



**SUMMARY TEST DATA
ON
HADA-D2002**

PL42819/2351

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>12/18/23</u>
Serial No: <u>PL42819/2351</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 QA
2	TSS:	-40 dBm Min @ -40°C to +85°	-40 dBm See Plot	
3	Frequency Flatness:	±1.65 dB Max	±0.675 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)	-0.16 / -0.88 dB +1.74 / -1.06 dB See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	+0.32 / -0.34 dB +0.46 / -0.45 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%)	22.5 ns See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	221.9 ns See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	61 mV @ +25°C 99 mV @ -40°C 30 mV @ +85°C	
12	Input VSWR:	3.0:1 Max @ +23 dBm	1.70:1 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	120 mA 70 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. Inten Date: 12-18-23

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SUMMARY TEST DATA ON HADA-D2002

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Log Linearity and Log Accuracy @ +25°C

Output Voltage Offset= 0.061 Volts
TSS Frequency(Min)= 10.0 GHz

Frequency		
2 GHz	INTERCEPT (mV)	2137
	SLOPE (mV/dB)	50

6 GHz	INTERCEPT (mV)	2167
	SLOPE (mV/dB)	49.8

10 GHz	INTERCEPT (mV)	2125
	SLOPE (mV/dB)	50.3

14 GHz	INTERCEPT (mV)	2157
	SLOPE (mV/dB)	49.5

18 GHz	INTERCEPT (mV)	2139
	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)	
	347	581	834	1086	1330	1594	1836	2088	2339	Measured Value (mV)	Error(dB)
	10	-6	-3	-1	-7	7	-1	1	2	Error (mV)	MAX MIN
	0.20	-0.12	-0.06	-0.02	-0.14	0.14	-0.03	0.01	0.03	LINEARITY ERROR (dB)	0.20 -0.14
	-0.06	-0.38	-0.32	-0.28	-0.40	-0.12	-0.28	-0.24	-0.22	LOGGING ACCURACY (dB)	-0.06 -0.40
	383	615	874	1126	1360	1628	1863	2116	2371	Measured Value (mV)	Error(dB)
	8	-9	1	4	-11	8	-5	-1	5	Error (mV)	MAX MIN
	0.16	-0.18	0.02	0.09	-0.21	0.17	-0.11	-0.03	0.09	LINEARITY ERROR (dB)	0.17 -0.21
	0.66	0.30	0.48	0.52	0.20	0.56	0.26	0.32	0.42	LOGGING ACCURACY (dB)	0.66 0.20
	329	567	817	1068	1306	1561	1818	2078	2342	Measured Value (mV)	Error(dB)
	14	0	-1	-1	-15	-11	-5	3	16	Error (mV)	MAX MIN
	0.27	0.01	-0.02	-0.03	-0.29	-0.22	-0.11	0.07	0.32	LINEARITY ERROR (dB)	0.32 -0.29
	-0.42	-0.66	-0.66	-0.64	-0.88	-0.78	-0.64	-0.44	-0.16	LOGGING ACCURACY (dB)	-0.16 -0.88
	382	614	876	1127	1348	1615	1852	2108	2363	Measured Value (mV)	Error(dB)
	7	-9	6	9	-17	3	-8	1	8	Error (mV)	MAX MIN
	0.14	-0.18	0.12	0.19	-0.34	0.05	-0.16	0.01	0.17	LINEARITY ERROR (dB)	0.19 -0.34
	0.64	0.28	0.52	0.54	-0.04	0.30	0.04	0.16	0.26	LOGGING ACCURACY (dB)	0.64 -0.04
	388	619	878	1129	1344	1606	1845	2094	2333	Measured Value (mV)	Error(dB)
	3	-10	6	13	-16	3	-2	4	-1	Error (mV)	MAX MIN
	0.06	-0.20	0.12	0.27	-0.32	0.06	-0.04	0.07	-0.02	LINEARITY ERROR (dB)	0.27 -0.32
	0.76	0.38	0.56	0.58	-0.12	0.12	-0.10	-0.12	-0.34	LOGGING ACCURACY (dB)	0.76 -0.34
	0.594	0.524	0.614	0.614	0.544	0.675	0.453	0.383	0.383		
	0.388	0.619	0.878	1.129	1.360	1.628	1.863	2.116	2.371		
	0.329	0.567	0.817	1.068	1.306	1.561	1.818	2.078	2.333		

Logging Linearity vs Frequency	Error(dB)
	MAX MIN
LOGGING LINEARITY ERROR (dB)	0.32 -0.34

Logging Accuracy vs Frequency	Error(dB)
	MAX MIN
LOGGING ACCURACY ERROR (dB)	0.76 -0.88

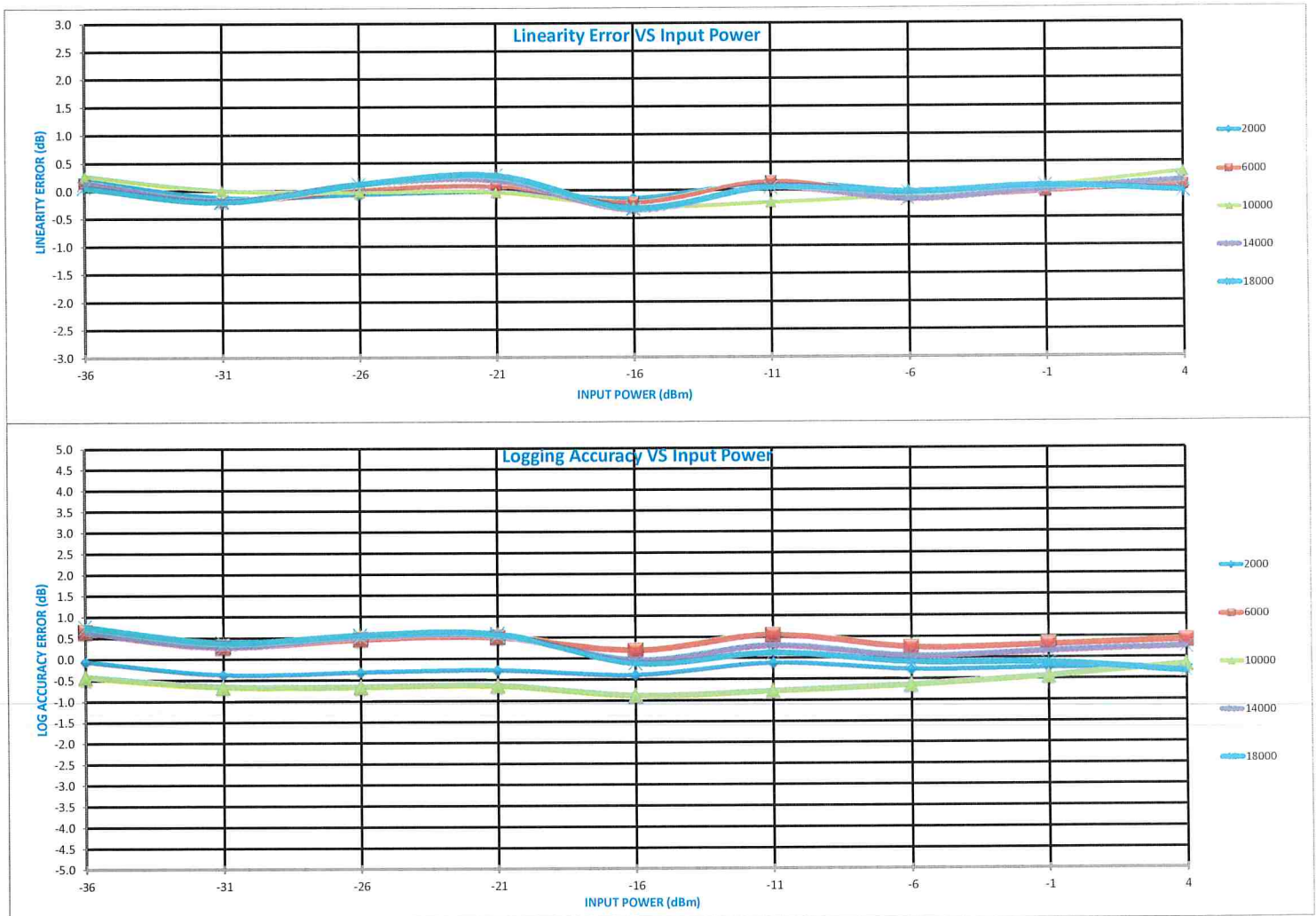
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SUMMARY TEST DATA
ON
HADA-D2002

PL42819/2351

Log Linearity and Log Accuracy @ +25°C



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SUMMARY TEST DATA ON HADA-D2002

PL42819/2351

Log Linearity and Log Accuracy @ -40°C

Output Voltage Offset= 0.099 Volts

Frequency		
2 GHz	INTERCEPT (mV)	2124
	SLOPE (mV/dB)	48.7

6 GHz	INTERCEPT (mV)	2155
	SLOPE (mV/dB)	48.5

10 GHz	INTERCEPT (mV)	2110
	SLOPE (mV/dB)	48.9

14 GHz	INTERCEPT (mV)	2145
	SLOPE (mV/dB)	48.2

18 GHz	INTERCEPT (mV)	2139
	SLOPE (mV/dB)	47.5

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	390	599	854	1100	1332	1606	1838	2083	2308	Measured Value (mV)	Error(dB)	
	18	-17	-5	-2	-14	17	6	8	-11	Error (mV)	MAX	MIN
	0.36	-0.34	-0.10	-0.05	-0.28	0.35	0.12	0.16	-0.22	LINEARITY ERROR (dB)	0.36	-0.34
	0.80	-0.02	0.08	0.00	-0.36	0.12	-0.24	-0.34	-0.84	LOGGING ACCURACY (dB)	0.80	-0.84
	423	636	894	1141	1365	1640	1868	2109	2341	Measured Value (mV)	Error(dB)	
	13	-17	-1	4	-15	18	4	2	-8	Error (mV)	MAX	MIN
	0.26	-0.35	-0.02	0.07	-0.30	0.37	0.08	0.05	-0.16	LINEARITY ERROR (dB)	0.37	-0.35
	1.46	0.72	0.88	0.82	0.30	0.80	0.36	0.18	-0.18	LOGGING ACCURACY (dB)	1.46	-0.18
	372	585	837	1082	1306	1572	1818	2073	2309	Measured Value (mV)	Error(dB)	
	21	-10	-2	-2	-22	-1	1	12	3	Error (mV)	MAX	MIN
	0.44	-0.21	-0.05	-0.04	-0.45	-0.01	0.02	0.24	0.07	LINEARITY ERROR (dB)	0.44	-0.45
	0.44	-0.30	-0.26	-0.36	-0.88	-0.56	-0.64	-0.54	-0.82	LOGGING ACCURACY (dB)	0.44	-0.88
	421	634	893	1141	1352	1627	1857	2103	2334	Measured Value (mV)	Error(dB)	
	12	-16	2	9	-22	12	1	6	-4	Error (mV)	MAX	MIN
	0.26	-0.33	0.04	0.18	-0.45	0.25	0.02	0.12	-0.09	LINEARITY ERROR (dB)	0.26	-0.45
	1.42	0.68	0.86	0.82	0.04	0.54	0.14	0.06	-0.32	LOGGING ACCURACY (dB)	1.42	-0.32
	437	651	907	1156	1358	1630	1859	2100	2317	Measured Value (mV)	Error(dB)	
	7	-16	2	14	-21	13	5	8	-12	Error (mV)	MAX	MIN
	0.15	-0.34	0.05	0.29	-0.45	0.28	0.10	0.17	-0.26	LINEARITY ERROR (dB)	0.29	-0.45
	1.74	1.02	1.14	1.12	0.16	0.60	0.18	0.00	-0.66	LOGGING ACCURACY (dB)	1.74	-0.66
	0.672	0.683	0.724	0.765	0.610	0.703	0.517	0.372	0.341			
	0.437	0.651	0.907	1.156	1.365	1.640	1.868	2.109	2.341			
	0.372	0.585	0.837	1.082	1.306	1.572	1.818	2.073	2.308			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.44	-0.45

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	1.74	-0.88

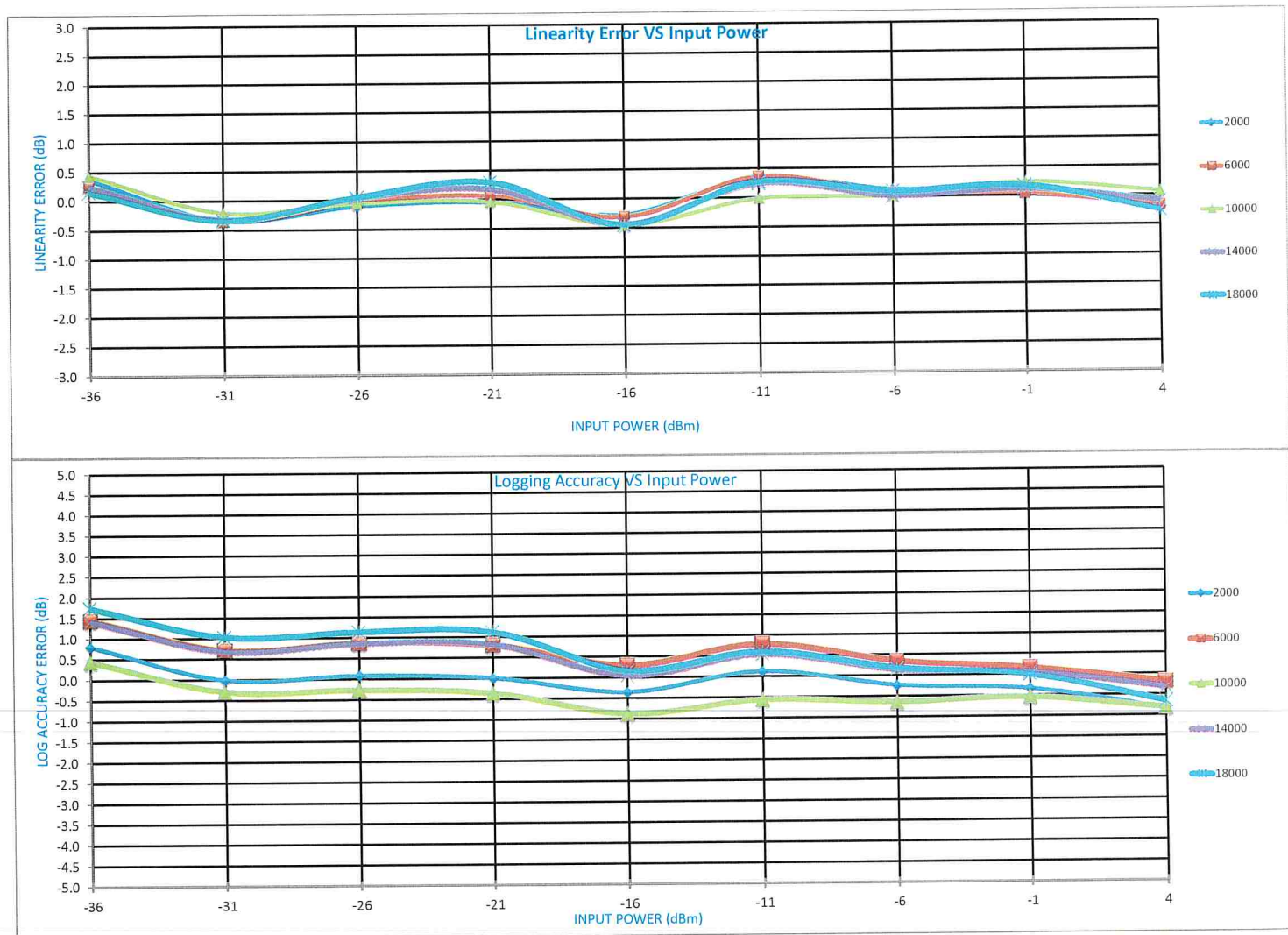
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SUMMARY TEST DATA
ON
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Log Linearity and Log Accuracy @ -40°C



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SUMMARY TEST DATA ON HADA-D2002

PL42819/2351

Log Linearity and Log Accuracy @ +85°C

Output Voltage Offset= 0.03 Volts

Frequency

2 GHz	INTERCEPT (mV)	2165
	SLOPE (mV/dB)	51.5

6 GHz	INTERCEPT (mV)	2207
	SLOPE (mV/dB)	51.1

10 GHz	INTERCEPT (mV)	2168
	SLOPE (mV/dB)	51.8

14 GHz	INTERCEPT (mV)	2179
	SLOPE (mV/dB)	50.7

18 GHz	INTERCEPT (mV)	2148
	SLOPE (mV/dB)	49.8

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	301	580	831	1089	1345	1596	1853	2103	2380	Measured Value (mV)	Error(dB)	
	-12	10	4	4	3	-3	-4	-11	9	Error (mV)	MAX	MIN
	-0.23	0.19	0.07	0.08	0.06	-0.06	-0.07	-0.21	0.17	LINEARITY ERROR (dB)	0.19	-0.23
	-0.98	-0.40	-0.38	-0.22	-0.10	-0.08	0.06	0.06	0.60	LOGGING ACCURACY (dB)	0.60	-0.98
	356	627	887	1141	1385	1645	1889	2145	2425	Measured Value (mV)	Error(dB)	
	-10	5	9	8	-4	0	-11	-11	14	Error (mV)	MAX	MIN
	-0.20	0.10	0.18	0.15	-0.08	0.01	-0.22	-0.21	0.27	LINEARITY ERROR (dB)	0.27	-0.22
	0.12	0.54	0.74	0.82	0.70	0.90	0.78	0.90	1.50	LOGGING ACCURACY (dB)	1.50	0.12
	297	578	829	1086	1333	1580	1848	2108	2399	Measured Value (mV)	Error(dB)	
	-7	15	7	5	-7	-19	-9	-8	24	Error (mV)	MAX	MIN
	-0.14	0.28	0.13	0.10	-0.13	-0.36	-0.18	-0.16	0.46	LINEARITY ERROR (dB)	0.46	-0.36
	-1.06	-0.44	-0.42	-0.28	-0.34	-0.40	-0.04	0.16	0.98	LOGGING ACCURACY (dB)	0.98	-1.06
	338	613	872	1126	1361	1614	1865	2119	2396	Measured Value (mV)	Error(dB)	
	-14	7	12	13	-6	-7	-10	-9	14	Error (mV)	MAX	MIN
	-0.28	0.14	0.24	0.25	-0.12	-0.13	-0.19	-0.18	0.28	LINEARITY ERROR (dB)	0.28	-0.28
	-0.24	0.26	0.44	0.52	0.22	0.28	0.30	0.38	0.92	LOGGING ACCURACY (dB)	0.92	-0.24
	335	610	864	1118	1348	1594	1850	2093	2348	Measured Value (mV)	Error(dB)	
	-20	6	11	16	-3	-6	1	-6	0	Error (mV)	MAX	MIN
	-0.39	0.13	0.22	0.32	-0.06	-0.13	0.01	-0.11	0.01	LINEARITY ERROR (dB)	0.32	-0.39
	-0.30	0.20	0.28	0.36	-0.04	-0.12	0.00	-0.14	-0.04	LOGGING ACCURACY (dB)	0.36	-0.30
	0.579	0.481	0.569	0.539	0.510	0.637	0.402	0.510	0.755			
	0.356	0.627	0.887	1.141	1.385	1.645	1.889	2.145	2.425			
	0.297	0.578	0.829	1.086	1.333	1.580	1.848	2.093	2.348			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.46	-0.39

Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	1.50	-1.06

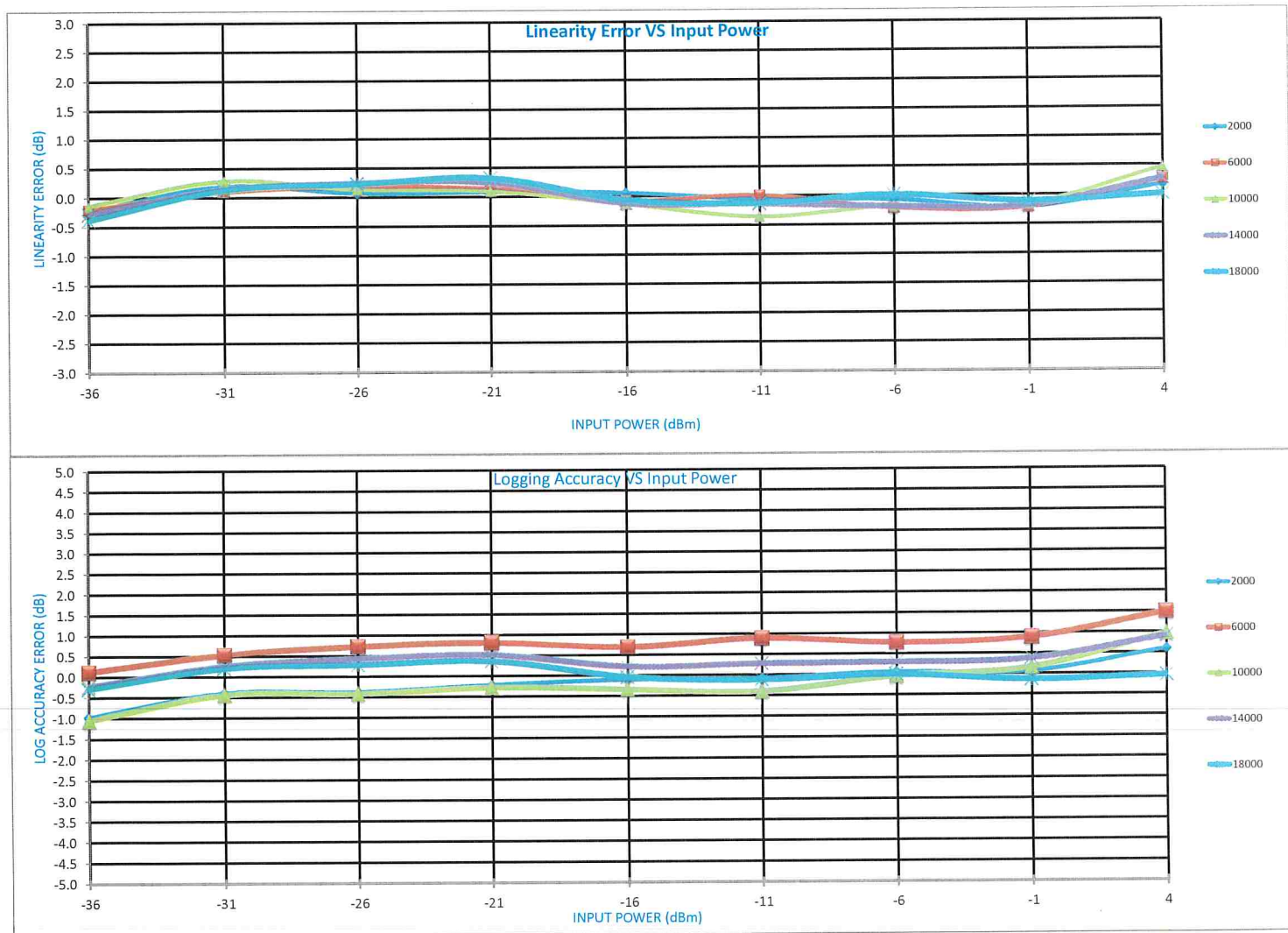
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Log Linearity and Log Accuracy @ +85°C



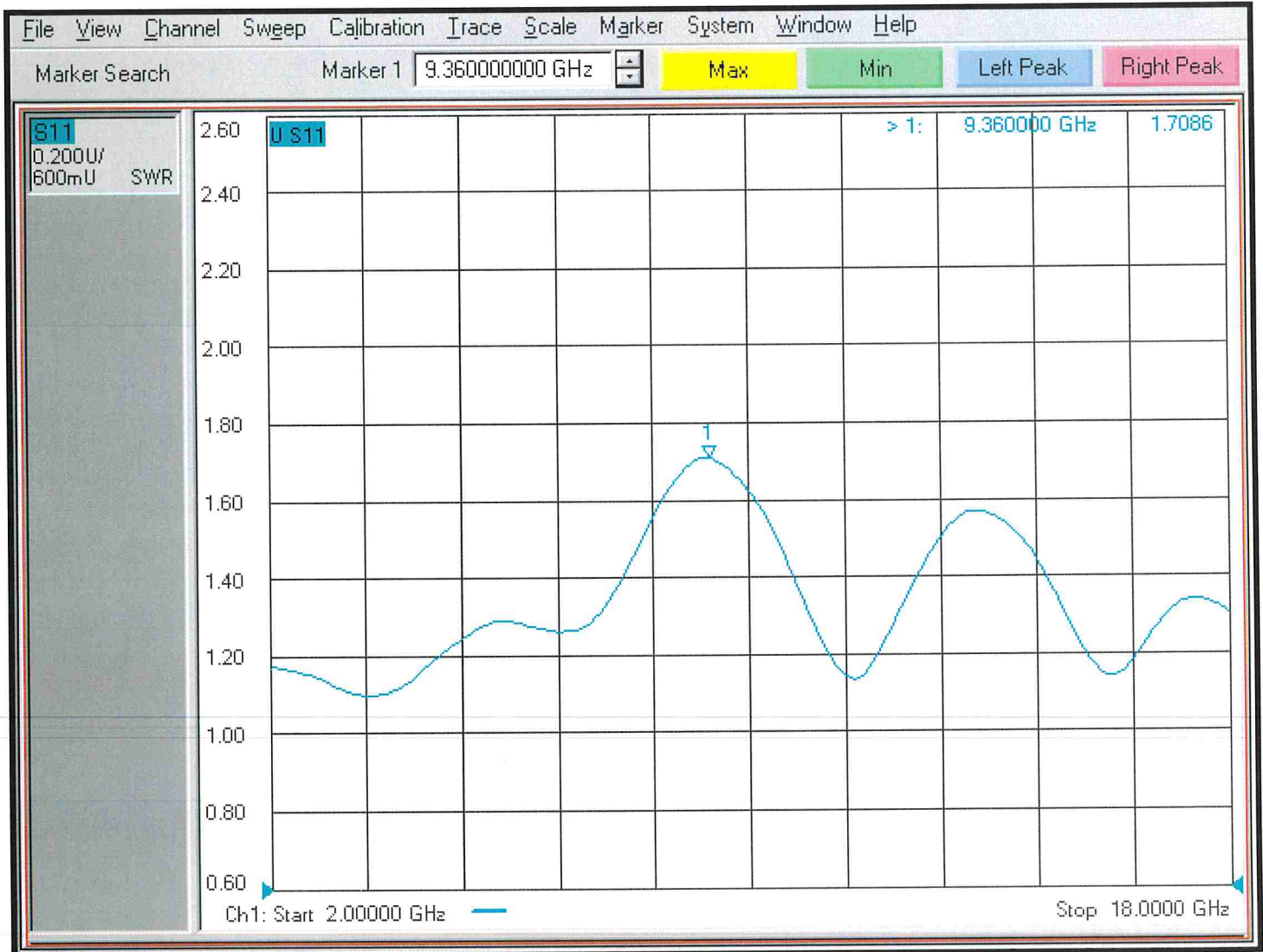
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VSWR 1.70:1



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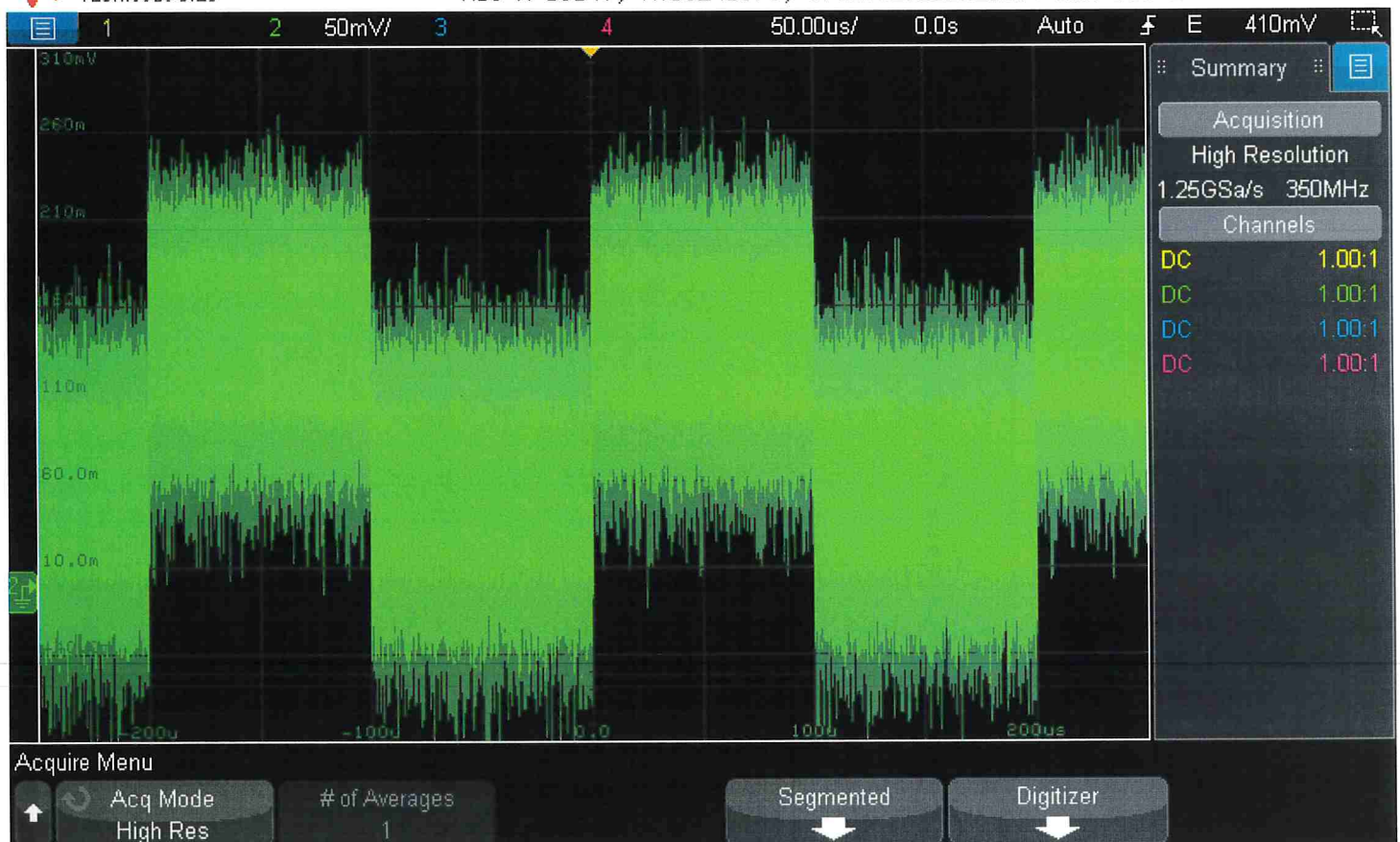
SUMMARY TEST DATA
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PL42819/2351

TSS @ -40 dBm



MSO-X 3034T, MY59241076, 07.50.2021102830: Mon Dec 18 09:53:50 2023



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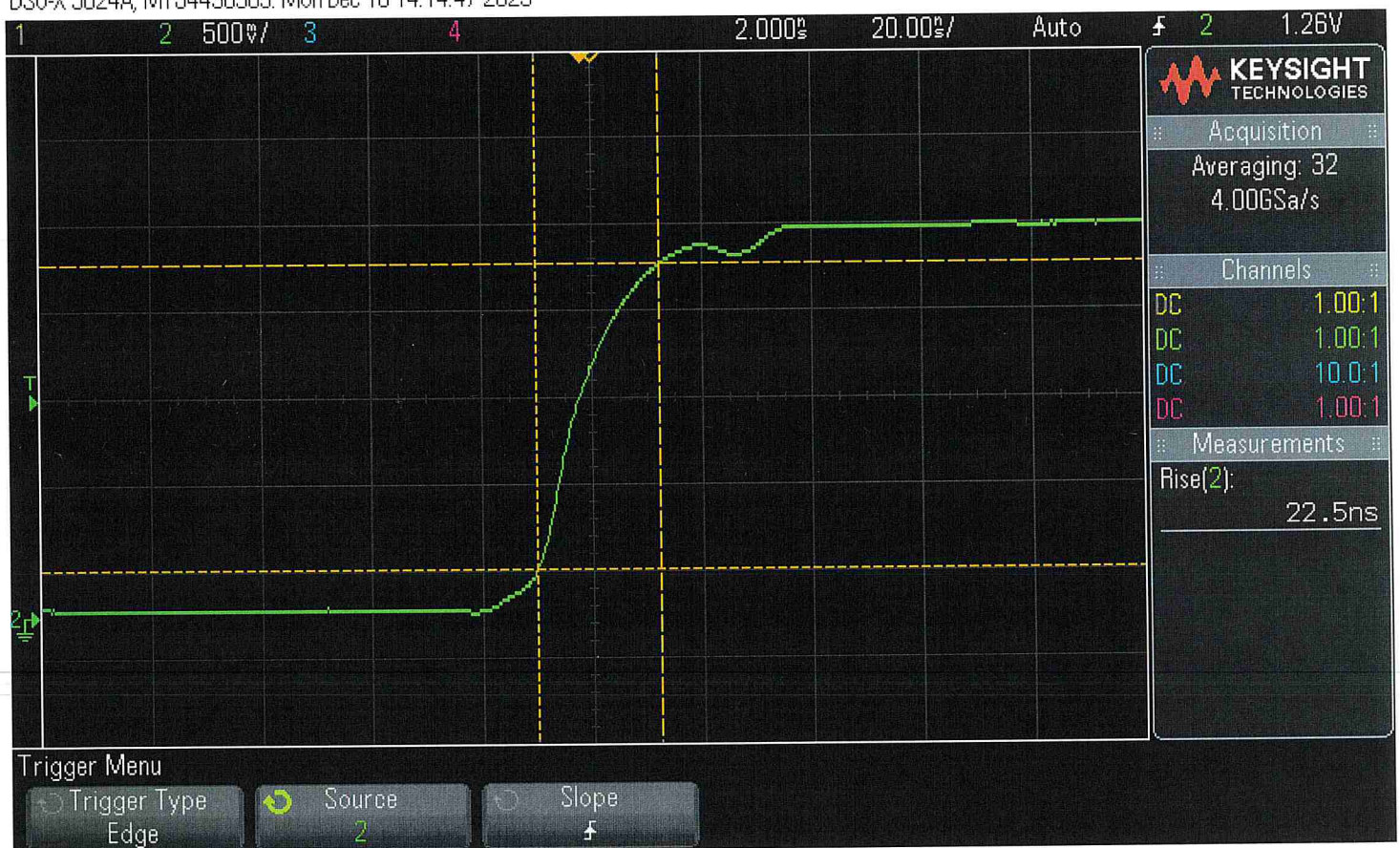


SUMMARY TEST DATA
ON
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PL42819/2351

Rise Time 22.5 ns

DSO-X 3024A, MY54490369: Mon Dec 18 14:14:47 2023



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SUMMARY TEST DATA
ON
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PL42819/2351

Fall Time 221.9 ns

DSO-X 3024A, MY54490369: Mon Dec 18 14:24:33 2023



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