



**SUMMARY TEST DATA  
ON  
HADA-D2002**

**PL47005/2431**

<b>Customer:</b> _____	<b>Tested By:</b> <u>Anton L.</u>
<b>SO No:</b> _____	<b>Temperature:</b> <u>+25°C -40°C +85°C</u>
<b>Model No:</b> <u>HADA-D2002</u>	<b>Date:</b> <u>7/23/24</u>
<b>Serial No:</b> <u>PL47005/2431</u>	<b>Drawing No:</b> <u>27620222</u> <b>Rev:</b> <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°	-41.5 dBm See Plot	
3	Frequency Flatness:	±1.65 dB Max	±0.980 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)	-0.48 / -1.18 dB +0.72 / -2.06 dB See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	+0.38 / -0.43 dB +0.56 / -0.52 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%)	24.0 ns See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	124.5 ns See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	125 mV @ +25°C 31 mV @ -40°C 97 mV @ +85°C	
12	Input VSWR:	3.0:1 Max @ +23 dBm	1.72:1 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: 7-25-24



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**Log Linearity and Log Accuracy @ +25°C**

Output Voltage Offset= 0.125 Volts

Frequency	INTERCEPT (mV)	SLOPE (mV/dB)	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)	Measured Value (mV)	Error(dB)	
2 GHz	2147	49.7	368	604	844	1084	1360	1618	1843	2093	2347				
			11	-1	-10	-19	9	18	-5	-4	1		MAX	MIN	
			0.22	-0.03	-0.20	-0.37	0.18	0.37	-0.11	-0.08	0.03		0.37	-0.37	
			0.36	0.08	-0.12	-0.32	0.20	0.36	-0.14	-0.14	-0.06		0.36	-0.32	
6 GHz	2141	49.2	377	615	857	1097	1362	1617	1840	2088	2337				
			6	-2	-6	-12	8	17	-6	-4	0		MAX	MIN	
			0.11	-0.04	-0.12	-0.24	0.15	0.34	-0.12	-0.08	-0.01		0.34	-0.24	
			0.54	0.30	0.14	-0.06	0.24	0.34	-0.20	-0.24	-0.26		0.54	-0.26	
10 GHz	2106	49.9	326	564	800	1041	1297	1559	1795	2058	2324				
			18	6	-8	-16	-10	2	-12	2	18		MAX	MIN	
			0.35	0.12	-0.15	-0.33	-0.20	0.04	-0.23	0.04	0.36		0.36	-0.33	
			-0.48	-0.72	-1.00	-1.18	-1.06	-0.82	-1.10	-0.84	-0.52		-0.48	-1.18	
14 GHz	2107	49.4	339	578	814	1054	1325	1580	1804	2057	2305				
			9	1	-10	-17	8	16	-7	-1	1		MAX	MIN	
			0.18	0.02	-0.20	-0.34	0.16	0.32	-0.14	-0.01	0.01		0.32	-0.34	
			-0.22	-0.44	-0.72	-0.92	-0.50	-0.40	-0.92	-0.86	-0.90		-0.22	-0.92	
18 GHz	2076	49.8	304	538	767	1010	1279	1539	1773	2030	2281				
			19	4	-16	-21	-1	10	-5	4	6		MAX	MIN	
			0.38	0.08	-0.31	-0.43	-0.02	0.20	-0.09	0.07	0.12		0.38	-0.43	
			-0.92	-1.24	-1.66	-1.80	-1.42	-1.22	-1.54	-1.40	-1.38		-0.92	-1.80	
Flatness +/- dB			0.736	0.776	0.908	0.877	0.837	0.797	0.706	0.635	0.666				
Max Video Output V			0.377	0.615	0.867	1.097	1.362	1.618	1.843	2.093	2.347				
Min Video Output V			0.304	0.538	0.767	1.010	1.279	1.539	1.773	2.030	2.281				
												Logging Linearity vs Frequency		Error(dB)	
												LOGGING LINEARITY ERROR (dB)		0.38	-0.43
												Logging Accuracy vs Frequency		Error(dB)	
												LOGGING ACCURACY ERROR (dB)		0.54	-1.80

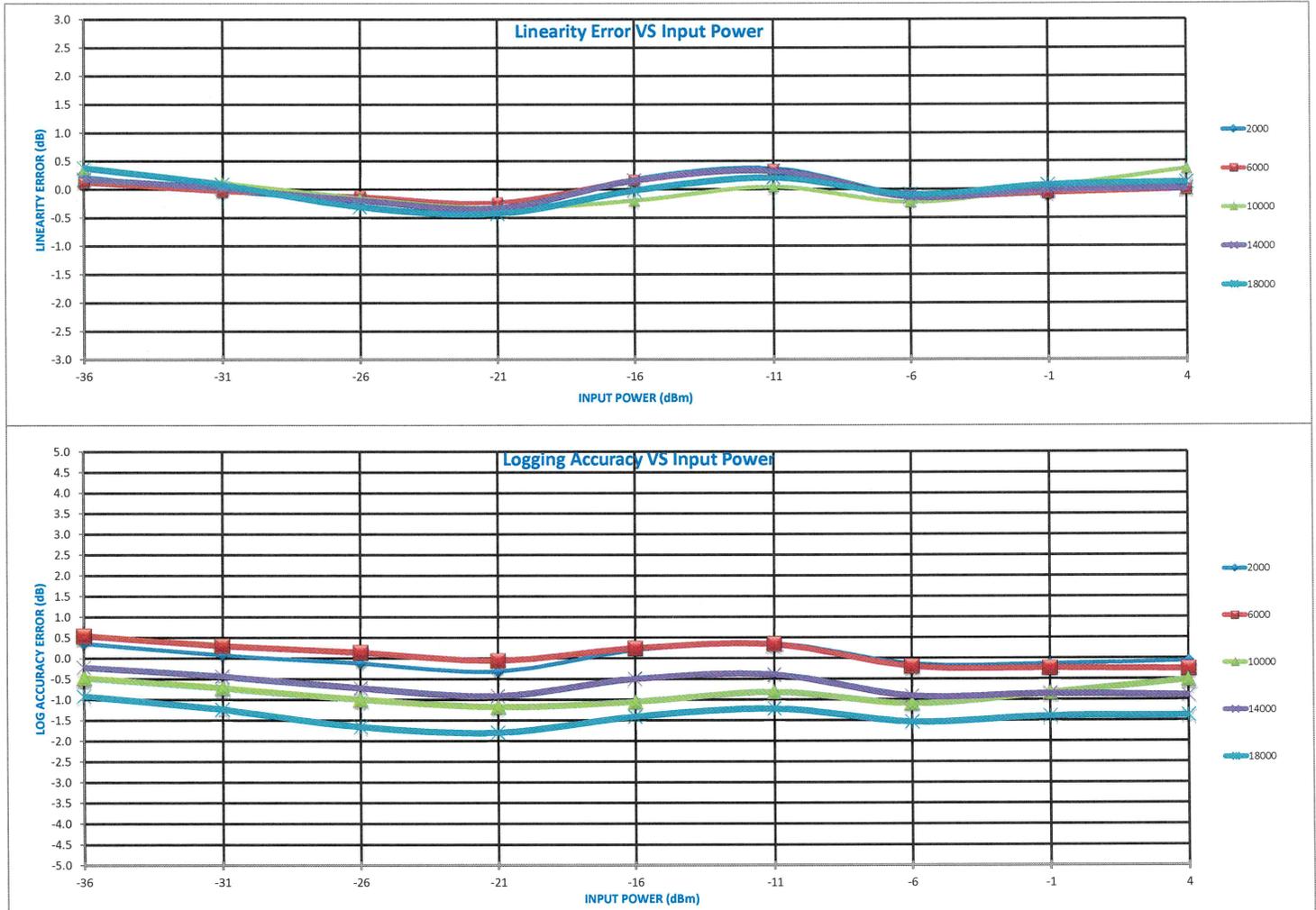
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SUMMARY TEST DATA  
ON  
HADA-D2002

PL47005/2431

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= 0.031 Volts

<b>Frequency</b>		
<b>2 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2160</b>
	<b>SLOPE (mV/dB)</b>	<b>50.1</b>

<b>6 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2150</b>
	<b>SLOPE (mV/dB)</b>	<b>49.5</b>

<b>10 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2116</b>
	<b>SLOPE (mV/dB)</b>	<b>50.5</b>

<b>14 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2129</b>
	<b>SLOPE (mV/dB)</b>	<b>49.9</b>

<b>18 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2102</b>
	<b>SLOPE (mV/dB)</b>	<b>50.5</b>

<b>Flatness +/- dB</b>
<b>Max Video Output V</b>
<b>Min Video Output V</b>

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)
	340	604	860	1107	1383	1636	1867	2097	2339	Measured Value (mV)
	-18	-4	1	-2	24	26	7	-13	-21	Error (mV)
	-0.36	-0.09	0.03	-0.04	0.47	0.53	0.14	-0.26	-0.43	MAX
	-0.20	0.08	0.20	0.14	0.66	0.72	0.34	-0.06	-0.22	MIN
										LINEARITY ERROR (dB)
										0.53
										LOGGING ACCURACY (dB)
										0.72
	344	611	869	1118	1381	1631	1860	2089	2323	Measured Value (mV)
	-25	-5	5	7	23	25	7	-12	-25	Error (mV)
	-0.50	-0.10	0.11	0.14	0.46	0.51	0.14	-0.24	-0.51	MAX
	-0.12	0.22	0.38	0.36	0.62	0.62	0.20	-0.22	-0.54	MIN
										LINEARITY ERROR (dB)
										0.51
										LOGGING ACCURACY (dB)
										0.62
	279	557	813	1056	1318	1677	1813	2062	2305	Measured Value (mV)
	-21	5	9	-1	9	16	-1	-4	-13	Error (mV)
	-0.41	0.10	0.17	-0.01	0.18	0.31	-0.01	-0.08	-0.26	MAX
	-1.42	-0.86	-0.74	-0.88	-0.64	-0.46	-0.74	-0.76	-0.90	MIN
										LINEARITY ERROR (dB)
										0.31
										LOGGING ACCURACY (dB)
										-0.46
	307	580	837	1081	1354	1606	1834	2072	2303	Measured Value (mV)
	-25	-1	6	0	24	26	4	-7	-26	Error (mV)
	-0.50	-0.03	0.12	0.00	0.47	0.52	0.09	-0.15	-0.52	MAX
	-0.86	-0.40	-0.26	-0.38	0.08	0.12	-0.32	-0.56	-0.94	MIN
										LINEARITY ERROR (dB)
										0.52
										LOGGING ACCURACY (dB)
										0.12
	264	542	792	1035	1313	1570	1801	2050	2281	Measured Value (mV)
	-21	5	3	-7	19	23	2	-1	-23	Error (mV)
	-0.41	0.10	0.05	-0.13	0.37	0.46	0.04	-0.03	-0.45	MAX
	-1.72	-1.16	-1.16	-1.30	-0.74	-0.60	-0.98	-1.00	-1.38	MIN
										LINEARITY ERROR (dB)
										0.46
										LOGGING ACCURACY (dB)
										-0.60
	0.799	0.689	0.769	0.829	0.699	0.659	0.659	0.469	0.579	
	0.344	0.611	0.869	1.118	1.383	1.636	1.867	2.097	2.339	
	0.264	0.542	0.792	1.035	1.313	1.570	1.801	2.050	2.281	

<b>Logging Linearity vs Frequency</b>	<b>Error(dB)</b>	
	<b>MAX</b>	<b>MIN</b>
<b>LOGGING LINEARITY ERROR (dB)</b>	<b>0.53</b>	<b>-0.52</b>

<b>Logging Accuracy vs Frequency</b>	<b>Error(dB)</b>	
	<b>MAX</b>	<b>MIN</b>
<b>LOGGING ACCURACY ERROR (dB)</b>	<b>0.72</b>	<b>-1.72</b>

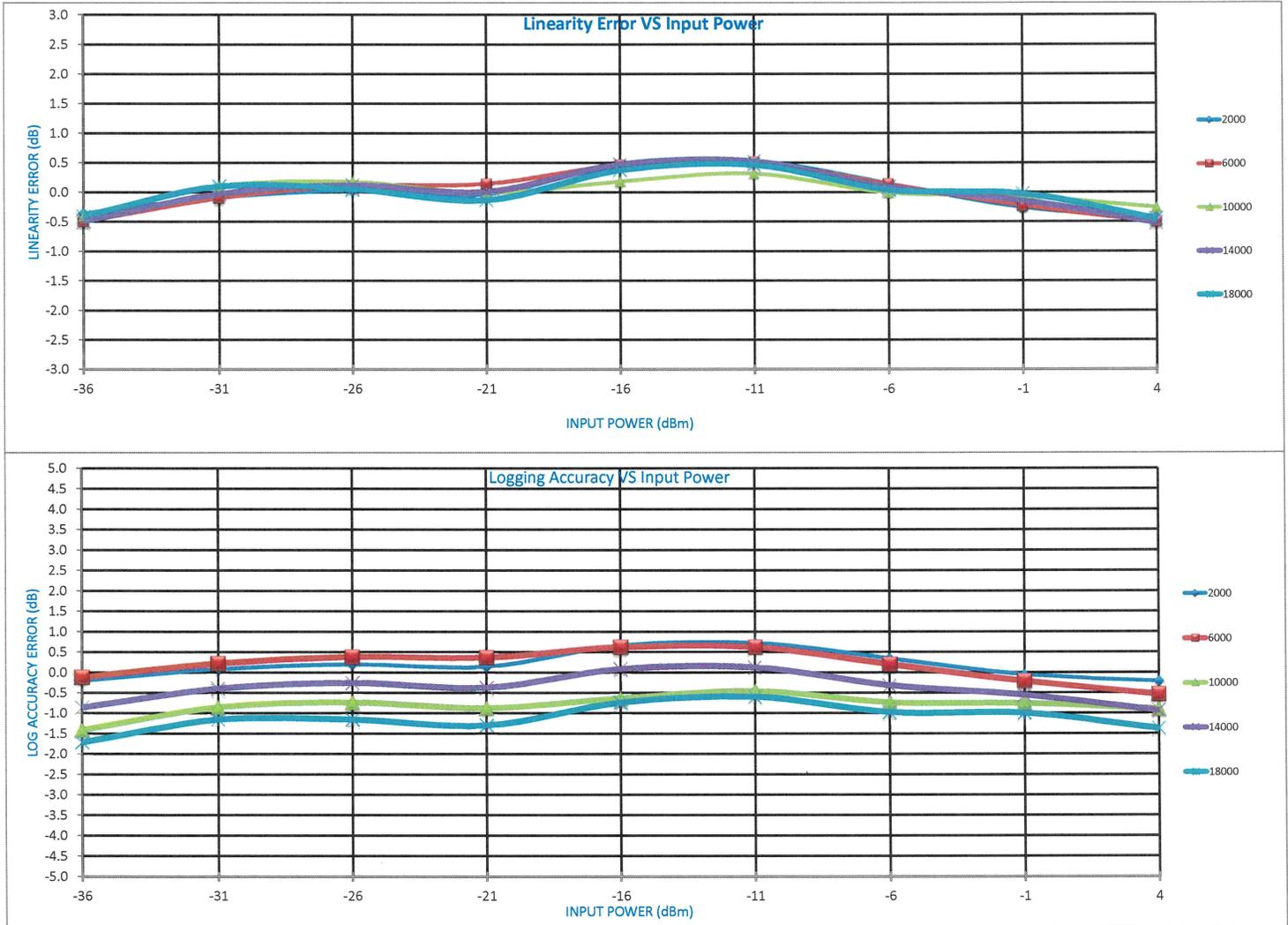
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**Log Linearity and Log Accuracy @ -40°C**



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

Output Voltage Offset= 0.097 Volts

**Frequency**

<b>2 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2152</b>
	<b>SLOPE (mV/dB)</b>	<b>50.6</b>

<b>6 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2147</b>
	<b>SLOPE (mV/dB)</b>	<b>50.1</b>

<b>10 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2117</b>
	<b>SLOPE (mV/dB)</b>	<b>51</b>

<b>14 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2112</b>
	<b>SLOPE (mV/dB)</b>	<b>50.3</b>

<b>18 GHz</b>	<b>INTERCEPT (mV)</b>	<b>2072</b>
	<b>SLOPE (mV/dB)</b>	<b>50.6</b>

<b>Flatness +/- dB</b>
<b>Max Video Output V</b>
<b>Min Video Output V</b>

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)
	326	591	833	1075	1350	1609	1836	2093	2363	Measured Value (mV)
	-3	9	-2	-14	8	14	-12	-8	8	Error (mV)
	-0.06	0.18	-0.05	-0.27	0.16	0.28	-0.24	-0.17	0.16	MAX
	-0.48	-0.18	-0.34	-0.50	0.00	0.18	-0.28	-0.14	0.26	MIN
										LINEARITY ERROR (dB)
										LOGGING ACCURACY (dB)
	338	603	847	1087	1351	1608	1833	2088	2357	Measured Value (mV)
	-6	8	2	-8	5	12	-14	-9	10	Error (mV)
	-0.12	0.17	0.04	-0.17	0.10	0.24	-0.27	-0.18	0.19	MAX
	-0.24	0.06	-0.06	-0.26	0.02	0.16	-0.34	-0.24	0.14	MIN
										LINEARITY ERROR (dB)
										LOGGING ACCURACY (dB)
	290	550	792	1036	1289	1553	1794	2060	2349	Measured Value (mV)
	8	13	0	-11	-12	-3	-17	-6	28	Error (mV)
	0.15	0.25	0.00	-0.21	-0.24	-0.06	-0.33	-0.11	0.56	MAX
	-1.20	-1.00	-1.16	-1.28	-1.22	-0.94	-1.12	-0.80	-0.02	MIN
										LINEARITY ERROR (dB)
										LOGGING ACCURACY (dB)
	301	563	804	1046	1314	1571	1799	2054	2323	Measured Value (mV)
	-2	8	-2	-11	6	11	-12	-8	10	Error (mV)
	-0.05	0.17	-0.04	-0.22	0.11	0.23	-0.24	-0.16	0.19	MAX
	-0.98	-0.74	-0.92	-1.08	-0.72	-0.58	-1.02	-0.92	-0.54	MIN
										LINEARITY ERROR (dB)
										LOGGING ACCURACY (dB)
	261	508	748	997	1259	1522	1762	2017	2287	Measured Value (mV)
	11	5	-8	-12	-3	7	-6	-5	12	Error (mV)
	0.22	0.10	-0.16	-0.24	-0.07	0.13	-0.13	-0.09	0.24	MAX
	-1.78	-1.84	-2.04	-2.06	-1.82	-1.56	-1.76	-1.66	-1.26	MIN
										LINEARITY ERROR (dB)
										LOGGING ACCURACY (dB)
	0.762	0.940	0.980	0.891	0.911	0.861	0.733	0.752	0.752	
	0.338	0.603	0.847	1.087	1.351	1.609	1.836	2.093	2.363	
	0.261	0.508	0.748	0.997	1.259	1.522	1.762	2.017	2.287	

<b>Logging Linearity vs Frequency</b>	<b>Error(dB)</b>	
	<b>MAX</b>	<b>MIN</b>
LOGGING LINEARITY ERROR (dB)	0.56	-0.33

<b>Logging Accuracy vs Frequency</b>	<b>Error(dB)</b>	
	<b>MAX</b>	<b>MIN</b>
LOGGING ACCURACY ERROR (dB)	0.26	-2.06

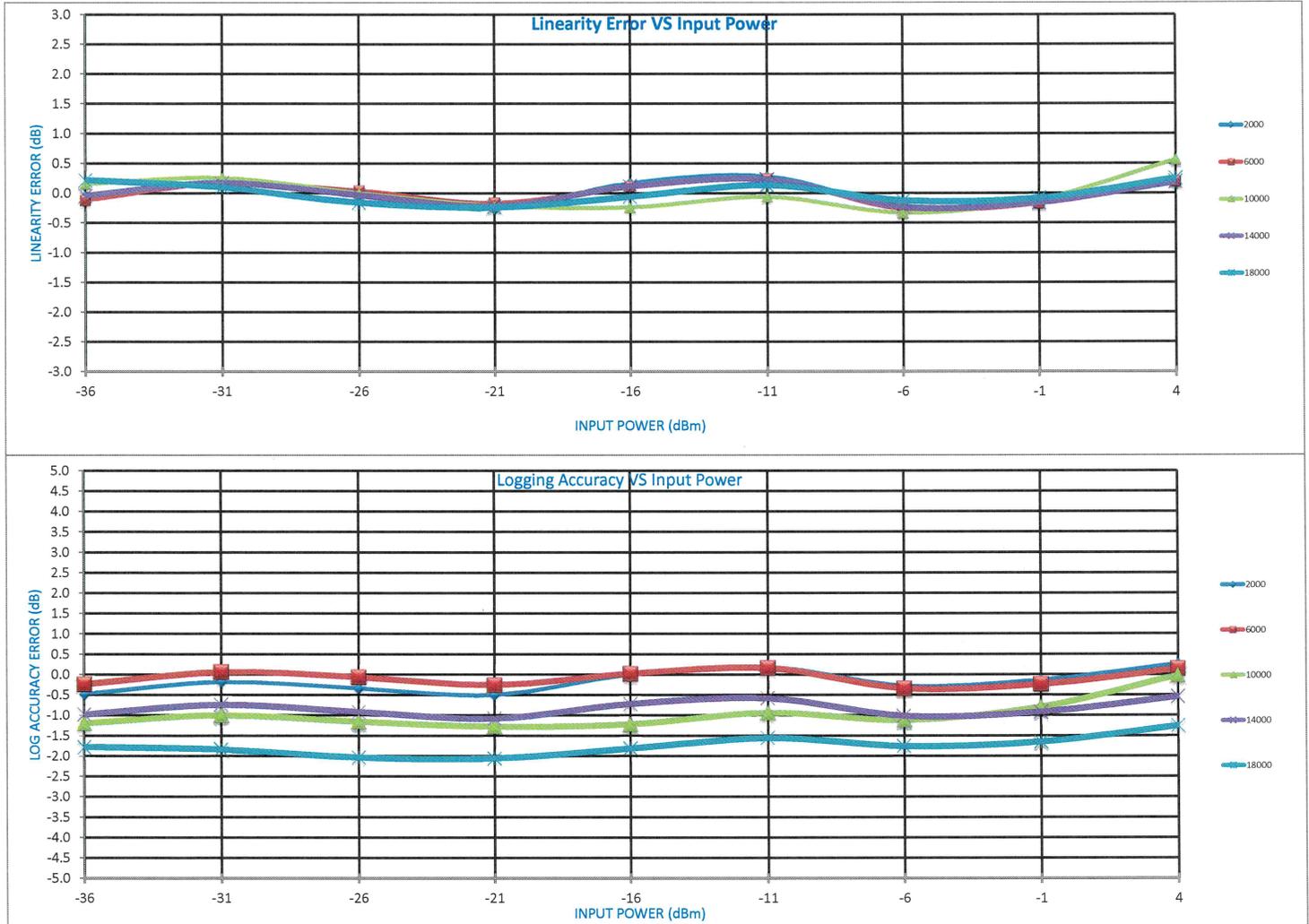
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**Log Linearity and Log Accuracy @ +85°C**



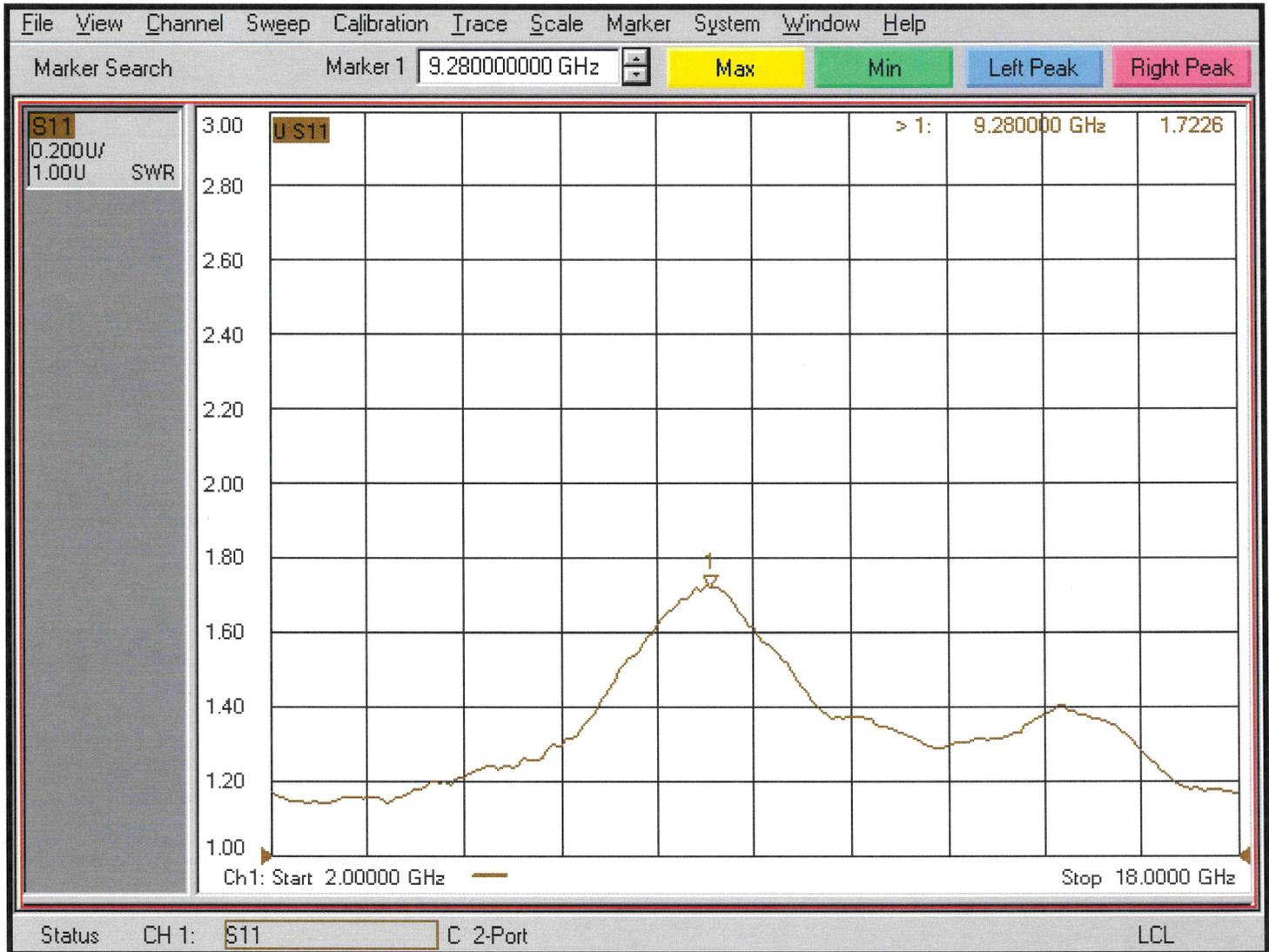
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VSWR 1.72:1



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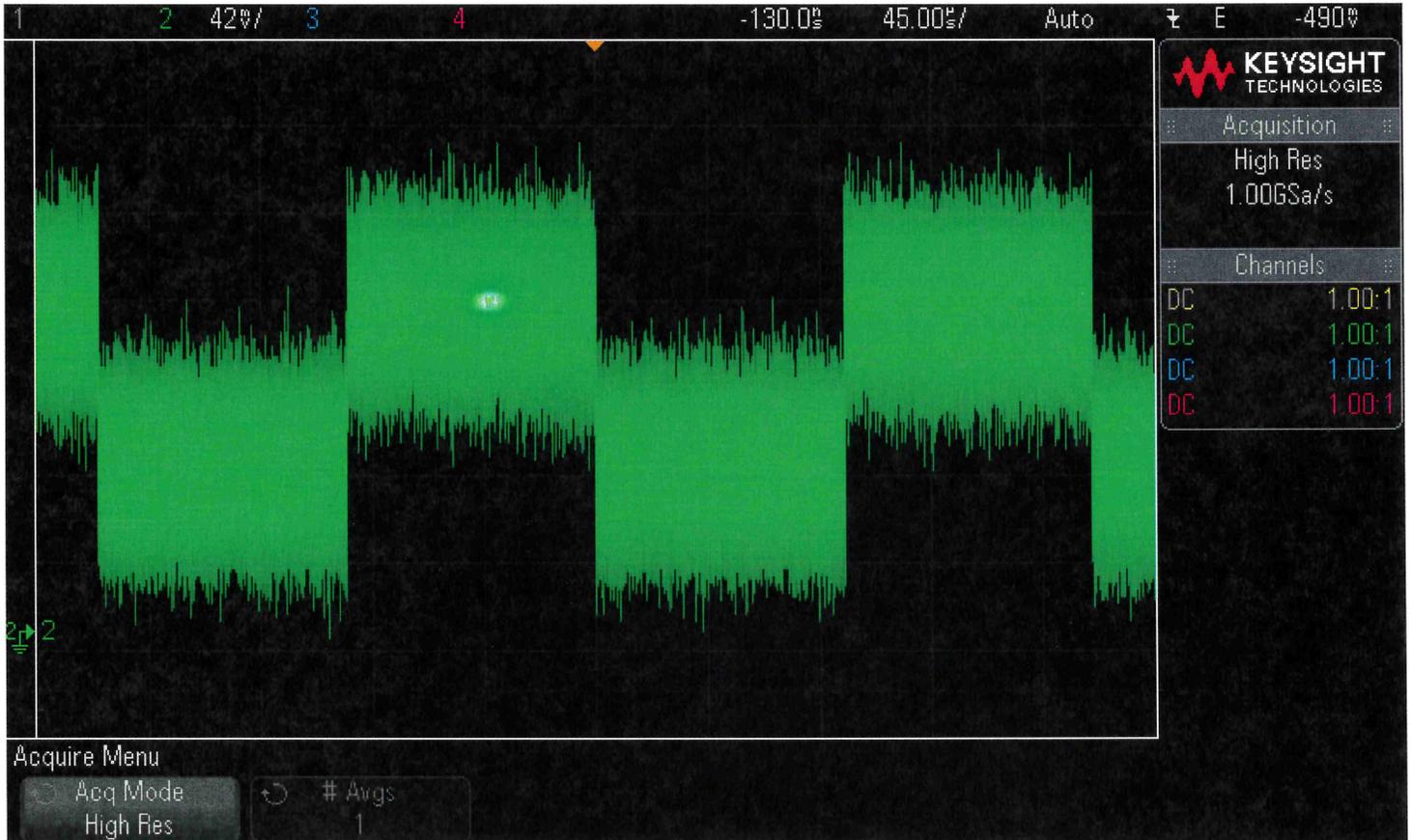


**SUMMARY TEST DATA  
ON  
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**PL47005/2431**

**TSS @ -41.5 dBm**

MSO-X 3054A, MY53400180: Tue Jul 23 08:18:18 2024



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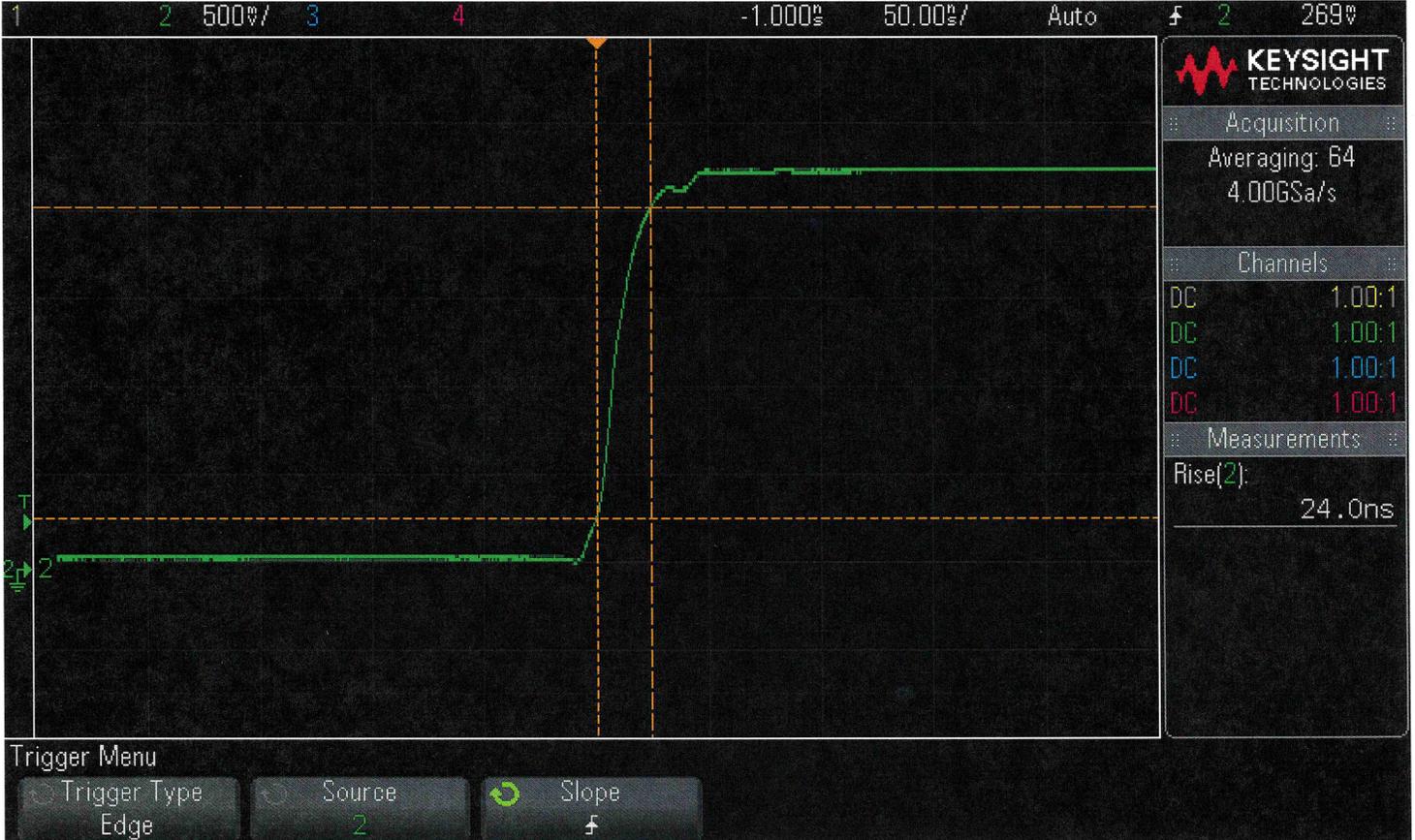


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Rise Time 24.0 ns

MSO-X 3054A, MY53400180: Tue Jul 23 08:02:31 2024



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SUMMARY TEST DATA  
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Fall Time 124.5 ns

MSO-X 3054A, MY53400180: Tue Jul 23 08:10:18 2024



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