



**SUMMARY TEST DATA
ON
HADA-D2002**

Customer: _____	Tested By: <u>D. Weinrob</u>
SO No: _____	Temperature: <u>+25°C</u>
Model No: <u>HADA-D2002</u>	Date: <u>07/25/24</u>
Serial No: <u>PL46951/2430</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°	-42 dBm See Plot	
3	Frequency Flatness:	±1.65 dB Max	0.72 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)	0.24 dB / -0.76 dB 1.28 dB / -1.66 dB See Plot	
6	Log Linearity:	±0.5 dB Max @ +25°C ±0.75 dB Max @ -40°C to +85°C	0.26 dB / -0.41 dB -0.35 dB / 0.51 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%)	19.6 ns See Plot	
10	Fall Time:	500 ns Max (@ Pulse width 100usec input) (90% to 10%)	115 ns See Plot	
11	DC Offset: (Input 50 Ω terminated):	+95 mV +55/-100 mV (@ -40°C to +85°C)	118 mV @ +25°C 133 mV @ -40°C 90 mV @ +85°C See Plot	

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12	Input VSWR:	3.0:1 Max @ +23 dBm	1.99:1 See Plot	PMI QA?
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 @ 90mA -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. Luter

Date: 7-25-24



SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
 MODEL: HADA-D2002
 SERIAL NO: PL46951
 TESTED BY: D. Weinrob
 DATE: 7/19/2024



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GRAPH #1

Output Voltage Offset= 0.118 Volts

Frequency

2 GHz	INTERCEPT (m)	2173
	SLOPE (mV/dB)	50.8

6 GHz	INTERCEPT (m)	2179
	SLOPE (mV/dB)	50.4

10 GHz	INTERCEPT (m)	2154
	SLOPE (mV/dB)	50.9

14 GHz	INTERCEPT (m)	2188
	SLOPE (mV/dB)	50.5

18 GHz	INTERCEPT (m)	2202
	SLOPE (mV/dB)	50.2

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)	
	327	603	853	1108	1373	1618	1865	2125	2365	Measured Value (mV)	Error(dB)
	-16	6	2	3	13	4	-3	3	-11	Error (mV)	MAX MIN
	-0.31	0.12	0.03	0.05	0.26	0.08	-0.06	0.05	-0.23	LINEARITY ERROR (dB)	0.26 -0.31
	-0.46	0.06	0.06	0.16	0.46	0.36	0.30	0.50	0.30	LOGGING ACCURACY (dB)	0.50 -0.46
	345	625	876	1126	1386	1628	1871	2129	2373	Measured Value (mV)	Error(dB)
	-20	8	7	5	13	3	-6	0	-8	Error (mV)	MAX MIN
	-0.41	0.15	0.13	0.09	0.25	0.06	-0.12	0.00	-0.16	LINEARITY ERROR (dB)	0.25 -0.41
	-0.10	0.50	0.52	0.52	0.72	0.56	0.42	0.58	0.46	LOGGING ACCURACY (dB)	0.72 -0.10
	312	685	835	1092	1339	1586	1840	2106	2362	Measured Value (mV)	Error(dB)
	-10	9	4	7	-1	-8	-9	3	5	Error (mV)	MAX MIN
	-0.19	0.17	0.08	0.13	-0.01	-0.16	-0.17	0.06	0.09	LINEARITY ERROR (dB)	0.17 -0.19
	-0.76	-0.30	-0.30	-0.16	-0.22	-0.28	-0.20	0.12	0.24	LOGGING ACCURACY (dB)	0.24 -0.76
	353	633	886	1135	1384	1629	1876	2142	2387	Measured Value (mV)	Error(dB)
	-18	9	10	7	3	-4	-9	5	-3	Error (mV)	MAX MIN
	-0.37	0.18	0.20	0.13	0.07	-0.08	-0.18	0.09	-0.05	LINEARITY ERROR (dB)	0.20 -0.37
	0.06	0.66	0.72	0.70	0.68	0.58	0.52	0.84	0.74	LOGGING ACCURACY (dB)	0.84 0.06
	376	654	908	1155	1394	1641	1895	2164	2397	Measured Value (mV)	Error(dB)
	-17	9	12	8	-4	-8	-6	12	-6	Error (mV)	MAX MIN
	-0.34	0.19	0.24	0.16	-0.08	-0.17	-0.11	0.24	-0.12	LINEARITY ERROR (dB)	0.24 -0.34
	0.52	1.08	1.16	1.10	0.88	0.82	0.90	1.28	0.94	LOGGING ACCURACY (dB)	1.28 0.52
	0.633	0.682	0.722	0.623	0.544	0.544	0.544	0.574	0.346		
	0.376	0.654	0.908	1.155	1.394	1.641	1.895	2.164	2.397		
	0.312	0.585	0.835	1.092	1.339	1.586	1.840	2.106	2.362		

Logging Linearity vs Frequency	Error(dB)
	MAX MIN
LOGGING LINEARITY ERROR (dB)	0.26 -0.41

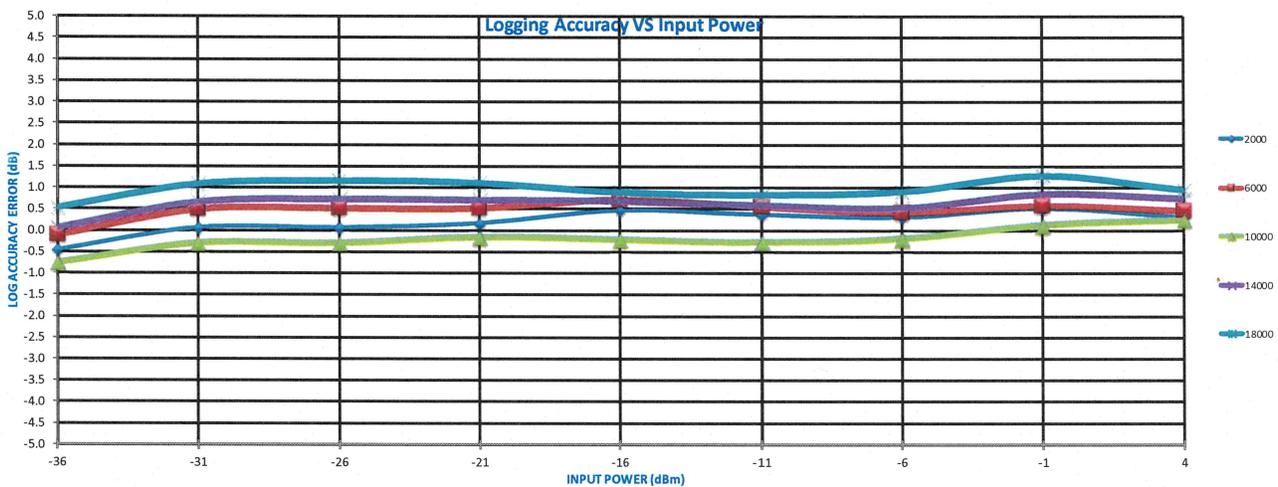
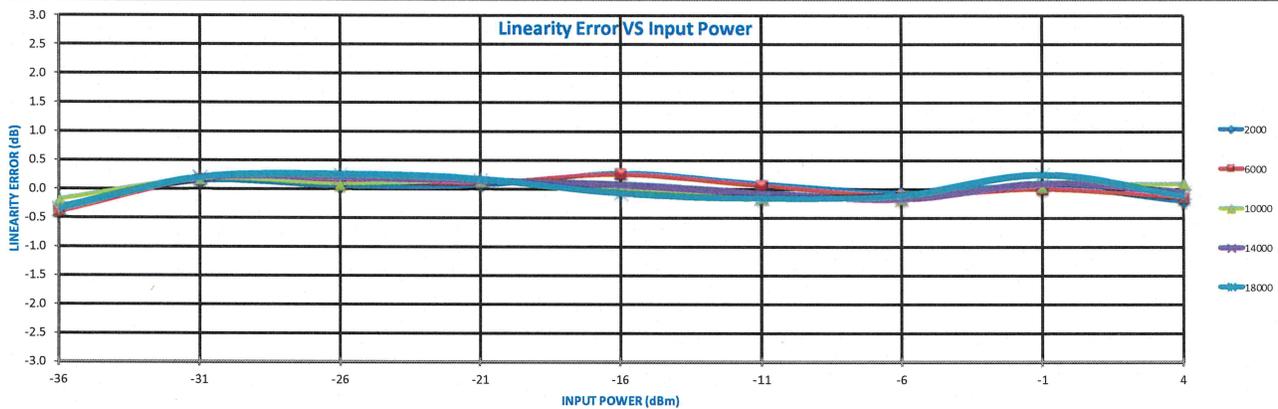
Logging Accuracy vs Frequency	Error(dB)
	MAX MIN
LOGGING ACCURACY ERROR (dB)	1.28 -0.76

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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +25C
MODEL: HADA-D2002
SERIAL NO: PL46951
TESTED BY: D. Weinrob



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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ -40C
 MODEL: HADA-D2002
 SERIAL NO: PL46951
 TESTED BY: D. Weinrob
 DATE: 7/23/2024



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GRAPH #2

Output Voltage Offset= 0.133 Volts

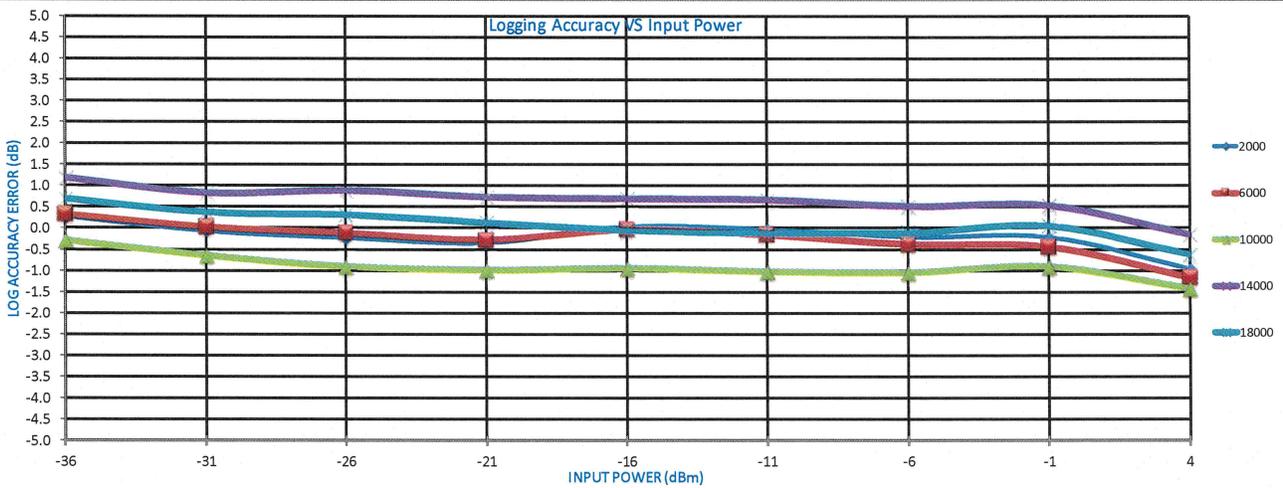
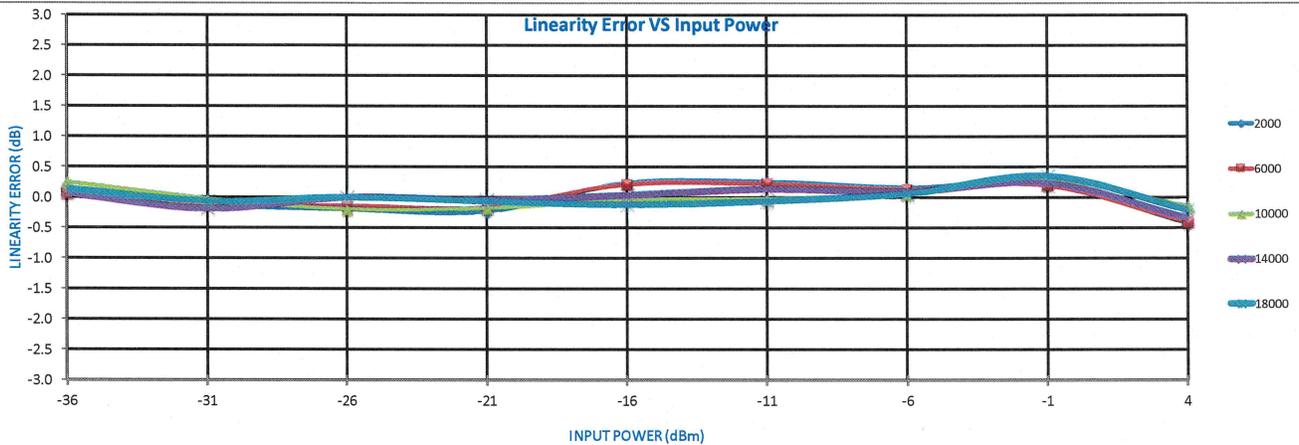
Frequency		-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
2 GHz	INTERCEPT (m)	363	596	838	1082	1351	1598	1839	2089	2302	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	7	-6	-10	-12	11	12	7	12	-21	Error (mV)	MAX	MIN
		0.14	-0.12	-0.20	-0.24	0.23	0.25	0.15	0.24	-0.43	LINEARITY ERROR (dB)	0.25	-0.43
		0.26	-0.08	-0.24	-0.36	0.02	-0.04	-0.22	-0.22	-0.96	LOGGING ACCURACY (dB)	0.26	-0.96
6 GHz	INTERCEPT (m)	366	601	844	1086	1348	1592	1831	2078	2292	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	3	-6	-6	-8	10	11	6	10	-20	Error (mV)	MAX	MIN
		0.06	-0.12	-0.13	-0.16	0.21	0.22	0.13	0.20	-0.41	LINEARITY ERROR (dB)	0.22	-0.41
		0.32	0.02	-0.12	-0.28	-0.04	-0.16	-0.38	-0.44	-1.16	LOGGING ACCURACY (dB)	0.32	-1.16
10 GHz	INTERCEPT (m)	336	568	805	1051	1303	1549	1798	2055	2279	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	12	-1	-9	-9	-2	-1	3	14	-7	Error (mV)	MAX	MIN
		0.25	-0.02	-0.19	-0.18	-0.04	-0.02	0.05	0.29	-0.14	LINEARITY ERROR (dB)	0.29	-0.19
		-0.28	-0.64	-0.90	-0.98	-0.94	-1.02	-1.04	-0.90	-1.42	LOGGING ACCURACY (dB)	-0.28	-1.42
14 GHz	INTERCEPT (m)	409	641	894	1136	1384	1633	1875	2126	2342	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	3	-9	0	-2	2	7	5	11	-17	Error (mV)	MAX	MIN
		0.07	-0.18	0.00	-0.04	0.04	0.14	0.09	0.24	-0.34	LINEARITY ERROR (dB)	0.24	-0.34
		1.18	0.82	0.88	0.72	0.68	0.66	0.50	0.52	-0.16	LOGGING ACCURACY (dB)	1.18	-0.16
18 GHz	INTERCEPT (m)	384	618	865	1106	1347	1594	1844	2102	2319	Measured Value (mV)	Error(dB)	
	SLOPE (mV/dB)	7	-3	0	-3	-6	-3	3	17	-10	Error (mV)	MAX	MIN
		0.14	-0.07	-0.01	-0.07	-0.13	-0.07	0.06	0.35	-0.21	LINEARITY ERROR (dB)	0.35	-0.21
		0.68	0.36	0.30	0.12	-0.06	-0.12	-0.12	0.04	-0.62	LOGGING ACCURACY (dB)	0.68	-0.62
Flatness +/- dB		0.746	0.746	0.910	0.869	0.828	0.859	0.787	0.726	0.644			
Max Video Output V		0.409	0.641	0.894	1.136	1.384	1.633	1.875	2.126	2.342			
Min Video Output V		0.336	0.568	0.805	1.051	1.303	1.549	1.798	2.055	2.279			
Logging Linearity vs Frequency												Error(dB)	
												MAX	MIN
												0.35	-0.43
Logging Accuracy vs Frequency												Error(dB)	
												MAX	MIN
												1.18	-1.42

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LOG TRANSFER WITH FREQUENCY @ -40C
MODEL: HADA-D2002
SERIAL NO: PL46951
TESTED BY: D. Weinrob



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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
 MODEL: HADA-D2002
 SERIAL NO: PL46951
 TESTED BY: D. Weinrob
 DATE: 7/1/2024



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GRAPH #3

Output Voltage Offset= 0.09 Volts

Frequency

2 GHz	INTERCEPT (m)	2161
	SLOPE (mV/dB)	51.3

6 GHz	INTERCEPT (m)	2162
	SLOPE (mV/dB)	50.9

10 GHz	INTERCEPT (m)	2131
	SLOPE (mV/dB)	51.5

14 GHz	INTERCEPT (m)	2165
	SLOPE (mV/dB)	51

18 GHz	INTERCEPT (m)	2171
	SLOPE (mV/dB)	50.8

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

	-36	-31	-26	-21	-16	-11	-6	-1	4	RF Input Power (dBm)		
	292	580	835	1090	1351	1594	1844	2107	2364	Measured Value (mV)	Error(dB)	
	-22	10	8	7	11	-2	-9	-2	-2	Error (mV)	MAX	MIN
	-0.42	0.19	0.16	0.13	0.22	-0.04	-0.17	-0.04	-0.03	LINEARITY ERROR (dB)	0.22	-0.42
	-1.16	-0.40	-0.30	-0.20	0.02	-0.12	-0.12	0.14	0.28	LOGGING ACCURACY (dB)	0.28	-1.16
	304	596	850	1101	1357	1597	1844	2106	2371	Measured Value (mV)	Error(dB)	
	-25	13	12	8	10	-5	-13	-5	5	Error (mV)	MAX	MIN
	-0.48	0.25	0.24	0.16	0.19	-0.10	-0.25	-0.11	0.10	LINEARITY ERROR (dB)	0.25	-0.48
	-0.92	-0.08	0.00	0.02	0.14	-0.06	-0.12	0.12	0.42	LOGGING ACCURACY (dB)	0.42	-0.92
	267	544	804	1061	1302	1550	1807	2076	2354	Measured Value (mV)	Error(dB)	
	-11	9	11	11	-5	-15	-15	-3	18	Error (mV)	MAX	MIN
	-0.21	0.17	0.22	0.22	-0.10	-0.28	-0.29	-0.06	0.34	LINEARITY ERROR (dB)	0.34	-0.29
	-1.66	-1.12	-0.92	-0.78	-0.96	-1.00	-0.86	-0.48	0.08	LOGGING ACCURACY (dB)	0.08	-1.66
	306	599	854	1104	1350	1594	1844	2114	2376	Measured Value (mV)	Error(dB)	
	-23	15	15	10	1	-10	-15	0	7	Error (mV)	MAX	MIN
	-0.46	0.29	0.29	0.19	0.02	-0.19	-0.29	0.00	0.14	LINEARITY ERROR (dB)	0.29	-0.46
	-0.88	-0.02	0.08	0.08	0.00	-0.12	-0.12	0.28	0.52	LOGGING ACCURACY (dB)	0.52	-0.88
	318	615	869	1117	1353	1601	1858	2129	2374	Measured Value (mV)	Error(dB)	
	-26	17	17	11	-6	-12	-9	8	-1	Error (mV)	MAX	MIN
	-0.51	0.34	0.34	0.23	-0.12	-0.24	-0.18	0.16	-0.01	LINEARITY ERROR (dB)	0.34	-0.51
	-0.64	0.30	0.38	0.34	0.06	0.02	0.16	0.58	0.48	LOGGING ACCURACY (dB)	0.58	-0.64
	0.499	0.695	0.636	0.548	0.538	0.499	0.499	0.519	0.215			
	0.318	0.615	0.869	1.117	1.357	1.601	1.858	2.129	2.376			
	0.267	0.544	0.804	1.061	1.302	1.550	1.807	2.076	2.354			

Logging Linearity vs Frequency	Error(dB)	
	MAX	MIN
LOGGING LINEARITY ERROR (dB)	0.34	-0.51

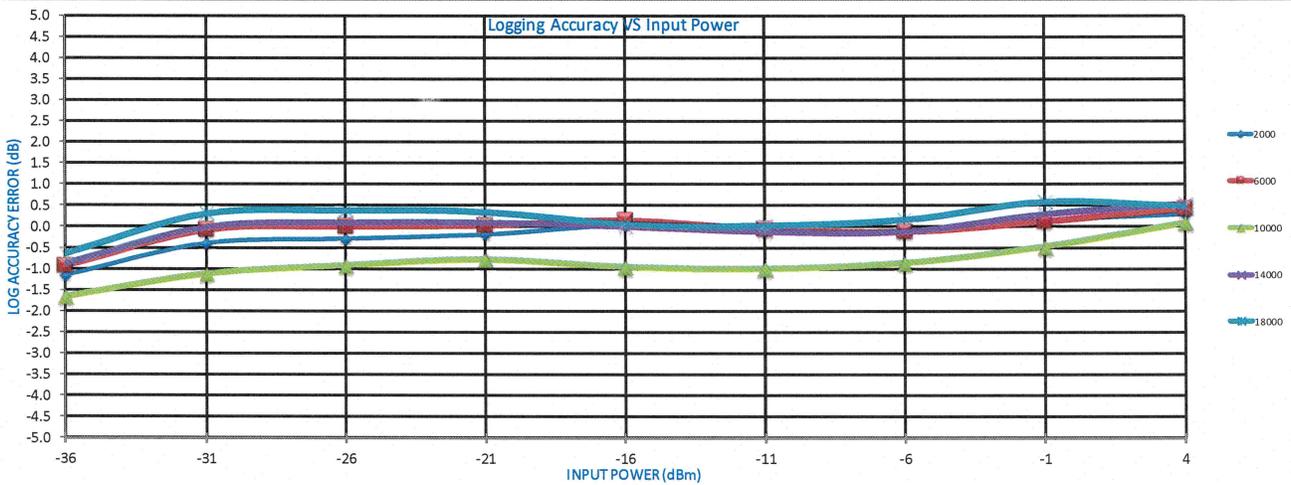
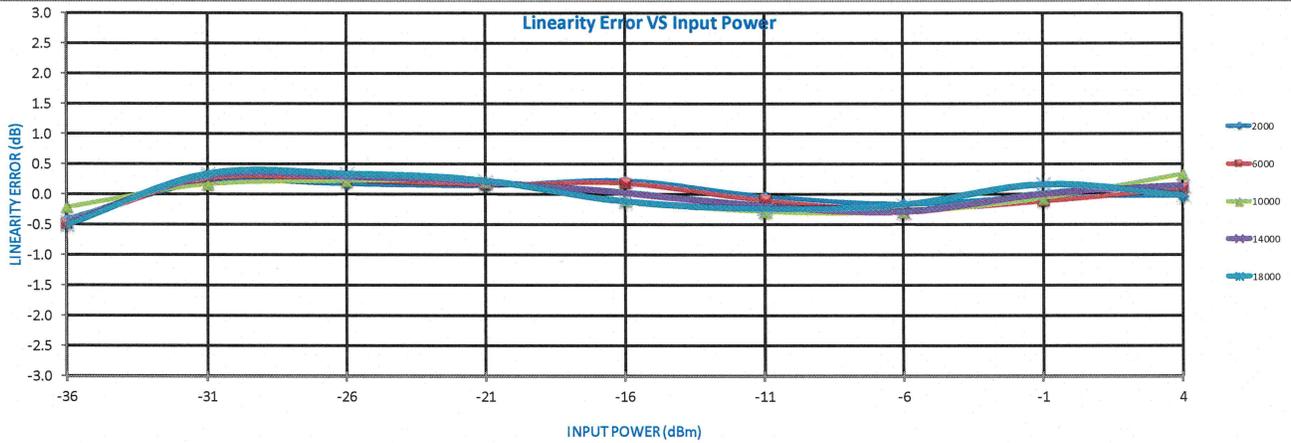
Logging Accuracy vs Frequency	Error(dB)	
	MAX	MIN
LOGGING ACCURACY ERROR (dB)	0.58	-1.66

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SUMMARY TEST DATA ON HADA-D2002

LOG TRANSFER WITH FREQUENCY @ +85C
MODEL: HADA-D2002
SERIAL NO: PL46951
TESTED BY: D. Weinrob

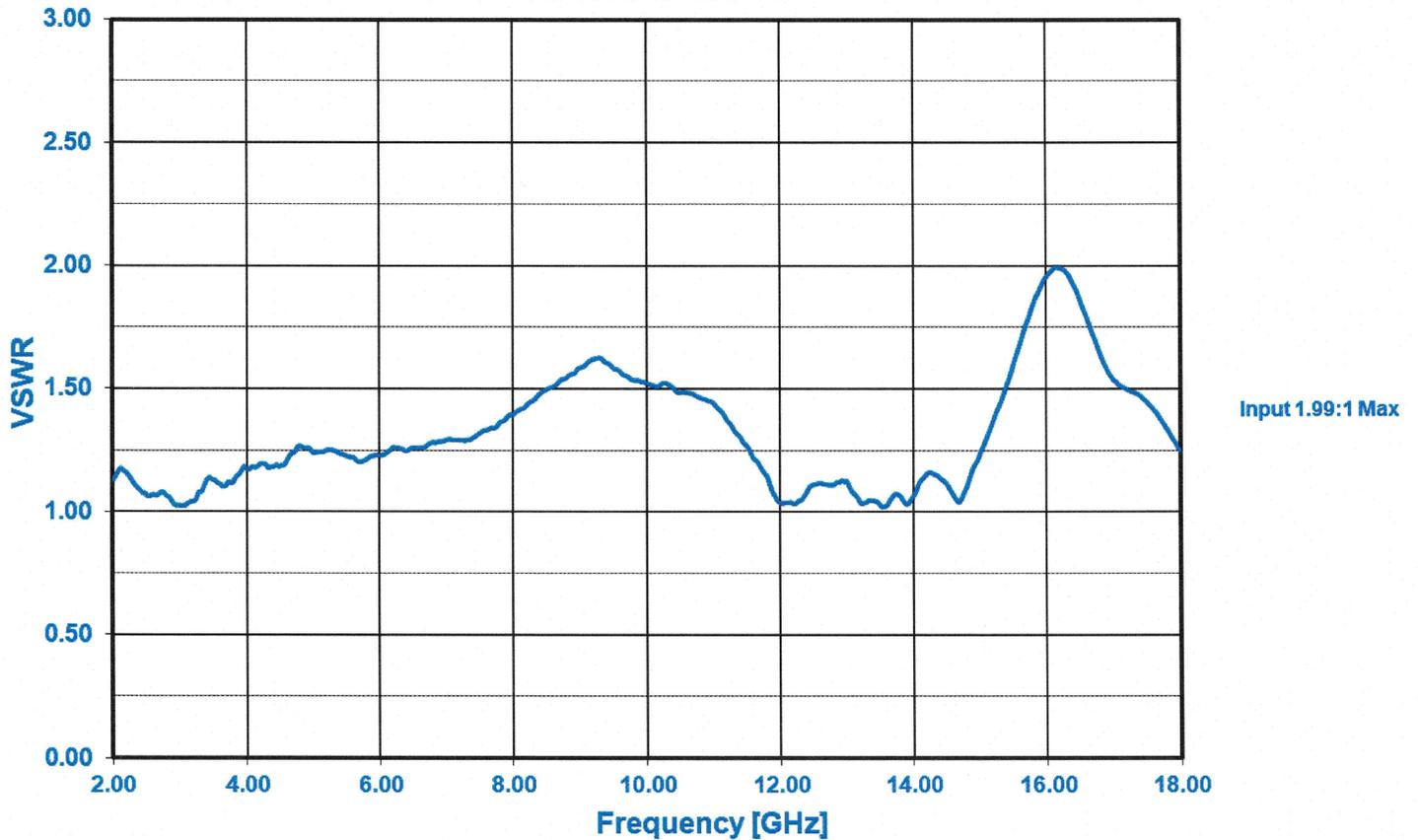


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**SUMMARY TEST DATA
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VSWR GRAPH

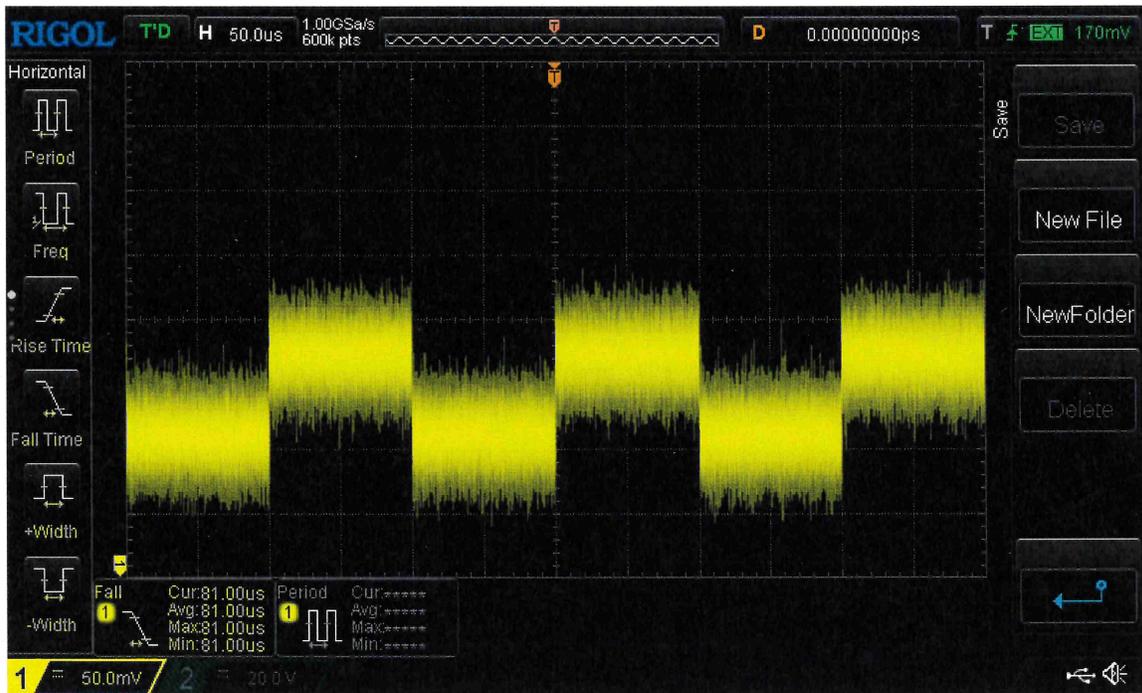


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**SUMMARY TEST DATA
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TSS = -42 dBm

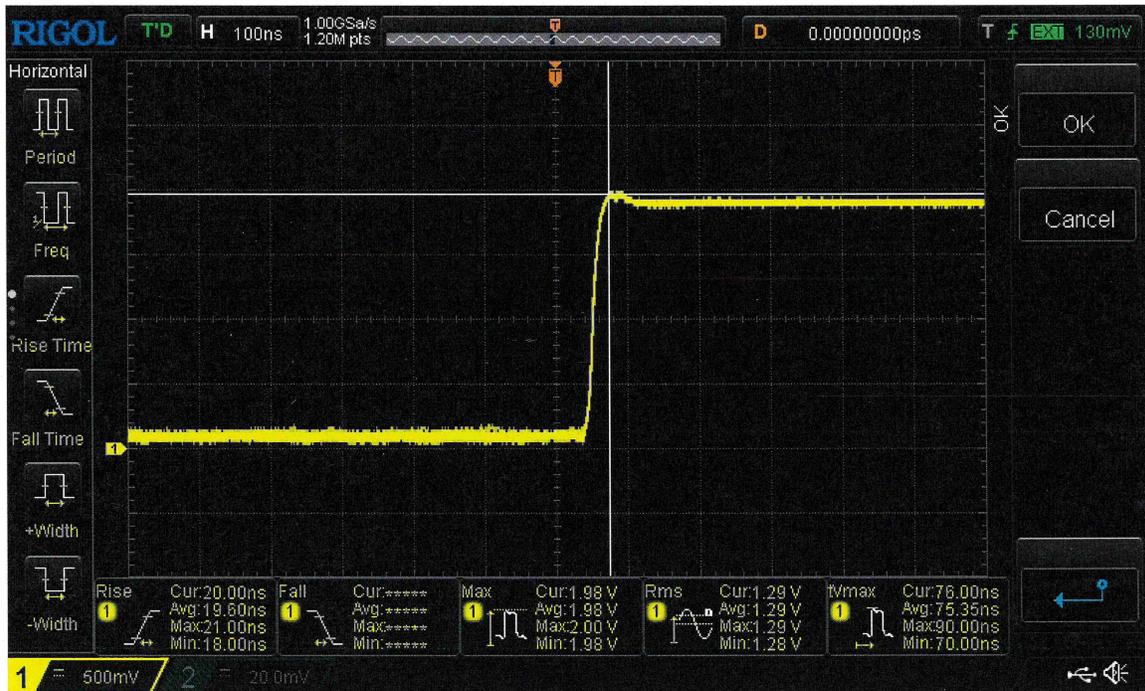


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**SUMMARY TEST DATA
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Rise Time = 19.6 ns

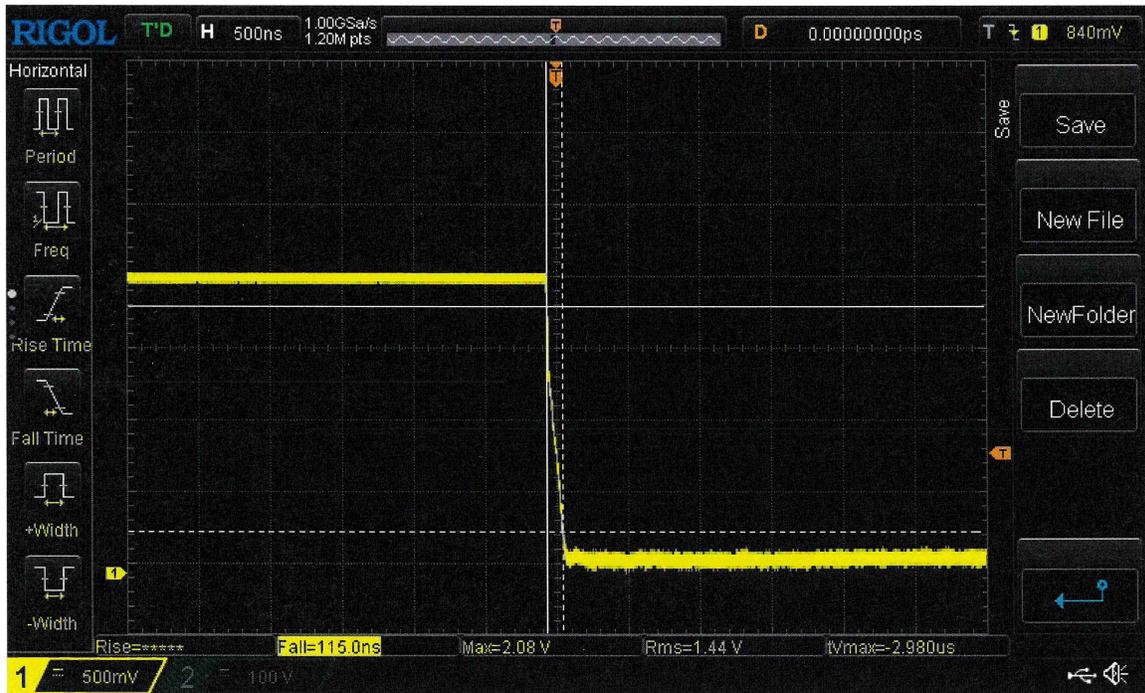


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**SUMMARY TEST DATA
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Fall Time = 115 ns



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