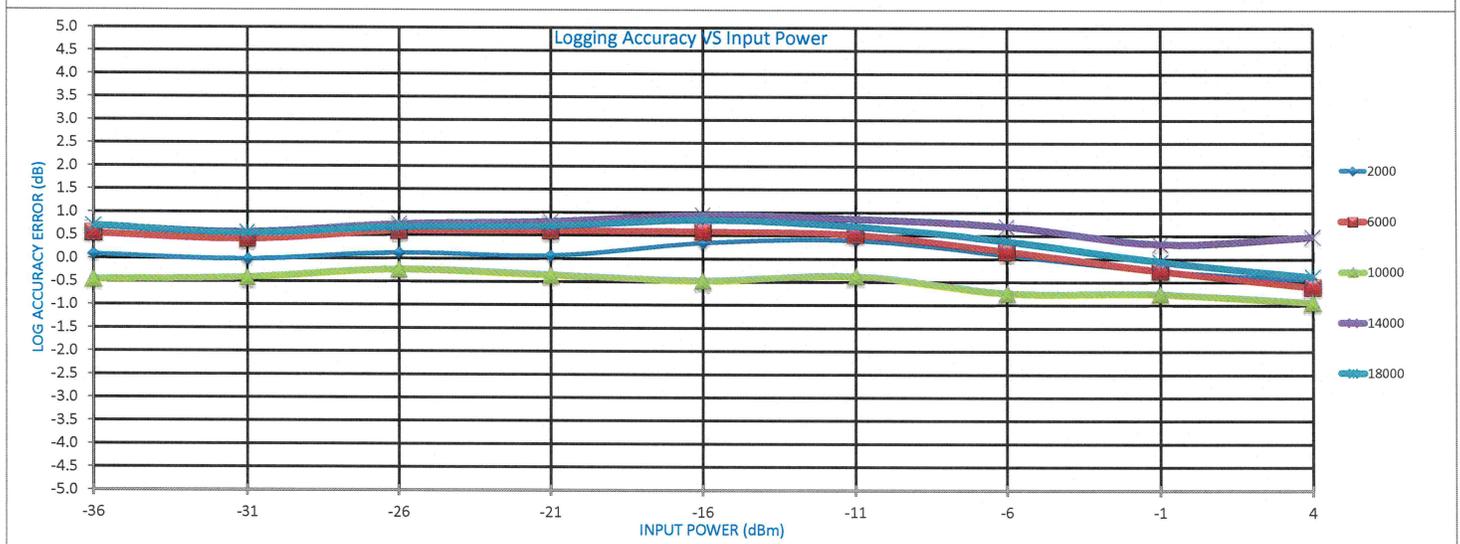
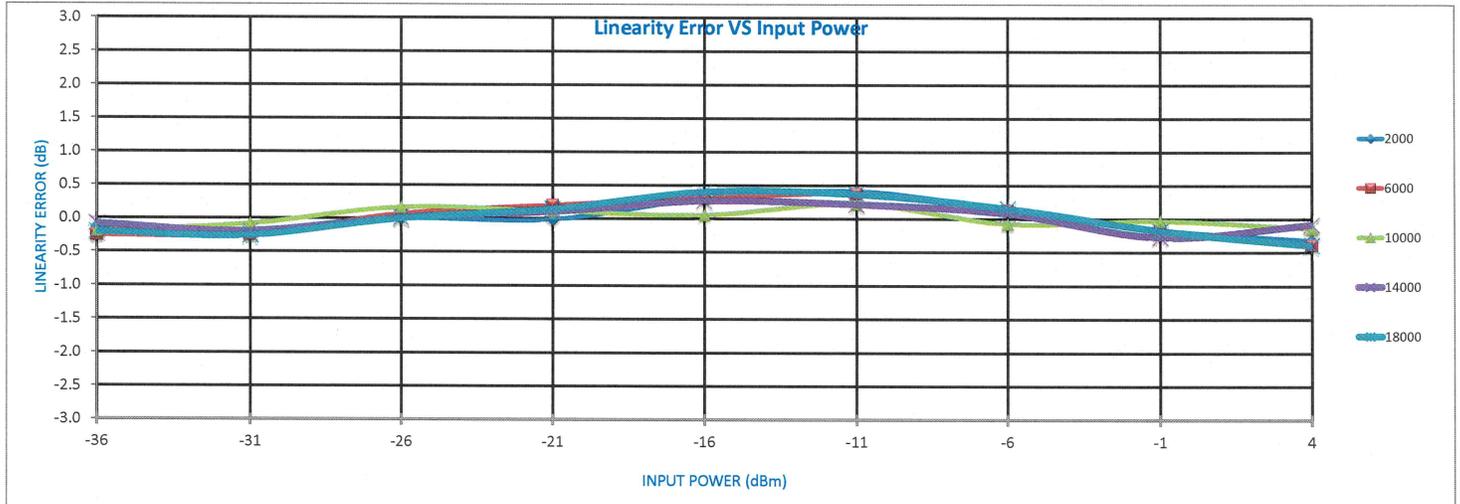
Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	0.94	-0.94



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Log Linearity and Log Accuracy @ -40°C



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**SUMMARY TEST DATA
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Log Linearity and Log Accuracy @ +85°C

Output Voltage Offset= 0.084 Volts

Frequency

2 GHz	INTERCEPT (mV)	2160
	SLOPE (mV/dB)	50.7

6 GHz	INTERCEPT (mV)	2169
	SLOPE (mV/dB)	49.9

10 GHz	INTERCEPT (mV)	2134
	SLOPE (mV/dB)	50.5

14 GHz	INTERCEPT (mV)	2196
	SLOPE (mV/dB)	50.7

18 GHz	INTERCEPT (mV)	2170
	SLOPE (mV/dB)	49.5

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	337	598	843	1083	1350	1608	1839	2104	2379		Measured Value (mV)	Error(dB)
	2	9	1	-13	1	6	-17	-5	16		Error (mV)	MAX MIN
	0.03	0.18	0.02	-0.25	0.02	0.11	-0.33	-0.10	0.32		LINEARITY ERROR (dB)	0.32 -0.33
	-0.26	-0.04	-0.14	-0.34	0.00	0.16	-0.22	0.08	0.58		LOGGING ACCURACY (dB)	0.58 -0.34
	369	626	877	1116	1369	1623	1850	2112	2386		Measured Value (mV)	Error(dB)
	-2	5	7	-4	-1	4	-19	-7	18		Error (mV)	MAX MIN
	-0.04	0.10	0.13	-0.08	-0.02	0.07	-0.38	-0.13	0.35		LINEARITY ERROR (dB)	0.35 -0.38
	0.38	0.52	0.54	0.32	0.38	0.46	0.00	0.24	0.72		LOGGING ACCURACY (dB)	0.72 0.00
	321	583	829	1068	1314	1570	1807	2078	2369		Measured Value (mV)	Error(dB)
	3	13	7	-6	-13	-9	-24	-5	33		Error (mV)	MAX MIN
	0.07	0.26	0.14	-0.12	-0.25	-0.17	-0.48	-0.11	0.66		LINEARITY ERROR (dB)	0.66 -0.48
	-0.58	-0.34	-0.42	-0.64	-0.72	-0.60	-0.86	-0.44	0.38		LOGGING ACCURACY (dB)	0.38 -0.86
	373	630	882	1120	1382	1638	1870	2141	2421		Measured Value (mV)	Error(dB)
	3	7	5	-10	-2	0	-21	-4	22		Error (mV)	MAX MIN
	0.07	0.13	0.10	-0.21	-0.04	0.00	-0.42	-0.08	0.44		LINEARITY ERROR (dB)	0.44 -0.42
	0.46	0.60	0.64	0.40	0.64	0.76	0.40	0.82	1.42		LOGGING ACCURACY (dB)	1.42 0.40
	380	636	886	1124	1385	1636	1857	2118	2371		Measured Value (mV)	Error(dB)
	-6	2	4	-5	8	11	-15	-2	3		Error (mV)	MAX MIN
	-0.12	0.04	0.09	-0.11	0.16	0.23	-0.31	-0.04	0.06		LINEARITY ERROR (dB)	0.23 -0.31
	0.60	0.72	0.72	0.48	0.70	0.72	0.14	0.36	0.42		LOGGING ACCURACY (dB)	0.72 0.14
	0.587	0.527	0.567	0.557	0.706	0.676	0.627	0.627	0.517			
	0.380	0.636	0.886	1.124	1.385	1.638	1.870	2.141	2.421			
	0.321	0.583	0.829	1.068	1.314	1.570	1.807	2.078	2.369			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.66	-0.48

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	1.42	-0.86

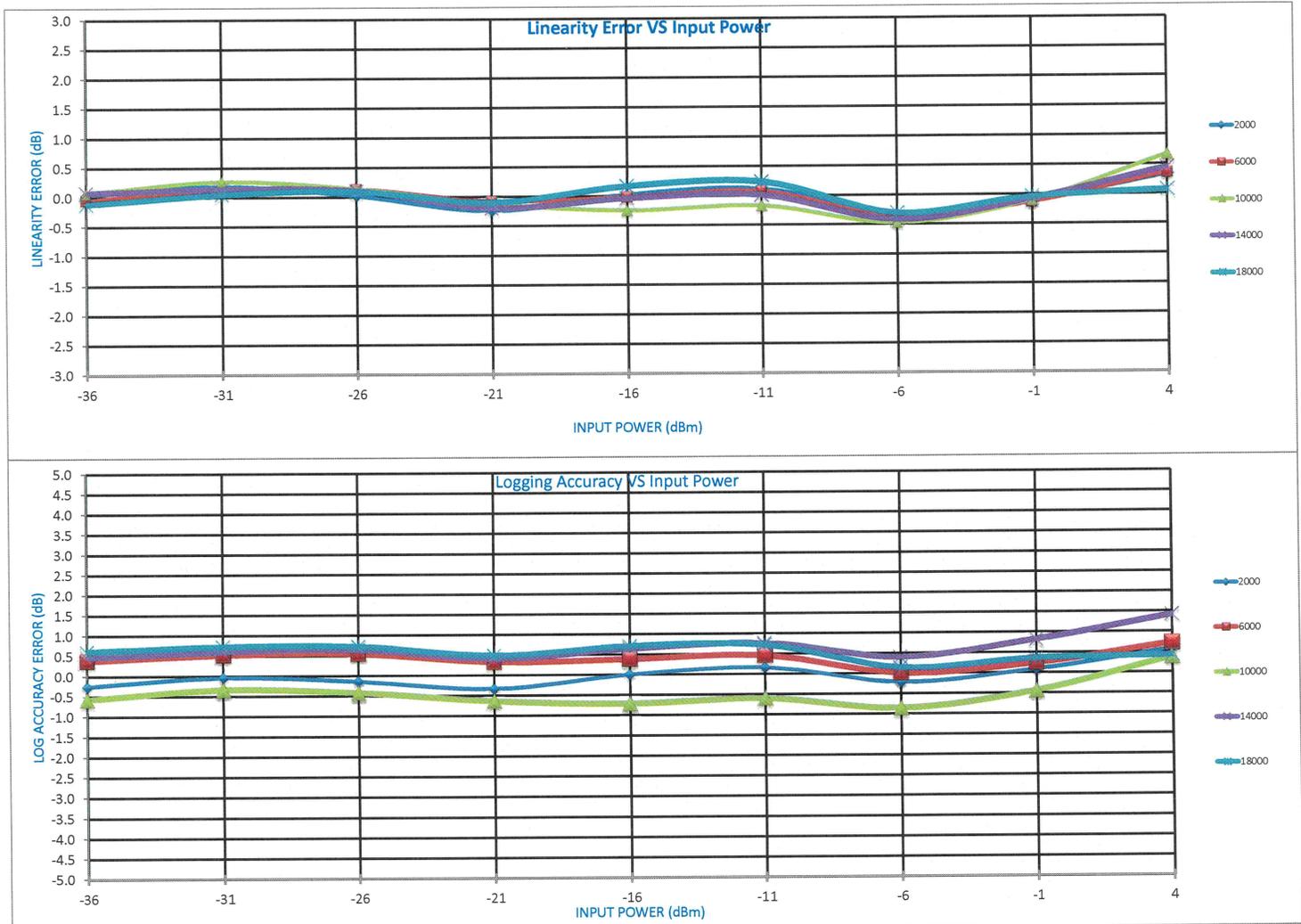
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Log Linearity and Log Accuracy @ +85°C



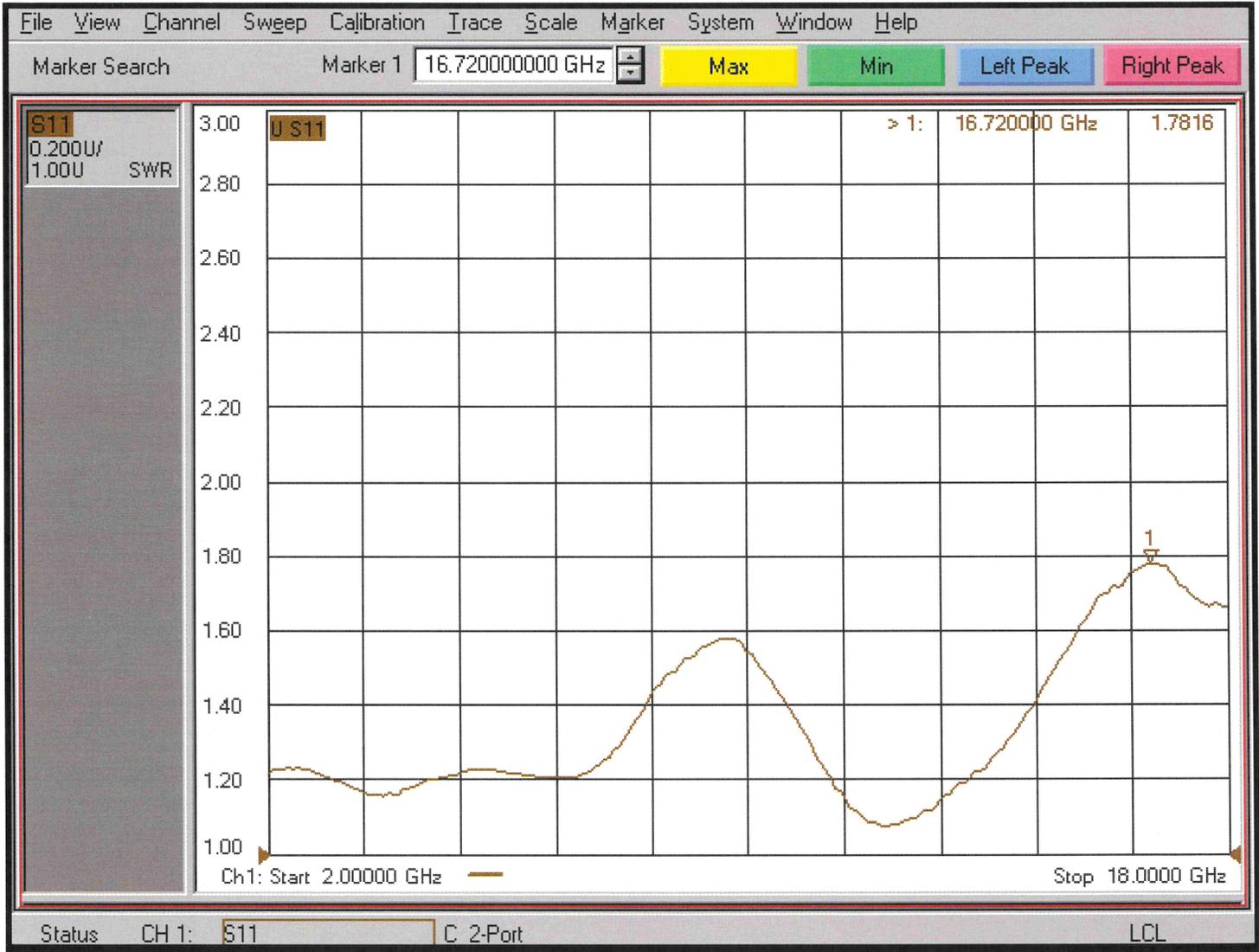
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VSWR 1.78:1



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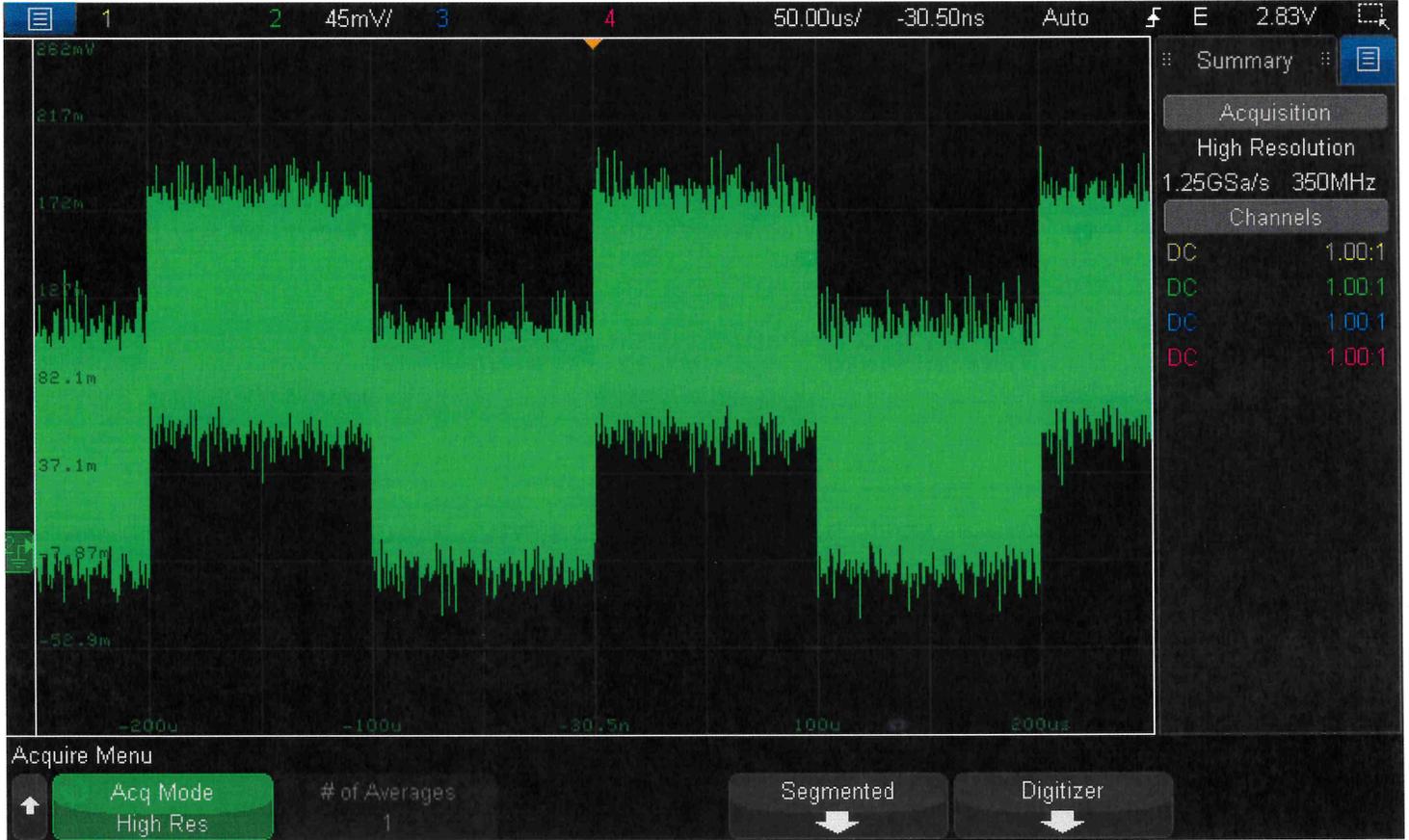
**SUMMARY TEST DATA
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PL46302/2426

TSS @ -43.0 dBm



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 07:00:40 2024



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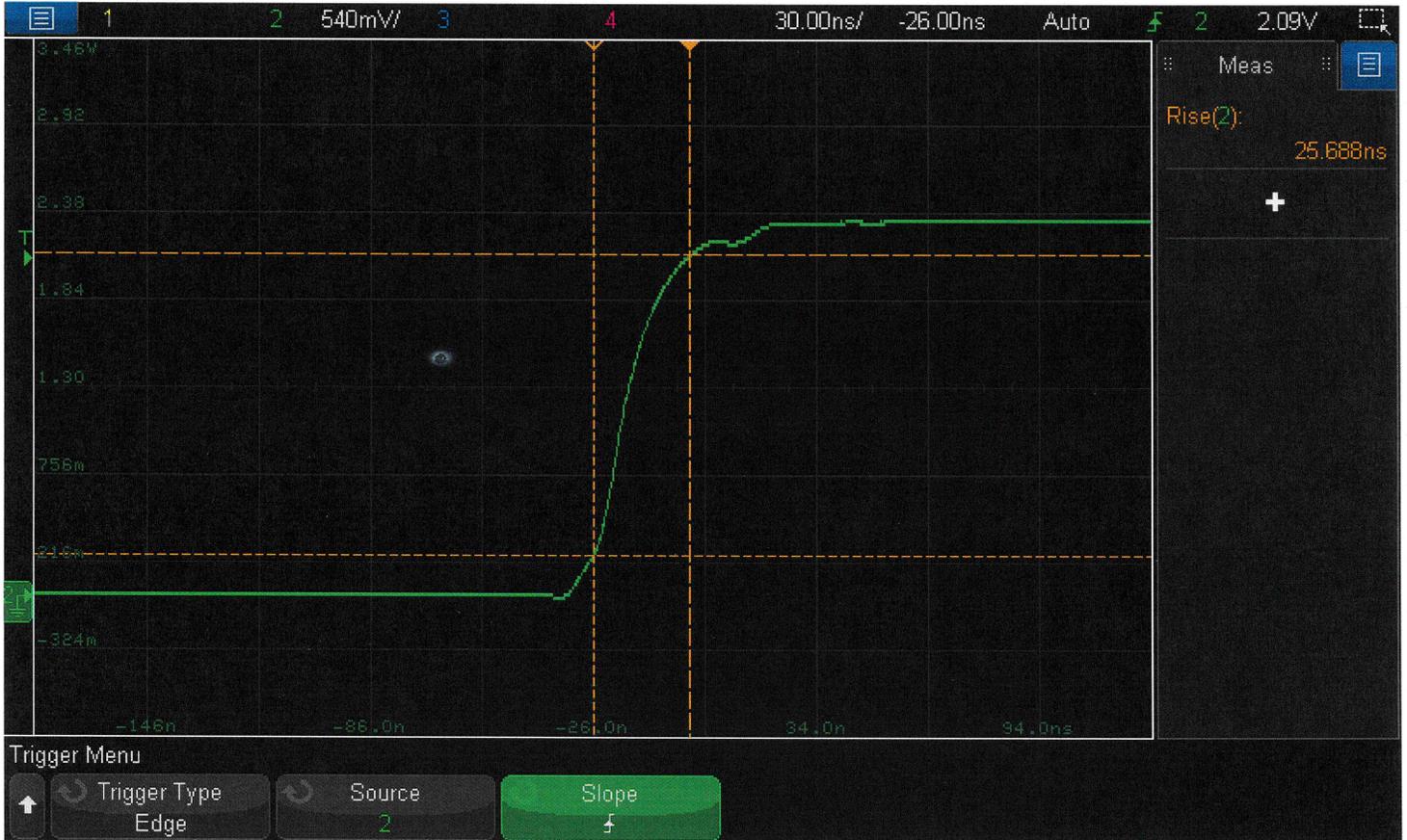
SUMMARY TEST DATA
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PL46302/2426

Rise Time 25.6 ns



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 06:40:46 2024



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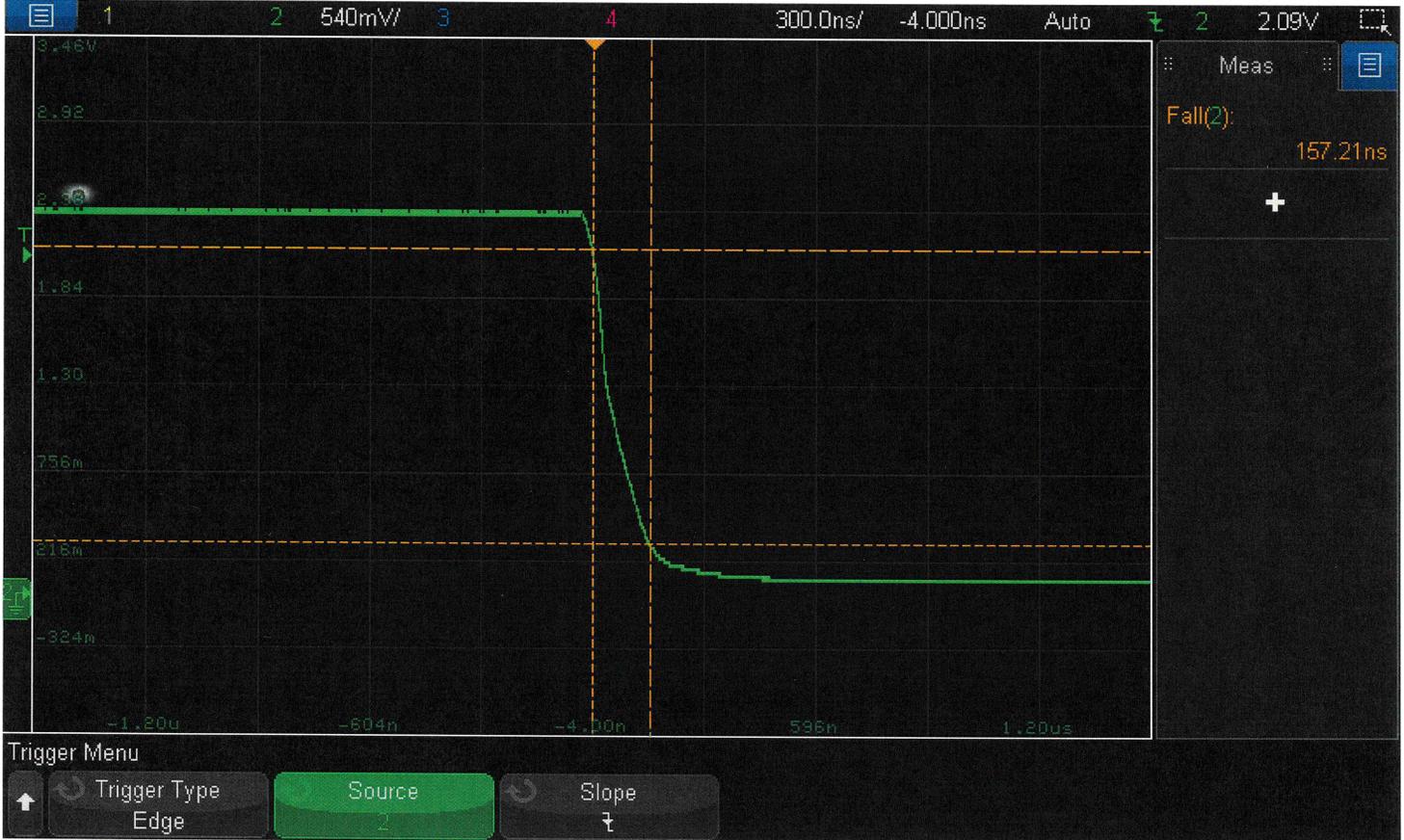
SUMMARY TEST DATA
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PL46302/2426

Fall Time 157.2 ns



MSO-X 3034T, MY59241076, 07.50.2021102830: Fri Jun 21 06:36:16 2024



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